Vernal Pool
Habitat Conservation Plan (VPHCP)
City of San Diego Planning Department

Preliminary Draft
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CITY OF SAN DIEGO

PRELIMINARY DRAFT
CITY OF SAN DIEGO VERNAL POOL HABITAT CONSERVATION PLAN

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GLOSSARY

The following provides a list of terms that are used throughout the VPHCP (and definitions of the terms where appropriate) as well as the acronyms used for abbreviation of certain terms.

Term	Acronym/Definition
California Department of Fish and Wildlife	CDFW
California Department of Transportation	Caltrans
California Endangered Species Act	CESA
California Environmental Quality Act	CEQA
California Native Plant Society	CNPS
California Orcutt grass	ORCA
City of San Diego	City
City of San Diego City Council	City Council
City of San Diego Environmentally Sensitive Lands Regulations	ESL
City of San Diego Multiple Species Conservation Program Subarea Plan	MSCP SAP
City of San Diego Vernal Pool Habitat Conservation Plan	VPHCP
City of San Diego Vernal Pool Management Plan	VPMP
City of San Diego Vernal Pool Monitoring and Management Plan	VPMMP
Clean Water Act	CWA
Vernal Pool Complex	A collection of vernal pools that occur in close proximity, on the same soil series and are typically biogeographically and hydrologically connected
Covered Activities	Activities and uses that will be authorized under the VPHCP and be specifically identified as compatible with the VPHCP.
Covered Projects	Land development projects that will be authorized under the VPHCP and be specifically identified as compatible with the VPHCP.

Term	Acronym/Definition
Covered Species	Those listed species identified in the approved VPHCP to be conserved and managed consistent with the approved VPHCP such that, through approval of the VPHCP, USFWS will authorize their take under Section 10 of the Endangered Species Act.
Environmental Impact Statement	EIS
Environmental Impact Report	EIR
Essential Public Projects	EPP
Federal Endangered Species Act	FESA
Global Positioning System	GPS
Habitat Conservation Plan	HCP; a conservation plan prepared pursuant to Section 10(a)(1)(B) of FESA.
Immigration and Naturalization Service	INS
Implementing Agreement	An agreement that legally binds the permittee to the requirements and responsibilities of a HCP and Section 10 permit. It may assign the responsibility for planning, approving, and implementing the mitigation measures under the HCP.
Incidental Take	Take of any federally listed wildlife species that is incidental to, but not the purpose of, otherwise lawful activities.
Incidental Take Permit	An official certificate, pursuant to Section 10 of the FESA, that authorizes take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.
Listed Species	Those species designated as candidate, threatened, or endangered pursuant to CESA and or listed as threatened or endangered under FESA.
Marine Corps Air Station Miramar	MCAS Miramar
Marine Corp Base Camp Pendleton	MCB Camp Pendleton
Multiple Species Conservation Program	MSCP
Multi-Habitat Planning Area	MHPA
National Environmental Policy Act	NEPA
National Historic Preservation Act	NHPA

Term	Acronym/Definition
Natural Community Conservation Program Plan	NCCP; a conservation plan created pursuant to Fish and Game Code, Section 2801, et seq.
Natural Community Conservation Planning Act	NCCPAR; Fish and Game Code, Section 2800, et seq.
Natural Resource Management Plan	NRMP
Notice of Intent	NOI
Notice of Preparation	NOP
Off highway vehicles	OHV
Otay Mesa mint	PONU
Riverside fairy shrimp	STWO
San Diego button-celery	ERAR
San Diego fairy shrimp	BRSA
San Diego Gas and Electric	SDG&E
San Diego Mesa mint	POAB
Spreading navarretia	NAFO
State Route	SR
Take	Under section 3(18) of FESA, "…to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" with respect to federally listed endangered species of wildlife. Federal regulations provide the same taking prohibitions for threatened wildlife species.
Third Party Beneficiaries	Private entities that receive coverage under the VPHCP
U.S. Army Corps of Engineers	USACOE
U.S. Fish and Wildlife Service	USFWS
USFWS and CDFW, collectively	Wildlife Agencies
VPHCP Planning Units	Geographic planning units for the VPHCP Plan Area (North, Central, and South)
VPHCP Plan Area	VPHCP Plan Area; the geographic areas proposed to be addressed in the VPHCP. Specifically; this refers to the private and City-owned land over which the City of San Diego has land use jurisdiction.
VPMMP	Vernal Pool Management and Monitoring Plan
Vernal Pool Preservation Program	VPPP

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CHAPTER 1
INTRODUCTION

1.1 VERNAL POOL HABITAT CONSERVATION PLAN OVERVIEW

The City of San Diego 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 the City of San Diego (City), while improving and streamlining the environmental permitting process for impacts to threatened and endangered species associated with vernal pools.

In October of 2009, the City and U.S. Fish and Wildlife Service (USFWS) entered into a Planning Agreement for the development of a Habitat Conservation Plan (HCP) covering vernal pool habitats and associated species in the City. The California Department of Fish and Wildlife (CDFW) was named as an advisory agency in the development of the VPHCP. 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 Planning Agreement originally identified eight species for inclusion for in the VPHCP. One of the species, little mouse tail (*Myosurus minimus* ssp. *apus*) was subsequently excluded due to unresolved taxonomic issues. The remaining seven vernal pool species are the focus of, and are being requested for, incidental take coverage under the VPHCP.

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. The vernal pool management and monitoring program will apply within the existing and expanded MHPA.

1.1.1 Purpose and Need

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 lands under the City's jurisdiction contain valuable vernal pool resources. The vernal pools contain species that are protected, or may be protected in the future, under the California Endangered Species Act (CESA) and/or the Federal Endangered Species Act (FESA). Past planning and management activities have provided a significant structure for the long-term conservation, management, and monitoring of these species to avoid the delays of future listing of vernal pool species by the state and federal governments and to avoid costly delays and uncertainty associated with a project-by-project approach toward vernal pool conservation. To this end, the City developed this VPHCP using the requirements of an HCP under Section 10(a)(1)(B) of FESA as the basis for take authorization for the seven covered vernal pools species (i.e., covered species), and as a long-term strategic plan for the protection of vernal pool resources with its jurisdiction. This VPHCP will complement, but be distinct from, the HCP prepared and adopted for the City's MSCP SAP.

Under FESA, an incidental take permit is required when activities may result in "take"[1] of threatened or endangered wildlife. An HCP must accompany an application for an incidental take permit when associated with nonfederal activities. The take prohibition for federally listed plants under FESA is more limited than for listed animals. Section 9(a)(2)(B) prohibits the removal of listed plants or the malicious damage of such plants on areas under federal jurisdiction, or the destruction of listed plants on nonfederal areas in violation of state law or regulation. USFWS may include plants as covered species for purposes of extending federal assurances for them provided that the HCP meets Section 10 issuance criteria and it provides conservation benefits to the covered plant species.

The purpose of the HCP process associated with the permit is to ensure there is adequate minimization and mitigation for the effects of the authorized incidental take of state and federal protected vernal pool resources.

1.1.2 Conservation Goals

The specific conservation goals of the VPHCP, defined by the Planning Agreement, are as follows:

[1] *Take*, as defined by FESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification."

1. Provide for the conservation and management of covered species covered 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 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), and the National Environmental Policy Act (NEPA) within the VPHCP Plan Area (defined in Chapter 2);
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.

These goals will be achieved through implementation of habitat-based and species-specific objectives (detailed in Chapter 6) that are consistent with the USFWS (1998) Recovery Plan for Vernal Pools of Southern California (Recovery Plan).

1.1.3 Conservation Approach

The overall approach to conservation of vernal pools and associated covered Species within the VPHCP Plan Area is as follows. The VPHCP conservation strategy is detailed in Chapter 5.

1. Expand the City's existing MHPA to conserve targeted vernal pool complexes in a configuration that maintains habitat function and viability of the seven covered species within the VPHCP Plan Area, consistent with the Recovery Plan (USFWS 1998);
2. Implement a VPHCP Management and Monitoring Plan to provide for long-term protection, management, and enhancement of vernal pool habitat and the seven covered species;
3. Avoid and minimize impacts to vernal pools and mitigate unavoidable impacts consistent with the VPHCP and the City's Municipal Code;

4. Conduct compliance and effectiveness monitoring of vernal pools and covered species to evaluate implementation of the VPHCP and track the status of the vernal pools and seven covered species; and

5. Where appropriate, introduce covered species into restoration plans to expand/restore species populations in historically occupied complexes to maintain viability of the seven covered species.

1.2 OVERVIEW OF VERNAL POOLS

Vernal pools are seasonal, depression-type wetlands that result from a unique set of physical parameters and support a specific biological assemblage of plant and animal species. Functional vernal pool ecosystems form under specific physical conditions when small, shallow depressions collect precipitation to create a seasonally perched water table. In San Diego County, these basins are generally oval to circular in shape and one to several hundred square feet in size (Zedler 1987). The features occur most often on level ground and are often associated with hillocks known as mima mounds; however, sometimes these wetlands can occur on former landslide areas and are then referred to as "slump" pools. Vernal pools in the City are primarily associated with Huerhuero, Stockpen, Redding, and Olivenhain soil series, and the basins are sealed either by subsurface layers of impervious hardpan, or clay that expands to seal the basin when saturated (Greenwood and Abbot 1980).

These ecosystems are defined by seasonal hydrologic extremes: desiccated pool basins during the dry months followed by variable lengths of saturation and inundation during the rainy season. In southern California, the interannual variation in precipitation augments the inconsistent moisture conditions. This drastic change between vegetated wetland and dry basin defines a vernal pool and separates them from other wetland ecosystems (Zedler 1987).

Although seasonal wetlands are found worldwide, vernal pools sharing physical and biological parameters occur within the Mediterranean climate zone of the western United States, from southern Oregon, to northern Baja California, Mexico. In southern California, remnants of historic vernal pools occur on coastal mesas in the counties of Santa Barbara, Los Angeles, Orange, and San Diego, as well as inland in the San Diego foothills and Riverside basalt terraces.

The VPHCP considers a seasonally flooded depression to be a vernal pool if it includes one or more of the vernal pool indicator species, based on the species identified by the U.S. Army Corps of Engineers (USACE 1997), which are listed in Appendix A. Consistent with the City's Biology Guidelines Attachment II, A.3, depressions which are man-made, such as tire tracks or road ruts, may still be considered vernal pools if they contain at least one indictor plant species.

Road ruts and other seasonal depressions which are not vernal pools may contain wildlife associated with vernal pools, such as San Diego or Riverside fairy shrimp, but will not contain vernal pool plant indicator species. The VPHCP also applies to these man-made road ruts and other seasonal depressions if they contain one or more of the covered species.

For convenience of reference, groups of vernal pools are sometimes referred to as vernal pool complexes that may include two to several hundred individual vernal pools (Keeler-Wolf et al. 1998). Vernal pool complexes are defined as a series of vernal pool groups that are hydrologically connected with similar soil types and species compositions. Within San Diego County, vernal pool complexes were first described and surveyed by Beauchamp and Cass (1979) and subsequently updated in 1986 (Bauder) and 2004 (City of San Diego). Local upland vegetation communities associated with vernal pools include needlegrass grassland, annual grassland, coastal sage scrub, maritime succulent scrub, and chaparral (USFWS 1998). Vernal pool habitat and species are considered sensitive because they have been greatly reduced due to land development, agricultural clearing, and other anthropogenic factors. Within the City, vernal pool complexes are found in the following areas: Del Mar Mesa, Mira Mesa, Carmel Mountain, Rancho Peñasquitos, Torrey Hills, Torrey Highlands, University, Kearny Mesa, Mission Trails Regional Park, East Elliott, Tierrasanta, Serra Mesa, Navajo, Otay Mesa, Otay Lakes, Proctor Valley, and Marron Valley.

A vernal pool series is a set of complexes located in a geographic area that can be related to a particular mesa top or similar geographic area. For example, the “J” series of vernal pools occur on lands in the Otay Mesa community of the City.

A vernal pool complex is a collection of vernal pools that occur in proximity on the same soil series and are typically hydrologically connected. The uses of complexes are a helpful tool for planning and management, but it is recognized that a complex can be subjective. For the VPHCP, all vernal pools have been assigned both a complex identification code and a sub-complex name (e.g., J14, Cal Terraces South).

1.3 PAST AND CURRENT VERNAL POOL RESOURCE PLANNING EFFORTS

Various vernal pool protection efforts have been implemented by the City over the last three decades. Protection mechanisms have increased in effectiveness and efficiency due to improved knowledge of these resources. This VPHCP, while building on previous efforts, is intended to further refine and improve vernal pool preservation strategies in the City with a focus on the seven covered vernal pool species and their habitats.

1.3.1 Vernal Pool Preservation Plan 1980

The Vernal Pool Preservation Program (VPPP) was adopted by the City Council on June 17, 1980 (Council Resolution R-252015), in an effort to balance conservation of the federally endangered San Diego Mesa mint with public and private development concerns. The program developed a framework for protection of representative complexes by prioritizing vernal pool groups according to several factors such as disturbance, site defensibility, and the presence of sensitive species. The ranking system was used by a collaborative decision-making committee to determine regulatory procedures for specific vernal pools. This committee selected certain areas with high-quality vernal pools to be subject to individual Section 404 permits administered by USACE under the Clean Water Act (CWA). Other areas, especially those with low-priority vernal pools, were included in the Section 404 nationwide permit to decrease the difficulty of development. Prior to project approval, all areas were subject to an environmental review process by the City under CEQA, which included mitigation of vernal pool impacts through preservation of resources on-site or contributions to the Vernal Pool Preservation Fund. This fund was designated for the purchase, research, and maintenance of vernal pools and their associated habitat in the City. The VPPP was marginal in its success due to several factors, including lack of oversight on the loss and conservation of vernal pools, single species focus, and continued reliance on project-by-project implementation. While the VPPP's preservation funds were used to purchase and preserve some lands with vernal pools, the area of vernal pools purchased was small compared to the area lost.

1.3.2 Multiple Species Conservation Program 1997

Starting in the early 1990s, the City and the other local jurisdictions included in the City's Metropolitan Wastewater District embarked on the MSCP, which is a multiple species, multi-habitat planning effort for a 900-square-mile area in southwestern San Diego County. The City's MSCP SAP was completed in 1997 and allows the City incidental take for federally and state listed species in exchange for the preservation, management, and monitoring of large, contiguous open space areas. This preserve system, called the MHPA, is a planning zone for core biological resources and corridors targeted for conservation. The type and extent of development allowed within the MHPA is limited. The MSCP and the City's SAP were prepared in conjunction with USFWS and CDFW (herein referred to as the "Wildlife Agencies") to meet the requirements of FESA and the California Natural Community Conservation Planning (NCCP) Act of 1991. Together, these two documents implement the City's portion of the MSCP SAP. The City's permit initially covered 85 species, including the seven vernal pool species addressed in this plan.

In 1998, the City's SAP was subject to a lawsuit regarding coverage of the seven covered species for this VPHCP. In response to the lawsuit, the Ninth Circuit Courts of Appeals issued an injunction in 2006 prohibiting the City from permitting projects that would impact the seven covered species under the City's SAP. After almost 2 years of mediation, the City decided in 2010 to relinquish federal coverage of these seven species under the City's SAP, which rendered the injunction moot. The VPHCP has been proposed to provide complete federal coverage of the seven covered species regardless of whether they are in areas that are inside or outside of USACE jurisdiction.

Although the City's federal permit does not cover the seven vernal pool species, the SAP does provide a Framework Management Plan that identifies both general preserve-wide management guidelines and specific management policies and directives for various preserve segments. The Framework Management Plan includes management consideration and specific directives regarding vernal pools and the seven covered Species. In addition, the City's state NCCP permit is still valid and addresses conservation and take of vernal pool species.

1.3.3 Vernal Pool Inventory 2002–2004

In 2002, the City received funding from the State of California through a USFWS Traditional Section 6 Grant to complete an inventory and management plan of vernal pools with in the City's jurisdiction. The Vernal Pool Inventory (VPI) was built on several previous studies and surveys, which were used to determine the general locations of individual vernal pools, complexes, and series. Beauchamp (1979) and Bauder (1986) covered the greater portion of San Diego County, and represent complexes as polygons. Villasenor and Riggan (1979) and Zedler and Ebert (1979) mapped the boundaries of individual vernal pool basins within Kearny Mesa and Del Mar Mesa, respectively. Much of the City and private lands had never been surveyed for specific vernal pools and, in many cases, historical maps did not accurately represent the existing basins. The VPI did not, however, include vernal pools known to occur on military lands (i.e., Marine Corp Air Station Miramar [MCAS Miramar] and Navy Chollas Heights, which are physically located within the City but not under City jurisdiction).

The VPI project utilized geospatial technology to update information on the location of individual vernal pools and complexes, including documentation of changes in vernal pool distribution due to development and restoration efforts subsequent to Bauder's report (1986). Specialized software combined with a sub-meter global positioning system (GPS) was used to precisely record each basin.2 The inventory expanded and updated existing information and provides the basis for the analysis of vernal pool conservation efforts within the City.

[2] The term basin will be used in this HCP to denote the geographic limits of a vernal pool based upon ponding water, saturated clay soils, and/or vernal pool indicator plant species.

A comprehensive vernal pool survey was completed for areas known or expected to contain vernal pools for which access was permitted. City staff and/or their consultants identified the presence or absence of vernal pool flora and fauna, including the seven covered species being considered for inclusion in the VPHCP. Protocol surveys for the two fairy shrimp species were not conducted.

1.3.4 Updated Vernal Pool Database (2012)

Because of the time elapsed since completion of the VPI, additional information on vernal pools and the seven covered species, including lands not surveyed for the VPI, was then gathered from the Wildlife Agencies' databases and during public scoping meetings for the VPHCP. The resulting database, which includes the best available information for vernal pools and the seven covered species on private and public lands, was analyzed to determine the extent of vernal pool protection, as well as preservation and management needs.

1.3.5 Draft Vernal Pool Management and Monitoring Plan

The historical surveys (Beauchamp 1979; RECON 1979; Bauder 1986), VPI, and updated vernal pool database served as the basis for developing the City's Vernal Pool Management Plan (VPMP) (2012). The primary purpose of the VPMP was to expand on the MSCP Framework Management Plan to provide management strategies, directives, and recommendations for all lands containing vernal pools in the City to preserve and restore their physical function and biotic components, and promote the recovery of associated threatened and endangered species. The VPMP presents management challenges and opportunities for vernal pools at both a general City-wide and a local site-specific scale. The regulatory requirement to comply with the VPMP varies according to the status (e.g., ownership) of a given site and is noted in each site-specific discussion. Existing requirements and recommendations at various scales, such as USFWS Biological Opinions, also are included and referenced in the VPMP.

The VPMP is intended to guide vernal pool management on public and private, preserved and developable lands within the City. The history, issues, requirements, and goals for each site containing vernal pools are provided. The VPMP has been reviewed and updated as part of this VPHCP effort, but is a stand-alone document.

1.3.6 Public Outreach

The purpose of the VPHCP public outreach process is to:

- Inform the public and policy makers that the VPHCP is underway;
- Involve representatives of interested groups and individuals in the planning process; and
- Build a broad base of understanding and support for the VPHCP

The audiences selected for public outreach include all affected parties such as City departments and decision-makers, private property owners, environmental groups, developers, special interest groups, and interested individuals. The development of the VPHCP has included numerous opportunities for public input throughout the process, as listed in Table 1-1.

Table 1-1
VPHCP Public Outreach/Input Opportunities

Public Outreach/Input Opportunity	Date
Initial VPHCP Workshop	January 14, 2011
Initial workshop materials posted on City website with email link for comments	January, 2011
Scoping Meeting	December 12, 2011
Notice of Preparation and Scope of Work distributed for 30-day public review	December 20, 2011
Notice of Issuance distributed for 30-day public review	December 20, 2011
Otay Mesa Community Planning Meeting	February 15, 2012
Otay Mesa Property Owner's Association meeting	March 1, 2012
Second VPHCP Workshop	March 15, 2012
Second workshop materials posted on City website with email link for comments	March/April, 2012
Property Owner's meeting	June 26, 2012
Technical White Papers (TWPs) 1 through 6 posted on City's website with email link for comments	August, 2012
Third VPHCP Workshop	August 30, 2012
Third workshop materials posted on City website with email link for comments	September, 2012

As part of the planning and approval process, additional meetings and opportunities for public input will occur. These include the following:

- Post Administrative Draft VPHCP and updated maps on City of San Diego Planning Department website
- Initiation of proposed Amendments to the General Plan, Kearny Mesa Community Plan, and Otay Mesa Community Plan – City of San Diego Planning Commission hearing
- VPHCP Workshop – City of San Diego Planning Commission hearing
- City of San Diego City Council Committee on Smart Growth and Land Use and
- Wetland Advisory Board meeting
- 60-day Public Review of the Draft VPHCP
- 60-day Public Review of the Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS)
- City of San Diego City Council hearing for the adoption of the VPHCP

1.4 REGULATORY REQUIREMENTS

1.4.1 Federal Endangered Species Act

FESA provides for the protection and conservation of fish, wildlife, and plants that have been federally listed as threatened or endangered. Activities otherwise prohibited by Section 9 of FESA are subject to entities pursuant to the requirements of Section 7 of FESA and for other persons pursuant to Section 10 of FESA. Section 9 prohibits the "removal or reduction to possession" of any listed plant species "under federal jurisdiction" (i.e., on federal land, where federal funding is provided, or where federal authorization is required). Even though under FESA there is no prohibition for take of plants on nonfederal lands, this VPHCP includes many covered plants. Some plants are covered to meet regulatory obligations under FESA Section 7 and to comply with CESA. Incidental take authorization is also requested for plants to provide no-surprises assurances for these species (see Chapter 9).

Section 10(a)(2)(A) of FESA states that no permit may be issued authorizing any taking referred to in Section 10(a)(1)(B) unless the applicant (in this case, the City) submits to the Secretary of the Interior an HCP that specifies:

1. The impact that will likely result from such taking;
2. What steps the applicant will take to minimize and mitigate such impacts, and the funding that will be available to implement such steps;
3. What alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized; and
4. Such other measures that the Secretary may require as being necessary or appropriate for purposes of the plan.

Under Section 10(a)(2)(B) of FESA, USFWS may permit the incidental take of species only after finding that the HCP meets the following issuance criteria:

- The taking will be incidental;
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
- The applicant will ensure that adequate funding for the plan will be provided;
- The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and

- Other measures, if any, which USFWS requires as being necessary or appropriate for purposes of the plan will be met.[3]

The VPHCP is intended to meet all regulatory requirements necessary for USFWS to issue a Section 10(a)(1)(B) permit to allow incidental take of the two fairy shrimp species as a result of covered activities undertaken by the City.

In June 2000, USFWS adopted a five-point policy initiative designed to clarify elements of the HCP program as they relate to measurable biological goals, adaptive management, monitoring, permit duration, and public participation. The VPHCP satisfies the goals and objectives of the five-point policy as described below.

Biological Goals and Objectives

HCPs must include biological goals and objectives that set out specific measurable targets that the plan is intended to meet. These targets are based on the best scientific information available and are used to guide conservation strategies for species covered by the VPHCP. Specifically, the biological goals and objectives of the VPHCP are described in Chapter 6. Both habitat-based and species-specific objectives have been identified that will achieve the biological goal to "contribute to the recovery and ensure continued persistence of the VPHCP covered vernal pool species populations." As stated in the USFWS Five-Point Policy, the biological goals of an individual HCP are not necessarily equivalent to the range-wide recovery goals and conservation of a species. However, if viewed collectively, an HCP's biological goals and objectives should support the recovery goals and conservation for a species (USFWS 2000). In the case of the City's VPHCP, the goals and objectives are specific conservation and management of the covered species populations within the City's jurisdiction because the City does not have jurisdiction over the entire distribution range for any of the covered species.

Adaptive Management

The five-point policy encourages the development of adaptive management plans as part of the HCP process under certain circumstances. Adaptive management provides a means to address biological uncertainty and to devise alternative strategies for meeting biological goals and objectives. Adaptive management is important in instances where significant data or information gaps exist, particularly with respect to the ecology of the species or its habitat, habitat or species management techniques, or the potential effect of an activity on covered species. The framework for an adaptive management program for the VPHCP is set forth in Chapter 7. As discussed

[3] 16 U.S.C. § 1539(a)(2)(B)(2010).

throughout Chapter 7, there is inherent uncertainty in the available scientific data and understanding of covered species population ecology. It is expected that, over time, as additional research is conducted and data are collected on the covered species in the City, the management program (triggers and/or actions) can and will be adjusted to reflect new information and understanding of population function and dynamics. For example, it is anticipated that the methods for management of fairy shrimp will be modified over time as additional understanding is obtained regarding hybridization.

Monitoring

Monitoring is a mandatory element of all HCPs under the five-point policy. The VPHCP will institute a monitoring program to gauge the effectiveness of the plan in meeting the biological goals and objectives and to verify that the minimization and mitigation measures identified in the plan are being properly implemented. The biological and compliance monitoring provisions of the VPHCP are found in Chapter 7. The monitoring program in the VPMP has been developed to gather the information necessary to determine if the standards are being met and, if not, directives are provided to adjust management actions so that the standards are achieved. The monitoring program will allow the City to track compliance with the VPHCP on an annual basis, and make adjustments in management according to monitoring observations so that the VPHCP goal and objectives are achieved.

Permit Duration

Under the five-point policy, several factors are used to determine the duration of an incidental take permit, including the timeframe of the City's proposed activities and the expected positive and negative effects on covered species associated with the proposed duration. In addition, USFWS considers the level of scientific and commercial data underlying the proposed operating conservation program, the length of time necessary to implement and achieve the benefits of the operating conservation program, and the extent to which the program incorporates adaptive management strategies. The duration of the permit issued under the VPHCP is anticipated to be consistent with the City's MSCP permit, which expires in 2047.

Public Participation

Under the five-point policy guidance, USFWS sought to expand public participation in the HCP process to provide greater opportunity for the public to assess, review, and analyze HCPs and associated NEPA documentation. As part of this effort, USFWS has expanded the public review process for most HCPs. The VPHCP process has provided extensive opportunities for public involvement and input during development, as described in Section 1.3.6.

1.4.2 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (16 United States Code [U.S.C.] 470 et seq.), requires federal agencies to take into account the effects of their actions proposed on properties eligible for inclusion in the National Register of Historic Places. "Properties" are defined as "cultural resources," which includes prehistoric and historic sites, buildings, and structures that are listed on or eligible to the National Register of Historic Places. An undertaking is defined as a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; those requiring a federal permit, license or approval; and those subject to state or local regulation administered pursuant to a delegation or approval by a federal agency. The issuance of an incidental take permit is an undertaking subject to Section 106 of the NHPA. The USFWS has determined that the area of potential effects for the present undertaking is that area where on-the-ground project activities will result in take of species. The NHPA and the potential effects of the conservation strategy on resources subject to the NHPA are discussed in detail in the EIR/EIS.

1.4.3 National Environmental Policy Act and California Environmental Quality Act

NEPA was enacted by Congress in 1969 to ensure that federal agencies consider the environmental impacts of their actions and decisions. NEPA requires the federal government to use all practicable means and measures to protect environmental values and makes environmental protection a part of the mandate of every federal agency and department. NEPA requires analysis and a detailed statement of the environmental impact of any proposed federal action that significantly affects the quality of the human environment.

CEQA (California Public Resources Code, Section 21000 et seq.) requires the preparation of an EIR for any project that a lead agency determines may have significant impact on the environment. According to Section 21002.1(a) of the CEQA statutes, "The purpose of an environmental impact report is to identify the significant effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided." CEQA also establishes mechanisms whereby the public and decision makers can be informed about the nature of the project being proposed, and the extent and types of impacts that the project and its alternatives could have on the environment if they were to be implemented.

A joint EIS and EIR in accordance with NEPA and CEQA (14 California Code of Regulations [CCR] 15000 et seq.) has been prepared for this VPHCP and is incorporated by reference herein. The EIR/EIS (1) identifies the purpose and need for a federal Section 10(a)(1)(B) permit; (2)

describes the environment that would be affected by the proposed VPHCP; (3) discusses alternatives considered; (4) describes plans to mitigate impacts to federally listed species and their habitats; and (5) identifies possible environmental consequences of the proposed VPHCP and mitigation measures.

1.5 INCIDENTAL TAKE PERMIT

The City and all its departments, except for Real Estate Assets Department (READ) Airport Division, as well as private and public organizations that receive discretionary permits from the City, shall be beneficiaries of the VPHCP and its corresponding incidental take permit once executed. Other local and state jurisdictions are not provided any beneficiary status under this VPHCP unless they voluntarily subject themselves to the City's land entitlement and permitting process. Non-City entities that receive incidental take authorization through the City shall be referred to as Third-Party Beneficiaries.

CHAPTER 2
VERNAL POOL HCP PLAN AREA

This chapter presents a description of the VPHCP Plan Area including acreage, land use, and number of vernal pools.

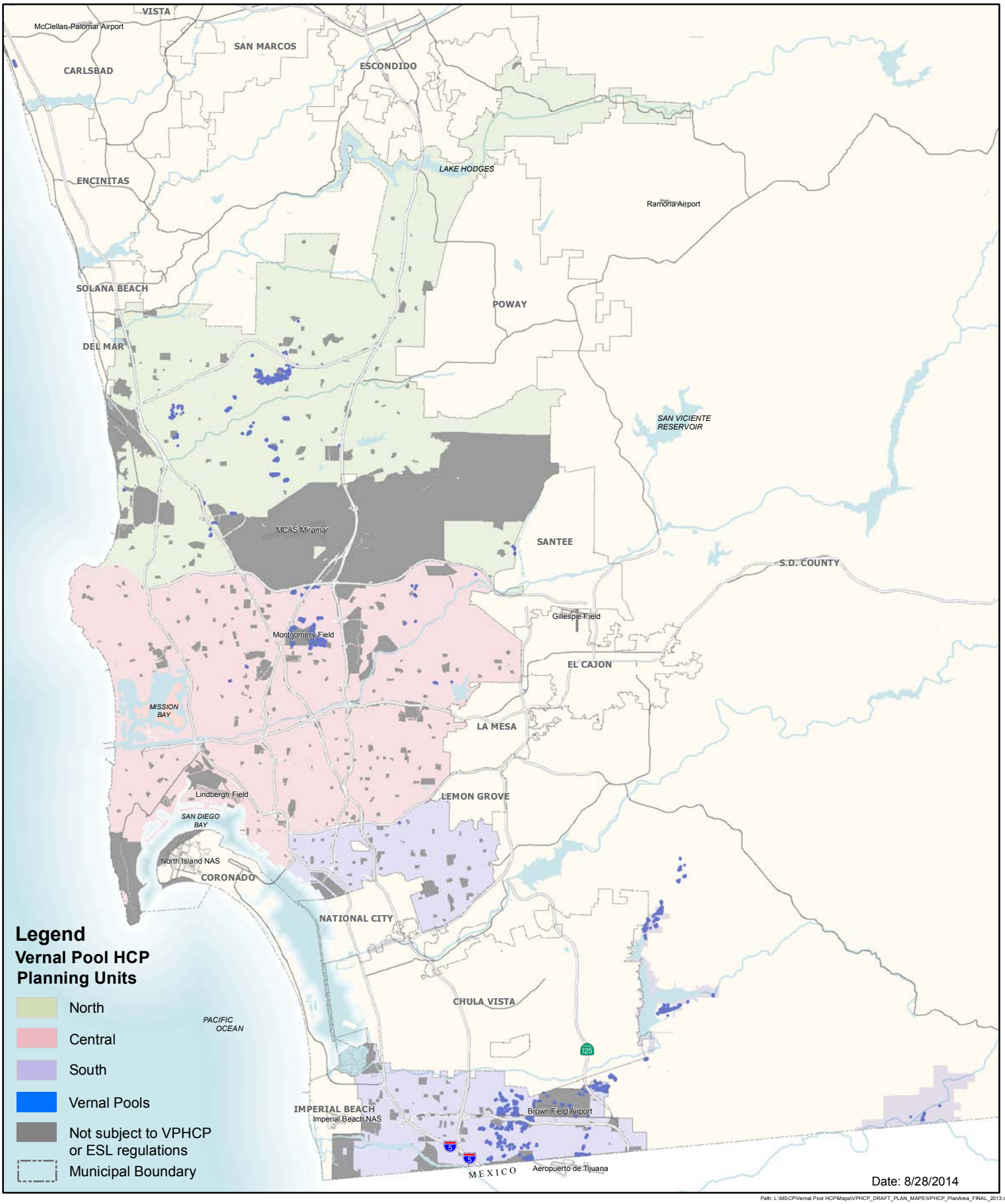
2.1 OVERVIEW OF VPHCP PLAN AREA

The VPHCP Plan Area is the geographical extent of land that will be included in the VPHCP and for which the protections provided under the VPHCP are afforded to the seven covered species. The VPHCP Plan Area includes lands subject to the City's jurisdiction within the jurisdictional boundary of the City, as well as three areas owned by the City's Public Utilities Department in the unincorporated portion of San Diego County. The VPHCP Plan Area also includes conserved lands within the City that are under the ownership of USFWS and CDFW. The VPHCP Plan Area's extent is, by design, the same area covered by the City's MSCP SAP; however, the VPHCP is a separate but complementary conservation plan for vernal pools and the seven covered species not covered under the City's federal permit for the MSCP SAP.

Figure 2-1 depicts the VPHCP Plan Area. The VPHCP Plan Area encompasses 206,124 acres in the southwestern portion of the County. The VPHCP Plan Area is characterized by urban land uses covering approximately 55.4% (Tables 2-1, 2-3, and 2-5) of the area with the remainder as open space/park system or undeveloped vacant land. The 2010 population within the VPHCP Plan Area was approximately 1.37 million (SANDAG 2011).

Appendix B includes detailed information for each vernal pool complex within the VPHCP Plan Area, including:

- Complex name
- Planning Unit (North, Central, or South; refer to Section 2.2)
- Location inside or outside the VPHCP Plan Area
- Total number of pools within the complex
- Land Ownership
- Surface area of vernal pools within the complex
- Underlying soils
- Presence of covered species critical habitat
- Number of vernal pools occupied by each covered species



THE CITY OF SAN DIEGO

Note:
Vernal pool symbols on this map have been enlarged to help identify their locations and are not to scale and do not represent the exact limits of the vernal pool basins.

N

0 7,700 15,400 23,100 Feet

SanGIS

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Figure 2-1
Vernal Pool HCP Plan Area

Certain lands included within the jurisdictional boundary of the City are not under the local land use jurisdiction of the City. These lands include, but are not limited to, school districts, military lands, other federal properties, and state lands. The regulatory requirements of the VPHCP are not applicable to lands not under the land use jurisdiction of the City. For reference, vernal pools that occur on lands that are not subject to the City's land use jurisdiction (i.e., outside the VPHCP Plan Area) are also included in Appendix B. However, these pools will not be discussed further in this VPHCP.

In certain areas, the VPHCP Plan Area overlaps with the plan areas for the San Diego Gas & Electric (SDG&E) and/or San Diego County Water Authority (SDCWA) HCPs. Due to the small scale of the SDG&E and SDCWA right-of-ways (ROWs), the City is unable to identify vernal pools that overlap with these utility ROWs and, therefore, the overlapping vernal pools are mapped in the VPHCP Plan Area. However, for this small subset of pools that occur in utility ROWs, the HCPs for those utilities (SDG&E or SDCWA) would apply. Additionally, the City owns and operates Brown Field Municipal Airport in Otay Mesa and Montgomery Field Airport in Kearny Mesa. The VPHCP conservation analysis only includes vernal pools that have been conserved at these locations (i.e., environmental baseline). All development and operational activities at the airports are subject to Federal Aviation Administration (FAA) jurisdiction and any loss of vernal pool resources would not be permitted under the VPHCP.

Within the VPHCP Plan Area, many vernal pool complexes have been subject to enhancement and restoration activities as mitigation for approved projects within the City. Of the 58 vernal pool complexes within the VPHCP Plan area, the majority have had some type of restoration and/or enhancement. Restoration and enhancement activities may have included, but are not limited to, access control, erosion control, weed control, seed bank reestablishment, and upland habitat improvements to provide watershed protection and to attract pollinators of covered species. An important component of the VPHCP conservation strategy is the restoration and enhancement activities proposed for the remaining degraded vernal pools as detailed in Chapter 5. Implementation would be via the VPHCP Management and Monitoring Plan (see Chapter 7).

Based upon over 30 years of vernal pool studies in San Diego (Beauchamp and Cass 1979, Bauder 1986, City of San Diego 2004, and others) all major vernal pool complexes have been identified and no new complexes are likely to be located in the City. However; vernal pools are highly affected by interannual variability of precipitation. It is understood that vernal pool basins may not fill up during dry years, and some pools may combine together into one large pool during wet years. As such, the number of mapped vernal pools within the VPHCP Plan Area is representative of data collected over multiple years from multiple sources and is not necessarily an absolute value during any given year.

2.2 VPHCP PLANNING UNITS

For planning and management purposes, the VPHCP Plan Area is divided into three "planning units": North, Central, and South. These planning units were selected for convenience of management due to the proximity of vernal pools within each unit.

The following sections describe the North, Central, and South planning units of the VPHCP (Figures 2-2 through 2-4). Each section includes a description of the planning unit, including the number of vernal pools.

2.2.1 North Planning Unit

Figure 2-2 (located at the end of this chapter) depicts the North VPHCP planning unit, which includes the City jurisdiction north of State Route (SR) 52. Mesa tops containing vernal pools in this area include Carmel Mountain, Del Mar Mesa, and Mira Mesa. In addition, a small area of pools is located on the coastal bluffs. This planning unit contains tracts of interconnected existing and planned open space, interlaced with urban development.

Table 2-1 includes acreage of generalized land use category within the North VPHCP planning unit. This planning unit includes 110,891 acres, or 48%, of the total VPHCP Plan Area. Approximately 43% of the land use within the North VPHCP planning unit is categorized as urban and 57% as open space.

Table 2-1
Existing Land Use and Land Cover in North VPHCP Planning Unit

Generalized Land Use	Acreage	% of Total
Residential	17,677	16
Commercial	2,411	2
Industrial	5,331	5
Other	18,907	17
Conserved Natural Lands	22,350	20
Lands Planned for Conservation	25,459	23
Agriculture	3,833	3
Active Parks	942	1
Vacant	8,696	8
Water	2,150	2
Total North Planning Unit	**110,891**	**100%**

Source: SANDAG Land Use Database
Note: The "other" category includes developed land uses not specified above, such as public or institutional uses including schools, hospitals, and road ROWs.

THE CITY OF SAN DIEGO

VPHCP Conservation Analysis Planning Unit North

DRAFT

Date: 12/12/2014

Vernal Pools

Note:
Vernal pool symbols on this map have been enlarged to help identify their locations and are not to scale and do not represent the exact limits of the vernal pool basins

Not subject to VPHCP or ESL regulations

Municipal Boundary

Baseline Conservation
Conservation Level

100

75 - 99

Note:
The Baseline Conservation is defined as the MHPA boundary plus conserved lands, approved projects, projects with approved USFWS Biological opinions, and/or pipeline projects(ie.,in a stage of project approval where conservation and loss of lands have been determined).

VPHCP Conservation Level

100

75 - 99

Note:
The VPHCP Conservation builds on the Baseline Conservation. It includes all areas in Baseline Conservation plus additional selected lands.

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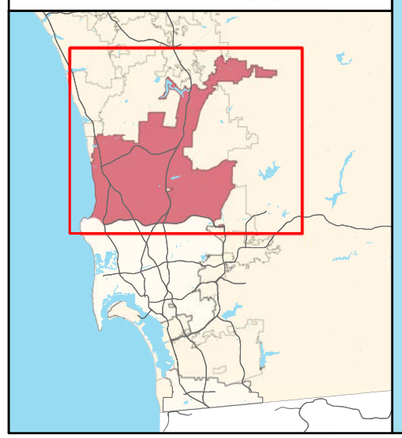

SAN MARCOS
CARLSBAD
ESCONDIDO
ENCINITAS
LAKE HODGES
Ramona Airport
SOLANA BEACH
POWAY
DEL MAR
S.D. COUNTY
SAN VICIENTE RESERVOIR
PACIFIC OCEAN
MCAS Miramar
SANTEE
EL CAJON
Gillespie Field

Figure 2-2

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THE CITY OF SAN DIEGO

VPHCP Conservation Analysis Planning Unit Central

DRAFT

Date: 12/12/2014

Vernal Pools

Note:
Vernal pool symbols on this map have been enlarged to help identify their locations and are not to scale and do not represent the exact limits of the vernal pool basins

Not subject to VPHCP or ESL regulations

Municipal Boundary

Baseline Conservation Conservation Level

100

75 - 99

Note:
The Baseline Conservation is defined as the MHPA boundary plus conserved lands, approved projects, projects with approved USFWS Biological opinions, and/or pipeline projects(ie.,in a stage of project approval where conservation and loss of lands have been determined).

VPHCP Conservation Level

100

75 - 99

Note:
The VPHCP Conservation builds on the Baseline Conservation. It includes all areas in Baseline Conservation plus additional selected lands.

N

0 2,000 4,000 6,000 Feet

MCAS Miramar
SANTEE
Gillespie Field
Montgomery Field
EL CAJON
LAKE MURRAY
LA MESA
MISSION BAY
PACIFIC OCEAN
Lindbergh Field
SAN DIEGO BAY
LEMON GROVE
North Island NAS
CORONADO
S.D. COUNTY
SWEETWATER RESERVOIR
NATIONAL CITY

Figure 2-3

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THE CITY OF SAN DIEGO

VPHCP Conservation Analysis Planning Unit South

DRAFT

Date: 1/6/2015

Vernal Pools

Note:
Vernal pool symbols on this map have been enlarged to help identify their locations and are not to scale and do not represent the exact limits of the vernal pool basins

Not subject to VPHCP or ESL regulations

Municipal Boundary

Baseline Conservation Conservation Level

100

75 - 99

Note:
The Baseline Conservation is defined as the MHPA boundary plus conserved lands, approved projects, projects with approved USFWS Biological opinions, and/or pipeline projects(ie.,in a stage of project approval where conservation and loss of lands have been determined).

VPHCP Conservation Level

100

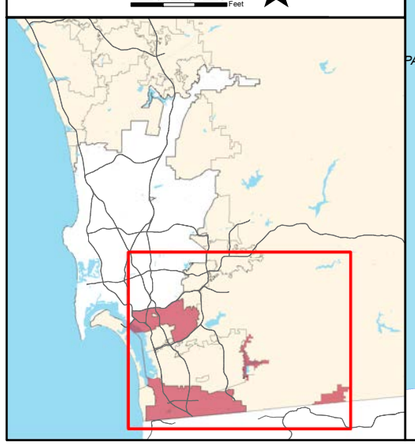
75 - 99

Note:
The VPHCP Conservation builds on the Baseline Conservation. It includes all areas in Baseline Conservation plus additional selected lands.

SanGIS

N

0 2,100 4,200 6,300 Feet



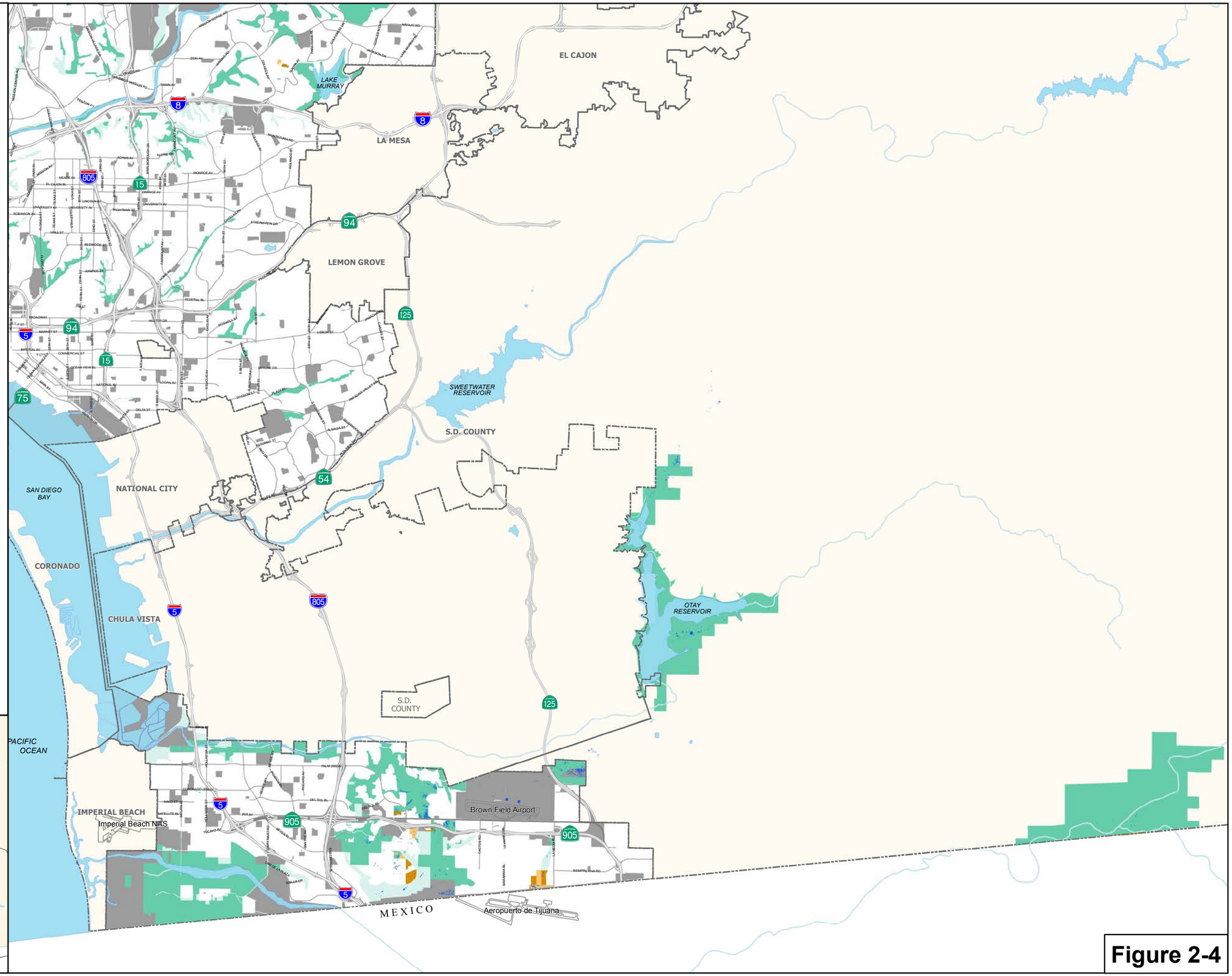


Figure 2-4

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Table 2-2 lists the vernal pools that occur within the North VPHCP planning unit. Vernal pools are listed by series name, complex names within each series, and site names within each complex. As shown in Table 2-3, 913 vernal pools exist within the North VPHCP planning unit.

The North VPHCP planning unit contains vernal pools within the B, C, D, H, I, N, O, Q, and X vernal pool complex series (refer to Chapter 1 for a definition of vernal pool complex series). Vernal pool soils include clay and fine, coarse, sandy, and cobbly loam soil from the Carlsbad, Chesterton, Huerhuero loam, Redding, Diablo-Olivenhain, and Terrace escarpment soil series.

Vernal pool resources are present in varying conditions within the North VPHCP planning unit. Carmel Mountain is owned by the City with the exception of two private in holdings. A few vernal pools also occur south of Carmel Mountain near the SDG&E electrical substation. Del Mar Mesa is split among various public agencies, including the City, CDFW, and USFWS. Each of these entities has mandates that direct their management of open space preserves. Del Mar Mesa also is part of the San Diego National Wildlife Refuge Vernal Pool Complex. Mira Mesa is predominately developed, but some vernal pools remain on isolated parcels throughout the mesa. Additional vernal pool areas that occur within the North VPHCP planning unit include pools adjacent to the Salk Institute in La Jolla and on the City's eastern boundary, adjacent to the City of Santee.

Table 2-2
Vernal Pool Resources in North VPHCP Planning Unit

Series Name **Complex Name** Site Name	**Total Pools**
B Total	**64**
B11	**44**
Mesa Norte	44
B5	**1**
Tierra Alta	1
B6	**1**
Lopez Ridge (CDFG)	1
B7-8	**17**
Crescent Heights	7
Lopez Ridge (City)	10
C Total	**10**
C17-18	**9**
Fieldstone	9
C27	**1**
Mira Mesa Market Center	1
D Total	**123**
D5-8	**123**
Carroll Canyon	119
Parkdale Carroll Canyon	4

Series Name **Complex Name** Site Name	**Total Pools**
H Total	**596**
H1-10, 13-15, 18-26	**483**
Del Mar Mesa (City/County)	92
Del Mar Mesa (Private)	5
Del Mar Mesa (State/Federal)	246
Rhodes	140
H17	**28**
Shaw Lorenz	28
H33	**2**
East Ocean Air Drive	2
H38	**64**
Carmel Mountain	64
H39	**19**
Greystone Torrey Highlands	19
I Total	**64**
I1	**34**
Arjons	34
I12	**7**
Pueblo Lands	7
I6 B	**8**
Ford Leasing (Bob Baker)	8
I6 C	**15**
Facilities Development (Eastgate Miramar Assoc.)	15
N Total	**2**
NC N	**2**
Li Collins	2
O Total	**15**
OO	**15**
Salk Institute	15
Q Total	**9**
Q3	**9**
Castlerock	9
X Total	**39**
X5	**11**
Nobel Drive	11
X7	**28**
Nobel Research	28
Grand Total North Planning Unit	**922**

Source: City of San Diego Vernal Pool Inventory Database 2012

2.3.2 Central VPHCP Planning Unit

Figure 2-3 (located at the end of this chapter) depicts the Central VPHCP planning unit, which is located generally south of SR 52 and north of SR 94. Mesa tops that support vernal pools in this planning unit include Clairemont Mesa, Kearny Mesa, and Serra Mesa. Vernal pools are also found in portions of Mission Trails Regional Park.

Table 2-3 lists acreage by generalized land use category. The Central VPHCP planning unit includes 81,296 acres, or 35%, of the total VPHCP Plan Area. Approximately 70% of the land use within the Central VPHCP planning unit is categorized as urban and 30% as open space. With the exception of Mission Trails Regional Park, the majority of this planning unit is heavily urbanized.

Table 2-3
Existing Land Use and Land Cover in Central VPHCP Planning Unit

Generalized Land Use	Acreage	% of Total
Residential	25,101	31
Commercial	3,974	5
Industrial	2,273	3
Other	24,168	30
Conserved Natural Lands	8,485	10
Lands Planned for Conservation	4,871	6
Agriculture	14	0
Active Parks	1,996	2
Vacant	1,685	2
Water	7,337	9
Total Central Planning Unit	**81,296**	**100%**

Source: SANDAG Land Use Database
Note: The "other" category includes developed land uses not specified above, such as public or institutional uses including schools, hospitals, and road ROWs.

The Central VPHCP planning unit contains 459 mapped vernal pools (Table 2-4). Vernal pools in the Central VPHCP planning unit occur within the F, K, N, Q, and U vernal pool complex series. Vernal pool soils include clay and fine, coarse, sandy, and cobbly loam soil from the Bosanko, Chesterton, Diablo, Huerhuero, Olivenhain, Redding, Tujunga, and Visalia sand series.

Vernal pool resources are present in varying conditions within the Central VPHCP planning unit. Mission Trails Regional Park contains high quality pools in two locations within the park. Several vernal pool series continue to persist in Kearny Mesa south of SR 52 on property owned by the City and under private ownerships. Large concentrations of vernal pools occur on Montgomery Field municipal airport and on isolated private parcels near the airport. Smaller locations of vernal pools occur in the Central VPHCP planning unit near Lake Murray and Tecolate Park.

Table 2-4
Vernal Pool Resources in Central VPHCP Planning Unit

Series Name Complex Name Site Name	Total Pools
F Total	**14**
F16-17	**14**
Menlo KM Parcel	14
K Total	**11**
KK1	**1**
Lake Murray	1
KK2	**10**
Pasatiempo	10
N Total	**340**
N1-4	**43**
Teledyne Ryan	43
N5-6	**249**
Montgomery Field	249
N7	**26**
Serra Mesa Library	26
N8	**22**
General Dynamics	22
Q Total	**26**
Q2	**17**
Mission Trails Regional Park	17
QQ	**9**
Tecolote Canyon	9
U Total	**68**
U15	**39**
SANDERS	39
U19	**29**
Cubic	29
Grand Total	**459**

Source: City of San Diego Vernal Pool Inventory Database 2012

2.3.3 South VPHCP Planning Unit

Figure 2-4 (at the end of this chapter) depicts the South VPHCP planning unit, which is located generally south of SR 94, and north of the international border between the United States (U.S.) and Mexico. Areas containing vernal pools include Otay Mesa, Proctor Valley, Otay Lakes, and Marron Valley.

Table 2-5 shows acreage by generalized land use category for the South VPHCP Planning Unit. The South VPHCP planning unit includes 38,742 acres, or 17%, of the total VPHCP Plan Area. Approximately 53% of the land use within the South VPHCP planning unit is categorized as urban and 47% as open space.

Table 2-5
Existing Land Use and Land Cover in South VPHCP Planning Unit

Generalized Land Use	Acreage	% of Total
Residential	9,103	24
Commercial	693	2
Industrial	1,904	5
Other	8,692	22
Conserved Natural Lands	10,157	26
Lands Planned for Conservation	2,125	5
Agriculture	681	2
Active Parks	420	1
Vacant	2,754	7
Water	1,994	5
Total South Planning Unit	**38,742**	**100%**

Source: SANDAG Land Use Database
Note: The "other" category includes developed land uses not specified above, such as public or institutional uses including schools, hospitals, and road ROWs.

The South VPHCP planning unit includes the majority of the vernal pools in the VPHCP Plan Area. Table 2-6 lists the 1,105 mapped vernal pool resources in the South planning unit. The South VPHCP planning unit contains vernal pools within the J, K, M, N, and R vernal pool complex series. Vernal pool soils include clay and fine, coarse, sandy, and cobbly loam soil from the Diablo, Gravel, Huerhuero, Linne, Olivenhain, Redding, San Miguel, Stockpen, and Visalia sand series.

The Otay Mesa community in this planning unit contains the largest tracts of vernal pools that have been conserved and restored.

Otay Mesa also contains the largest area of vernal pool resources that still retains development potential. Multiple private property owners control areas of vernal pool resources, especially south of SR 905 where planned urban development has not yet occurred. Vernal pools located on the mesa to the west of Spring Canyon and along the drainage swale adjacent to La Media Road are notable examples of vernal pool resources. In addition, vernal pool resources are located on Brown Field Metropolitan Airport, which is owned and operated by the City.

Table 2-6
Vernal Pool Resources in South VPHCP Planning Unit and Preserve

Series Name **Complex Name** Site Name	**Total Pools**
J Total	**875**
J11 E	**2**
Slump Block Pools	2
J11 W	**5**
J11W	5
J12	**5**
J12	5
J13 E	**8**
South Otay J13E	8
J13 N	**37**
NDU 1 & 2	13
South Otay 1 acre (City)	17
South Otay 1 acre (Private)	7
J13 S	**45**
Bachman	2
NDU 1 & 2	4
South Otay J13S	39
J14	**105**
Anderprises (City)	2
Bachman	2
Brown Field Basins	4
Cal Terraces (South)	73
Handler	24
J16-18	**23**
Goat Mesa	15
Goat Mesa (Private)	2
Wruck Canyon	6
J2	**363**
Cal Terraces (North), Otay Mesa Road Parcels	304
Clayton Parcel	35
St. Jerome's	24
J20-21	**33**
La Media ITS	33
J21	**7**
La Media Swale South	7
J27	**10**
Empire Center	10
J28 E	**5**
La Media Swale North	5
J31	**66**
Hidden Trails	66
J32	**25**
West Otay A	3
West Otay B	15
West Otay C	7
J34	**25**
Bachman	15
Candlelight	10

Series Name **Complex Name** Site Name	**Total Pools**
J35	**3**
Brown Field	3
J36	**17**
Southview	17
J4-5	**94**
California Crossings	11
Robinhood Ridge	83
K Total	**85**
K5	**85**
Otay Lakes	85
M Total	**18**
MM1	**18**
Marron Valley	18
N Total	**3**
NC S	**3**
Kelton	3
R Total	**124**
R1	**124**
Proctor Valley	124
Grand Total	**1,105**

Source: City of San Diego Vernal Pool Inventory Database 2012

Proctor Valley, Otay Lakes, and Marron Valley are owned and managed by the City's Public Utilities Department. These areas have been obligated as open space as part of the MSCP Cornerstone Lands Bank Agreement and are included in the MHPA (City of San Diego 1997). Vernal pools in all three locations have received varying levels of enhancement. Otay Lakes has limited public access and contains some of the largest pools in the VPHCP. Until recently, Proctor Valley encountered high disturbance levels due to illegal off-highway vehicles (OHVs). Recent signage and fencing have reduced these activities. Proctor Valley is currently being restored to repair the historic damage of OHV use. Marron Valley is isolated from public access with the biggest threat being frequent fires and errant grazing by cattle crossing from Mexico. The Marron Valley pools have been signed, fenced, and enhanced.

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CHAPTER 3
COVERED SPECIES

This chapter presents a biological description of the seven VPHCP covered species (covered species). It includes a summary of the life cycle, distribution, and status of each species within the VPHCP Plan Area. Detailed information on the covered species by vernal pool complex is included in Appendix B.

Table 3-1 summarizes the total number of vernal pools occupied with each of the seven covered species within the VPHCP Plan Area. A discussion of each covered species is provided in the sections that follow.

Table 3-1
Vernal Pools Occupied with Covered Species in VPHCP Plan Area

Covered Species	Total Occupied Pools	Number of Complexes with Occupied Pools
San Diego fairy shrimp	488	35
Riverside fairy shrimp	131	6
San Diego button-celery	733	20
Spreading navarretia	96	8
San Diego Mesa mint	339	16
California Orcutt grass	58	3
Otay Mesa mint	369	4

3.1 SAN DIEGO FAIRY SHRIMP

3.1.1 Species Biological Description

San Diego fairy shrimp is a small aquatic crustacean in the family Branchinectidae, in the order Anostraca. San Diego fairy shrimp were described by Fugate in 1993 and have been found in coastal areas of Santa Barbara, Los Angeles, Riverside, and San Diego counties, and northwestern Baja California, Mexico (USFWS 2008a).

This species is restricted to vernal pools and other nonvegetated ephemeral pools from 2 to 12 inches in depth. The San Diego fairy shrimp is similar in appearance to the versatile fairy shrimp (*Branchinecta lindahli*) (Fugate 1993), which is native to and commonly found throughout western North America (Eng et al. 1990; Simovich 1998).

The life cycle of San Diego fairy shrimp is dependent on the changing hydrologic conditions of the vernal pool. The species cannot persist in perennial water bodies because the rewetting of the dried cysts is one component of a set of environmental stimuli that trigger hatching (Eriksen and Belk 1999). San Diego fairy shrimp are usually observed January through March when seasonal rainfall fills vernal pools and initiates cyst hatching. Individuals hatch and mature within 7 to 14 days of rainfall filling a pool, depending on water temperature (Simovich and Hathaway 1996). This hatching period may be extended in years with early or late rainfall.

The cysts from successful reproduction are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks. The cysts are capable of withstanding temperature extremes and prolonged drying. Only a portion of the cysts may hatch when the pools refill in the same or subsequent rainy seasons. Therefore, cyst "banks" develop in pool soils that are composed of the cysts from several years of breeding. This partial hatching of cysts allows the San Diego fairy shrimp to persist in its extremely variable environment, since pools commonly fill and dry before hatched individuals can reproduce. If all cysts hatched during an insufficient filling, the species could be extirpated from a pool (Philippi et al. 2001; Simovich 2005; Simovich and Hathaway 1996). The ability of San Diego fairy shrimp to develop and maintain cyst banks is vital to the long-term survival of the species (Ripley et al. 2004; Simovich 2005).

For more information on the life history of this species and additional references, refer to the USFWS 5-year review (USFWS 2008a).

3.1.2 Listing Status

San Diego fairy shrimp was federally listed as endangered on February 3, 1997 (62 Federal Register [FR] 4925). San Diego fairy shrimp was listed in 1997 primarily due to the threat of development throughout the range of the species. At the time of listing, it was estimated that 90 to 97% of its historical habitat in San Diego County had been destroyed (Bauder 1986; Oberbauer and Vanderwier 1991; Keeler-Wolf et al. 1995) and that similar declines had occurred elsewhere (Keeler-Wolf et al. 1995; Ferren and Pritchett 1988).

Critical habitat for the San Diego fairy shrimp was designated by USFWS on December 12, 2007 (72 FR 70648). This final rule designated five critical habitat units (with 29 subunits) for San Diego fairy shrimp on 3,082 acres of land in Orange and San Diego counties. On September 20, 2011, the District Court of the District of Columbia (D.C. Court) vacated 151 acres of designated critical habitat as mandated by the United States Court of Appeals for the District of Columbia Circuit on September 14, 2011, and its underlying Opinion and Judgment dated July 22, 2011 (*Otay Mesa Property L.P. et al v. U.S. Department of the Interior, et al.* 1:08-CY-00383). A total of 1,314 acres of San Diego fairy shrimp critical habitat is located in the VPHCP Plan Area.

Additionally, the USFWS 5-year review was completed on September 30, 2008 (USFWS 2008a) and recommended no change to the endangered listing status of the San Diego fairy shrimp.

3.1.3 Status and Distribution

San Diego fairy shrimp is currently considered to be extant at 137 known occupied vernal pool complexes in the United States. San Diego fairy shrimp is found in 132 vernal pool complexes in San Diego County, 34 that are within the VPHCP Plan Area. These pool complexes are located in Del Mar Mesa, Kearny Mesa, Mira Mesa, Chollas Heights, Mission Trails Regional Park, Marron Valley, and Otay Mesa. Additional occupied vernal pool complexes located in San Diego County, but not in the City of San Diego, are found on Marine Corps Air Station (MCAS) Miramar, Marine Corps Base (MCB) Camp Pendleton, Poway, Carlsbad, San Marcos, Santee, Ramona, Santa Fe Valley, Naval Base Coronado, Otay Mesa, Sweetwater Reservoir, and Tijuana Slough (USFWS 2008a).

Due to the small size and life history traits of San Diego fairy shrimp, surveying occurrences for changes in numbers of individuals and demographic trends over time has not been feasible. Therefore, population trends have been based on changes in the amount of habitat occupied by the species over time. In 2008, a project was funded by a FESA Section 6 grant to develop a protocol to estimate San Diego fairy shrimp population sizes and conduct population viability analyses in real time to detect a decline preceding the likely extinction of a population (Bohonak 2011). Bohonak (2011) investigates several different methods of dry and wet sampling protocols and includes recommendations on how dry sampling might be used for monitoring population trends. This technique has not yet been applied; however, research is ongoing to refine monitoring techniques.

San Diego fairy shrimp occurs across all types of vernal pool soils, including Redding, Olivenhain, Huerhuero, Stockpen, Diablo, Linne, and Chesterton. These complexes occur on both claypan- and hardpan-type soils, and include every soil type that has been identified to support vernal pools.

San Diego fairy shrimp has been identified in 488 vernal pools within 35 complexes inside the VPHCP Plan Area (Table 3-1).

3.2 RIVERSIDE FAIRY SHRIMP

3.2.1 Species Biological Description

Riverside fairy shrimp was first identified in 1985 (Eng et al. 1990). Riverside fairy shrimp is a small aquatic crustacean in the order Anostraca. Riverside fairy shrimp feed on algae, bacteria,

protozoa, rotifers, and bits of detritus. Male Riverside fairy shrimp are distinguished from other fairy shrimp species primarily by the second pair of antennae. The females carry their cysts in an oval or elongated ventral brood sac (Eng et al. 1990; Eriksen and Belk 1999).

The life cycle of Riverside fairy shrimp is dependent on the changing hydrologic conditions of the vernal pool. The species is known to occur in pools that are greater than 12 inches in depth. The species cannot persist in perennial water bodies because the rewetting of the dried cysts is one component of a set of environmental stimuli that trigger hatching (Eriksen and Belk 1999). Riverside fairy shrimp are usually observed January through March, although the hatching period may be extended in years with early or late rainfall. Individuals hatch, mature, and reproduce within 7 to 8 weeks of rainfall filling a pool, depending on water temperature (Simovich and Hathaway 1996).

Similar to the San Diego fairy shrimp described above, the ability of Riverside fairy shrimp to develop and maintain cyst banks is vital to the long-term survival of the species (Ripley et al. 2004; Simovich 2005).

For more information on the life history of this species and additional references, refer to the USFWS 5-year review (USFWS 2008b).

3.2.2 Listing Status

On August 3, 1993, the Riverside fairy shrimp was federally listed as endangered (58 FR 41384). The USFWS 5-year review was completed on September 29, 2008 (USFWS 2008b).

A final designation of critical habitat for this species was made on December 4, 2012 (77 FR 72070) and consists of 1,724 acres of land in five units in Ventura, Los Angeles, Riverside, Orange, and San Diego counties. There is a total of 585 acres of designated Riverside fairy shrimp critical habitat acres within the VPHCP Plan Area.

3.2.3 Status and Distribution

Riverside fairy shrimp is restricted to vernal pools and other nonvegetated ephemeral pools greater than 12 inches in depth in Riverside, Orange, and San Diego counties.

In the U.S., Riverside fairy shrimp are currently considered to be extant at 45 known occupied vernal pool complexes, covering an area of approximately 59 acres. Twenty-six of the extant known occupied complexes are in San Diego County (USFWS 2008b).

Due to the small size and life history traits of Riverside fairy shrimp, surveying occurrences for changes in numbers of individuals and demographic trends over time is not feasible. Therefore, population trends are determined indirectly by assessing changes in the amount of habitat occupied by the species over time (USFWS 2008b). Similar to San Diego fairy shrimp, research is ongoing to refine monitoring techniques.

The soil types that underlie the vernal pool complexes with Riverside fairy shrimp are Huerhuero, Stockpen, Olivenhain, Diablo, and Linne, which are claypan-type soils.

Riverside fairy shrimp have been identified in 131 vernal pools within six complexes inside the VPHCP Plan Area (Table 3-1).

3.3 SAN DIEGO BUTTON-CELERY

3.3.1 Species Biological Description

San Diego button-celery is a perennial, gray-green herb that has a storage tap-root. It has a spreading shape with stems and lanceolate leaves, which give the plant a prickly appearance. San Diego button-celery has styles in fruit that are about the same length as the calyx (outer whorl of protective structures around the flower) and bractlets (modified leaves) without callused margins (Constance 1993).

San Diego button-celery is a vernal pool obligate and relies on ephemerally wet conditions to reproduce, blooming from April through June. San Diego button-celery seems more tolerant of a wider range of vernal pool habitat than most obligate vernal pool species. It is specifically adapted to surviving in vernally wet conditions due to the presence of air channels in the roots that facilitate necessary gas exchange in submerged plants (Keeley 1998).

San Diego button-celery is presumably insect-pollinated (Zedler 1987), potentially by bee flies (*Bombyliids*) (Schiller et al. 2000) and solitary bees (*Apoidea*), as are many vernal pool species (Thorpe 2007). Currently, the level of relationships between pollinators and San Diego button-celery is unknown.

Important differences between San Diego button-celery and the other sensitive vernal pool plant species in southern California is that San Diego button-celery is a perennial species and has been known to occur in the intermound areas, outside of vernal pool basins. San Diego Mesa mint, Otay Mesa mint, California Orcutt grass, and spreading navarretia are all annual species and are highly dependent on the health and quality of the existing seed bank for current and future ecological stability. While a healthy seed bank is important for San Diego button-celery as well,

the fact that the plants are perennial means that the seed bank can be almost nonexistent and the San Diego button-celery will continue to persist for a number of years, with fluctuating wet and dry years.

For more information on the life history of this species and additional references, refer to the USFWS 5-year review (USFWS 2010a).

3.3.2 Listing Status

San Diego button-celery was federally listed as an endangered species on August 3, 1993, 14 years after it was listed as endangered by the State of California (–(58 FR 41384)). It is a California Native Plant Society (CNPS) List 1B species and is a narrow endemic species under the City of San Diego Land Development Code Biology Guidelines. The USFWS 5-year review was completed on September 1, 2010 (USFWS 2010a).

No critical habitat has been designated for San Diego button-celery, but the Recovery Plan calls for essentially all populations of San Diego button-celery within the City MSCP to be conserved.

3.3.3 Status and Distribution

Historically, habitat for the San Diego button-celery included a coastal swath from Mesa de Colonet, north to Los Angeles County, and San Quintin in Baja California, Mexico. The northernmost range of the variety on the Pacific Coast is at MCB Camp Pendleton (Wire Mountain). San Diego button-celery can be locally abundant in remnant vernal pools; however, the distribution of this variety has been dramatically reduced (95 to 97%) due to loss of most vernal pool habitats in San Diego County (USFWS 1998).

San Diego button-celery is found in vernal pools in San Diego County at Otay Mesa, Kearny Mesa, Del Mar Mesa, MCAS Miramar, and MCB Camp Pendleton, and in northern Baja California, Mexico (USFWS 1993).

Within the VPHCP Plan Area, San Diego button-celery occurs across various types of vernal pool soils, including Redding, Olivenhain, Huerhuero, Stockpen, Diablo, and Linne. Unlike some of the other sensitive plant species known to occur in southern California vernal pools, San Diego button-celery does not appear to be restricted to any particular type of soil type.

San Diego button-celery has been identified in 733 vernal pools within 20 complexes inside the VPHCP Plan Area (Table 3-1).

3.4 SPREADING NAVARRETIA

3.4.1 Species Biological Description

Spreading navarretia is an annual herb in the phlox family (*Polemoniaceae*). It is a low, mostly spreading or ascending plant, with flat-topped, compact, leafy head flowers with white to lavender petals. The fruit is an ovoid, two-chambered capsule. Each seed is covered by a layer that becomes sticky and viscous when the capsule is moistened. Spreading navarretia also has linear corolla lobes, spreading or ascending habit, and flat-topped inflorescences.

The life cycle of spreading navarretia is dependent on the function of the vernal pool ecosystem. This annual species germinates from seeds left in the seed bank. For many vernal pool plant species, soil moisture affects the timing of plant germination (Myers 1975). Although not proven, it is likely that spreading navarretia uses these same cues for germination. The timing of germination is important so that the plant germinates under favorable conditions in the spring rather than the summer, autumn, or winter.

Spreading navarretia abundance also varies from year to year depending on precipitation and the soil saturation/drying time of the vernal pool. This annual variation makes it impossible to obtain an accurate count of the number of individuals in the population because the proportion of standing plants to remaining seeds in the seed bank that makes up the population cannot be measured.

Pollination and dispersal mechanisms are not well known for spreading navarretia. The plant has the ability to self-pollinate, but is not an obligate self-pollinator. Information on the pollinators of spreading navarretia is not available. Hypothetically, insects would be the main pollinators of the flowers. For example, the Hymenopteran insect *Perdita navarretiae* (a type of mining bee in the *Andrenidae* family) has been documented to make repeated visits to spreading navarretia, possibly for pollination (Krombein 1979).

After germination, the plant usually flowers in May and June when the vernal pool is devoid of water (Glenn Lukos Associates 2005). The plant then produces fruit, dries out, and senesces in the hot, dry summer months. Minimal information exists on the dispersal of spreading navarretia seeds. Individual seeds can often be glued in seed clusters that could stick to an animal or bird passing through the vernal pool, providing a method of dispersal. More research is needed to discover the actual methods of pollination and dispersal for spreading navarretia.

For more information on the life history of this species and additional references, refer to the USFWS 5-year review (USFWS 2009).

3.4.2 Listing Status

Spreading navarretia was federally listed as a threatened species on October 13, 1998 (63 FR 54975). This plant is a CNPS List 1B species and is considered to be a narrow endemic species under the City of San Diego Land Development Code Biology Guidelines. The USFWS 5-year review was completed on August 10, 2009 (USFWS 2009).

Approximately 6,720 acres of habitat in Los Angeles, Riverside, and San Diego counties falls within the boundaries of the critical habitat designation for spreading navarretia (75 FR 62192). There is a total of 450 acres of spreading navarretia critical habitat acres in the VPHCP Plan Area.

3.4.3 Status and Distribution

Spreading navarretia is found in widely disjointed and restricted vernal pool complexes extending from the Santa Clarita region of Los Angeles County, east to the western lowlands of Riverside County, south through coastal and foothill San Diego County, and south to San Quintin, Baja California, Mexico. Nearly 60% of populations in the official listing and in the Recovery Plan (USFWS 1998) were concentrated at three locations: Otay Mesa in southern San Diego County, alongside the San Jacinto River in western Riverside County, and near Hemet in western Riverside County (Bauder 1986; Bramlet 1993). At the time of listing, spreading navarretia occupied less than 300 acres of habitat in the U.S. (USFWS 2009).

Spreading navarretia occurs on a number of vernal pool soil types, including Huerhuero, Stockpen, Redding, and Chesterton, and is known from hardpan, claypan, alkali playas, and alluvial terrace pool complexes. The soil types that underlie the complexes with spreading navarretia are Redding, Huerhuero, Stockpen, Olivenhain, and Linne. With the exception of one complex (D5-8, also known as Carroll Canyon), all of these complexes are on claypan-type soils.

Within the VPHCP Plan Area, 96 pools are occupied with spreading navarretia within eight complexes (Table 3-1).

3.5 SAN DIEGO MESA MINT

3.5.1 Species Biological Description

San Diego Mesa mint is an annual herb in the mint family (*Lamiaceae*). San Diego Mesa mint has two flowers per node on the stem, whereas Otay Mesa mint (described later in this chapter) has at least six flowers per node. San Diego Mesa mint typically blooms from May or June

through early July and usually gives off a strong, sweet mint odor. The vegetative portions of the plant develop a reddish tinge during maturation. The plant has a hairy calyx, rather than the smooth calyx of the Otay Mesa mint, and bracts and leaves that are narrower than Otay Mesa mint.

The link between the onset of germination, temporal conditions associated with vernal pool inundation, temperature, and moisture are critical to the germination, maturation, flowering, and fruiting of San Diego Mesa mint. These environmental factors make it difficult to obtain an accurate measure of the population. Additionally, a portion of the population is represented by seeds remaining in the seed bank that are not accounted for each year.

The life cycle of San Diego Mesa mint is dependent on soil saturation in vernal pools. San Diego Mesa mint usually blooms in May and June when water is absent from the vernal pool (Munz 1974). The plants produce fruit, dry out, and senesce in the hot, dry summer months.

Pollination of San Diego Mesa mint was described by Schiller et al. (2000) by monitoring insect visitors to individual plants on Del Mar Mesa. Schiller et al. found the Eurasian honey bee (*Apis mellifera*), two anthophorid bees (*Exomalopsis nitens* and *E. torticornis*), and bee flies (*Bombylids*) to be the most common and likely pollinators of San Diego Mesa mint at the Del Mar Mesa locality. Other potential pollinators include hover flies (Syrphids). Pollinator studies specific to vernal pool species have been conducted in the California Central Valley where the upland habitat may play a crucial role in supporting native bee populations (Thorp and Leong 1998).

Gene dispersal may occur via pollen or seed. Schiller et al. documented that San Diego Mesa mint is self-fertile but has significantly greater seed set when cross-pollinated (Schiller et al. 2000). San Diego Mesa mint does not have seed morphology associated with animal or wind dispersal, although scattered occurrences of pool plants along well-worn trails that link individual pools over wide areas suggest that large animals may contribute to seed dispersal (Cole 1995). Waterfowl use pools (Proctor et al. 1967; Zedler 1987) and rabbit movement (Zedler and Black 1992) may be a potential mechanism for dispersal and genetic mixing. In addition, San Diego Mesa mint seeds can sometimes float, which may result in limited dispersal opportunities when pools interconnect or lakes fill their basins in years of greater than average precipitation (Scheidlinger 1981).

For more information on the life history of this species and additional references, refer to the USFWS 5-year review (USFWS 2010b).

3.5.2 Listing Status

San Diego Mesa mint was federally listed as an endangered species in September 1978 (43 FR 44810) and was listed the following year by the State of California. This plant is a CNPS List 1B species and is a narrow endemic species under the City of San Diego Land Development Code Biology Guidelines. The USFWS 5-year review was completed on September 1, 2010 (USFWS 2010b).

No critical habitat has been designated for San Diego Mesa mint, but the Recovery Plan calls for essentially all populations of San Diego Mesa mint to be conserved and protected. Much of the range and distribution for the species is found on MCAS Miramar with remaining populations outside MCAS Miramar found on City MSCP lands. While MCAS Miramar has an approved management plan for vernal pools and San Diego Mesa mint, it is not required to maintain all existing populations of San Diego Mesa mint within the MCAS Miramar boundary (U.S. Marine Corps 2011). Because of this less-than-certain protection for San Diego Mesa mint on MCAS Miramar, the Recovery Plan considers all populations within the VPHCP Plan Area to be critical to the stability and conservation of the species (USFWS 1998).

3.5.3 Status and Distribution

San Diego Mesa mint is found in vernal pools on mesas of western San Diego County; however, specific occurrence and range information was not included in the official listing (USFWS 1978). The Recovery Plan (USFWS 1998) identifies the northern distribution for San Diego Mesa mint as Del Mar Mesa. It occurs south on Mira Mesa, MCAS Miramar, and Kearny Mesa, with a few scattered populations in western Tierrasanta. Examination of occurrence data from the time of listing (Bauder 1986; CDFG 2010) suggests that the distribution of San Diego Mesa mint has decreased since its listing in 1978. San Diego Mesa mint was extirpated from pool complexes in the most southern and northern extremities of its range (Element Occurrences 49, 56). No new extant occurrences have been detected since the time of listing.

Historically, outside of San Diego Mesa mint's current range, the species is thought to have occurred around Linda Vista, the vicinity of Balboa Park, Normal Heights, and the area surrounding San Diego State University (USFWS 1998; Zedler et al. 1979). Some confusion has existed regarding San Diego Mesa mint's historical range due to misidentified herbarium specimens (identified as Otay Mesa mint) and vague references regarding collection sites. Upon review of these historical herbarium collections from the central part of San Diego County, it was determined that these historical occurrences were, in fact, San Diego Mesa mint (Bauder and McMillan 1998; Howell 1931). No estimate of numbers of San Diego Mesa mint plants at specific sites is currently available. This is likely due to the difficulty of measuring temporal

abundance at each occurrence. As with most annual plants, the germination success of San Diego Mesa mint differs annually depending, in part, on temperature, timing, and amount of rainfall.

Vernal pools that support San Diego Mesa mint are typically found on Redding soils. All San Diego Mesa mint populations are known from hardpan-type vernal pools. Olivenhain was also identified from several complexes and the J30 complex (Lone Star) also had Linne soils underlying the complex.

San Diego Mesa mint has been identified in 339 vernal pools within 16 complexes inside the VPHCP Plan Area (Table 3-1).

3.6 CALIFORNIA ORCUTT GRASS

3.6.1 Species Biological Description

California Orcutt grass is an annual grass in the grass family (Poaceae) that is bright gray-green in color and secretes sticky droplets. This species is inconspicuous and prostrate at first, although it develops more erect glandular pubescent stems. The plant inflorescences consist of seven spikelets arranged in two ranks, with the upper spikelets overlapping on a somewhat twisted axis. California Orcutt grass is sparsely hairy with a prostrate stem (USFWS 1998).

California Orcutt grass typically flowers from April through July and then sets seed. This species is adapted to conditions in the wettest, longest lasting portion of vernal pools. It is less abundant at the shallow periphery of vernal pools that are subject to more rapid changes in moisture (Reeder 1993; Munz 1974). The first significant fall and winter rains begin the process of vernal pool inundation; with no rain, no significant germination of this species will occur. California Orcutt grass seeds germinate while pools are inundated, and the plant appears prostrate during this period. Orcutt grass typically requires at least 15 to 30 days of inundation before germination will occur, so in low rainfall years, there may not be enough ponding to promote adequate germination and the species may remain dormant in the seed bank until an adequate rainfall season (Griggs 1976, 1981). As the season progresses, temperature increases and rainfall declines result in increased evaporation. This stimulates the plant's stems to become more erect, at which time the plant begins to flower. Flowering generally occurs April through June, and by early to mid-summer the pools become dry.

Orcutt grass relies on fungi to play a role in stimulating germination (Griggs 1976, 1981; Keeley et al. 1988), but it is unclear if this fungal association is present in all populations. As for the entire grass family, California Orcutt grass is believed to be wind pollinated, although no studies of wind pollination or vector-assisted pollination in this species are currently known (USFWS 2011a).

For more information on the life history of this species and additional references, refer to the USFWS 5-year review (USFWS 2011a).

3.6.2 Listing Status

California Orcutt grass was listed as an endangered species by the State of California in September 1979. The species was federally listed as endangered on August 3, 1993 (58 FR 41384). It is a CNPS List 1B species and is a narrow endemic species under the City of San Diego Land Development Code Biology Guidelines (City of San Diego 2006). The USFWS 5-year review was completed on March 11, 2011 (USFWS 2011a).

No critical habitat has been designated for California Orcutt grass, but the Recovery Plan calls for all populations of Orcutt grass to be conserved and protected (USFWS 1998).

3.6.3 Status and Distribution

California Orcutt grass is currently considered to be extant at 28 occurrences in four counties of southern California: three occurrences in Ventura County, three occurrences in Los Angeles County, nine occurrences in Riverside County, and 13 occurrences in San Diego County. Of these 13 occurrences, only the three vernal pool complexes located in Otay Mesa fall within the jurisdiction of the City. Additional occupied vernal pool complexes located in San Diego County, but not in the City, are found within MCAS Miramar, the City of Carlsbad, and Warner Valley. Additionally, two populations of this species known from Otay Mesa are presumed to have been extirpated, and the status of a population at a created pool at the Peñasquitos Substation is unknown (USFWS 2011a).

Historically, this species also was found on Mesa de Colonet and in pools at San Quintin in northern Baja California, Mexico. There is no current knowledge confirming the contemporary existence of the species in Baja California, but the vernal pool habitat that supported these occurrences still persists (USFWS 2011a). No estimate of numbers of California Orcutt grass specimens at specific sites is currently available. This is likely due to the difficulty of measuring temporal abundance at each occurrence. As with most annual plants, the germination success of California Orcutt grass differs annually depending, in part, on temperature, timing, and amount of rainfall.

The soil types that underlie the three complexes with California Orcutt grass are Huerhuero, Olivenhain, Stockpen, and Linne, which are claypan-type soils.

California Orcutt grass has been identified in 58 vernal pools within three complexes inside the VPHCP Plan Area (Table 3-1).

3.7 OTAY MESA MINT

3.7.1 Species Biological Description

Otay Mesa mint is an annual herb in the mint family (Lamiaceae). Otay Mesa mint has at least six flowers or more per node on the stem, and a glabrous to minutely hairy calyx, while San Diego Mesa mint (described above) typically only has two flowers per node. Otay Mesa mint bracts and leaves are also wider than San Diego Mesa mint. The plant is typically minimally branched, and the vegetative and floral portions of the plant emit a strong, turpentine mint odor. In contrast to San Diego Mesa mint, the vegetative portions of the plant do not develop a reddish tinge until the plant is past the flowering period. The flowers are purple with a white throat.

The link between the onset of germination, temporal conditions associated with vernal pool inundation, temperature, and moisture are critical to the germination, maturation, flowering, and fruiting of Otay Mesa mint. The interaction of these factors provides the plants favorable conditions in the spring rather than in the summer, autumn, or winter. Otay Mesa mint commences flowering in May and continues through June or July; by early to mid-summer, the pools become dry. Natural differences in the precipitation and the saturation/drying time of vernal pools from year to year may influence the distribution and abundance of Otay Mesa mint. These environmental factors make it difficult to obtain an accurate measure of the population. Additionally, a portion of the population is represented by seeds remaining in the seed bank, which is not accounted for each year.

The family is primarily bee pollinated (Proctor and Yeo 1973). Potential pollinators that frequently Otay Mesa mint flowers are hover flies (*Syrphids*), bee flies (*Bombylids*), sweet bees (*Halictids*), and the common honey bee (*Apis mellifera*) (McMillan 2012, pers. com.). Gene dispersal may occur via pollen or seed. Otay Mesa mint does not have seed morphology associated with animal or wind dispersal, although scattered occurrences of pool plants along well-worn trails that link individual pools over wide areas suggest that large animals may contribute to seed dispersal (Cole 1995). As with San Diego Mesa mint, waterfowl using pools (Proctor et al. 1967; Zedler 1987) and rabbit movement (Zedler and Black 1992) may be potential mechanisms for dispersal and genetic mixing. In addition, Otay Mesa mint seeds can sometimes float, which may result in limited dispersal opportunities when pools interconnect or lakes fill their basins in years of greater than average precipitation (Scheidlinger 1981).

For more information on the life history of this species and additional references, refer to the USFWS 5-year review (USFWS 2010c).

3.7.2 Listing Status

Otay Mesa mint was listed as an endangered species by the State of California in 1987, and federally listed as endangered on August 3, 1993 (58 FR 41384). It is a CNPS List 1B species and is a narrow endemic species under the City of San Diego Land Development Code Biology Guidelines. The USFWS 5-year review was completed on September 1, 2010 (USFWS 2010c).

No critical habitat has been designated for Otay Mesa mint, but the Recovery Plan calls for all populations of Otay Mesa mint to be conserved and protected (USFWS 1998).

3.7.3 Status and Distribution

Otay Mesa mint is found only in southern San Diego County. This mint grows in vernal pools near the Otay Mesa region. Historically, Otay Mesa mint was believed to be found beyond Otay Mesa and occurred at 10 locations in southern San Diego County, including sites farther north near University Heights, Balboa Park, and Mission Valley (USFWS 2010c). However, upon review of these historical herbarium collections from the central part of San Diego County, it was determined that these historical occurrences were actually the San Diego Mesa mint (McMillan 2012, pers. com.).

Otay Mesa mint also historically grew in vernal pools near the Tijuana International Airport in Baja California, Mexico, but has likely been extirpated there due to urban development. Most recently, the San Diego National Wildlife Refuge introduced it into the vernal pool complex ("S" series) located just south of the Sweetwater Reservoir. Seeds were distributed at the Shinohara vernal pool restoration site prior to the 2011 growing season. The seeds have sprouted, but it is too soon to tell whether this population will be successfully established. No estimate of numbers of individual Otay Mesa mint plants at specific sites is currently available. This is likely due to the difficulty of measuring temporal abundance at each occurrence. As with most annual plants, the germination success of Otay Mesa mint differs annually depending, in part, on temperature, timing, and amount of rainfall.

All Otay Mesa mint populations are known from claypan-type vernal pools. The soil types that underlie the 10 Otay Mesa mint complexes are Stockpen, Olivenhain, Linne, and Huerhuero (Bauder and McMillan 1998; Beauchamp and Cass 1979).

Otay Mesa mint has been identified in 369 vernal pools within four complexes inside the VPHCP Plan Area (Table 3-1).

3.8 SUMMARY OF STATUS INFORMATION FOR COVERED SPECIES

Table 3-2 summarizes key information and status data for each covered species within the VPHCP Plan Area.

3.9 THREATS AND PRESSURES

Threats (direct impacts on survival and persistence of the species) and pressures (indirect threats that affect the species) occur for all seven covered species. Some of these threats and pressures apply to all seven species, while others are species specific. Conceptual models of the threats and pressures for vernal pool plant and crustacean species are provided in Chapter 7. Threats and pressures to specific covered species are summarized here.

The loss and modification of vernal pool habitat continue to be a significant threat to the covered species, especially in areas where urbanization is expected to expand, and is considered a primary threat to vernal pools in southern California (Bauder 1986, 1987). Acquisition of land and conservation easements have preserved vernal pool habitat, but some loss of vernal pool habitat has continued. Most of these losses and impacts are the result of urban development, international border security, and military-related development and training, followed by industrial/commercial development, grazing, dumping, trampling, plowing, off-road vehicle traffic, and other mechanical disturbances. Other indirect threats degrade or destroy covered species habitat including altered hydrology, exposure to pesticides, invasion by nonnative plant species, habitat fragmentation, water and air pollution, and fire and wildfire suppression activities.

There are specific known losses of vernal pool complexes for three of the seven covered species. As of 2008, 28 of the 137 vernal pool complexes occupied by the San Diego fairy shrimp had been partially lost to urban development and about five additional complexes contained pools that had been damaged but not lost. Of these 28 pools, 14 pools are within the VPHCP Plan Area. Since its listing in 1993, at least nine complexes known to be occupied by Riverside fairy shrimp have been lost to urban development, 10 complexes have been partially lost to urban development, and eight complexes have damaged pools. Human access and disturbance effects associated with adjacent development have been documented at the majority of the spreading navarretia occurrences (McMillan 2012, pers. comm.).

Table 3-2
Summary of Covered Species Key Information and Status in VPHCP Plan Area

Covered Species	Federal and State Listing Status	Critical Habitat in VPHCP Plan Area	Key Description Information	Habitat	Life Cycle	Status and Distribution	Status in VPHCP Plan Area
San Diego fairy shrimp	FE	Approximately 1,314 acres (out of 2,931 acres in species designation)	• Small aquatic crustacean • Feed on algae, diatoms, and particulate organic matter	• Occurs in vernal pools and other nonvegetated ephemeral pools from 2 to 12 inches in depth in coastal areas of San Diego County, Orange County, and northwestern Baja • Restricted to dilute vernal pools having relatively low sodium concentrations, low alkalinity, and neutral pH	• Usually observed January through March, although the hatching period may be extended in years with early or late rainfall • Individuals hatch, mature, and reproduce within 7 to 14 days of rainfall filling a pool, depending on water temperature	• Coastal areas of San Diego County, Orange County, and northwestern Baja • Historic occurrence in Santa Barbara County	• Occurs in 488 vernal pools within 35 vernal pool complexes • Occurs across all types of vernal pool soils, including Redding, Olivenhain, Huerhuero, Stockpen, Diablo, Linne, and Chesterton • Occurs on both claypan- and hardpan-type soils
Riverside fairy shrimp	FE	Approximately 585 acres (out of 1,724 acres in species designation)	• Small aquatic crustacean	Restricted to vernal pools and other nonvegetated ephemeral pools greater than 12 inches in depth in Riverside, Orange, and San Diego counties	• Usually observed January through March, although the hatching period may be extended in years with early or late rainfall • Individuals hatch, mature, and reproduce within 7 to 8 weeks of rainfall filling a pool, depending on water temperature • Cysts are capable of withstanding temperature extremes and prolonged drying	• Riverside, San Diego, and Orange counties • Historical occurrences reported from Ventura County, Los Angeles County, and northwestern Baja	• Identified in 131 vernal pools within six vernal pool complexes • Occurs on Huerhuero, Stockpen, Olivenhain, Diablo, and Linne soils • Claypan-type soils associated with marine sediments with subsurface layers that are basic in pH
San Diego button-celery	FE, CE	No designated critical habitat	• Perennial gray-green herb that has a storage tap-root	• Found in almost every type of southern	• Vernal pool obligate and relies on ephemerally wet conditions to reproduce,	• San Diego County at Otay Mesa, Kearny Mesa, Del Mar Mesa,	• Occurs in 733 vernal pools within 20 vernal pool

Covered Species	Federal and State Listing Status	Critical Habitat in VPHCP Plan Area	Key Description Information	Habitat	Life Cycle	Status and Distribution	Status in VPHCP Plan Area
			• Stems and lanceolate leaves give the plant a prickly appearance	California vernal pool, including claypan-, hardpan-, and alluvial-terrace-type pools • Does not appear to be restricted to any particular type of soil type	blooming from April through June • Seems more tolerant of a wider range of vernal pool habitat than most obligate vernal pool species • Can tolerate disturbance factors better than most endemic species • Presumably insect-pollinated	MCAS Miramar, and MCB Camp Pendleton, and in northern Baja California, Mexico • Historically, habitat included a coastal swath from Mesa de Colonet and San Quintin in Baja north to Los Angeles County	complexes • Occurs across various types of vernal pool soils, including Redding, Olivenhain, Huerhuero, Stockpen, Diablo, and Linne
Spreading navarretia	FT	Approximately 450 acres (out of 6,720 total acres in species designation)	• Annual herb • Flat-topped, compact, leafy head flowers with white to lavender-white petals • Seed is covered by a layer that becomes sticky and viscous when the capsule is moistened	Known from hardpan, claypan, alkali playas, and alluvial terrace pool complexes	• Pollination and dispersal mechanisms not well known • Ability to self-pollinate, but is not an obligate self-pollinator • Blooms in May and June through summer months • Minimal information on seed dispersal	• Found in widely disjointed and restricted vernal pool complexes extending from the Santa Clarita region of Los Angeles County, to the western lowlands of Riverside County, through coastal and foothill San Diego County, and south to San Quintin, Baja	• Occurs in 96 vernal pools within eight complexes • Occurs on Redding, Huerhuero, Stockpen, Olivenhain, and Linne soils • Primarily claypan-type soils associated with marine sediments and typically have basic pH subsurface layers
San Diego Mesa mint	FE, CE	No designated critical habitat	• Annual herb • Two flowers per node • Plant emits a strong, sweet mint odor	Known from hardpan-type vernal pools in San Diego County	• Dependent on saturated soils of vernal pools • Blooms from May or June through early July • Primarily bee pollinated • Gene dispersal occurs via pollen or seed	• Mesas of western San Diego County including Del Mar Mesa, Mira Mesa, Marine Corps Air Station Miramar, Kearny Mesa, and western Tierrasanta • Historically, thought to have occurred around Linda Vista, the vicinity of Balboa Park, Normal Heights, and the area surrounding San Diego State University	• Occurs in 339 vernal pools within 16 vernal pool complexes • Found on Redding soils, with Olivenhain or Linne on several complexes • Hard-pan soils acidic in pH

Covered Species	Federal and State Listing Status	Critical Habitat in VPHCP Plan Area	Key Description Information	Habitat	Life Cycle	Status and Distribution	Status in VPHCP Plan Area
California Orcutt grass	FE, CE	No designated critical habitat	• Annual grass • Bright gray-green in color and secretes sticky droplets • Inflorescences consist of seven spikelets arranged in two ranks, with the upper spikelets overlapping on a somewhat twisted axis	Restricted to vernal pools in southern California	• Flowers from April through July and then sets seed • Adapted to conditions in the wettest, longest lasting portion of vernal pools • Typically requires at least 30 days of inundation before germination begins • Believed to be wind pollinated	• Ventura, Los Angeles, Riverside, and San Diego counties • Several historical occurrences reported from northern Baja	• Occurs in 58 vernal pools with California Orcutt grass within three vernal pool complexes • Occurs on Huerhuero, Olivenhain, Stockpen, and Linne soils • Claypan-type soils associated with marine sediments with subsurface layers that are basic in pH
Otay Mesa mint	FE, CE	No designated critical habitat	• Annual herb • Six flowers per node • Plant emits a strong, turpentine mint odor	Known from claypan-type vernal pools on Otay Mesa	• Dependent on saturated soils of vernal pools • Blooms from May or June through early July • Primarily bee pollinated • Gene dispersal occurs via pollen or seed	• Found only in southern San Diego County vernal pools on Otay Mesa • Extirpated from Baja due to development	• Occurs in 369 vernal pools within four vernal pool complexes • All but one of the pools have had some habitat restoration • Found on Stockpen, Olivenhain, Linne, and Huerhuero soils

FE = federally endangered
FT = federally threatened
CE = California state endangered

San Diego fairy shrimp, Riverside fairy shrimp, San Diego button-celery, spreading navarretia, San Diego Mesa mint, California Orcutt grass, and Otay Mesa mint also may be affected by factors associated with climate change, which has the potential to adversely affect this species through changes in vernal pool inundation patterns and consistency. While it is possible that climate warming will cause shifts in the distribution and abundance of San Diego fairy shrimp, this threat will be considered as a changed circumstance for the VPHCP. The secondary effects of climate change (e.g., drought, increased weed invasion, increased fire threat) will be addressed in further detail in Chapter 7.

Other threats specific to San Diego fairy shrimp include hybridization, direct competition with the versatile fairy shrimp and cytoplasmic incompatibility induced by Wolbachia (or similar) bacteria. The versatile fairy shrimp has been documented within the range of the San Diego fairy shrimp at Otay Mesa, MCAS Miramar, Del Mar Mesa, and MCB Camp Pendleton. Hybridization and competition could threaten the San Diego fairy shrimp in the future should the range of the versatile fairy shrimp expand (USFWS 2008a). In addition to incompatibility, the Wolbachia bacteria also can lead to biased sex ratios, parthenogenesis (female asexual reproduction), feminization of males, and a high juvenile male mortality. There is substantial evidence that the versatile fairy shrimp harbors feminizing endoparasitic bacteria (Krumm 2006). While there is no evidence of the bacteria in San Diego fairy shrimp, the potential hybridization of the two species suggests that this could be a concern for the genetics and reproduction of the San Diego fairy shrimp. These issues are being addressed with funding provided by FESA Section 6 and Transnet research grants. The results of this research will be used to refine management and monitoring techniques.

At the time of listing in 1978, the major threats to San Diego Mesa mint and its habitat were road-widening projects (e.g., Miramar Road, SR 163, and SR 52), housing development, off-highway vehicle use, and illegal dumping. Military activities, altered hydrology, and nonnative plants are new threats identified since its listing, which all continue to pressure San Diego Mesa mint habitat. Additionally, the Cedar Fire in 2003 burned large expanses of MCAS Miramar, including many vernal pools that support San Diego Mesa mint and other listed vernal pool species. For many of these areas, the fire facilitated a dramatic increase in the weed populations. Since the fire, weed invasion has had a substantial impact on the populations of San Diego Mesa mint (Scott McMillan 2012, pers. comm.).

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CHAPTER 4
COVERED PROJECTS AND ACTIVITIES

This chapter describes the projects (Section 4.1) and activities (Section 4.2) within the VPHCP Plan Area that will be covered by the final permits and for which the VPHCP will provide avoidance, minimization, and compensation (i.e., conservation) for impacts to covered species and vernal pool habitat. "Projects" are well-defined actions that occur once in a discrete location. Together, these activities and projects are the covered activities for which incidental take authorization from the Wildlife Agencies will be obtained. "Activities" are actions that occur repeatedly in one location or throughout the permit area.

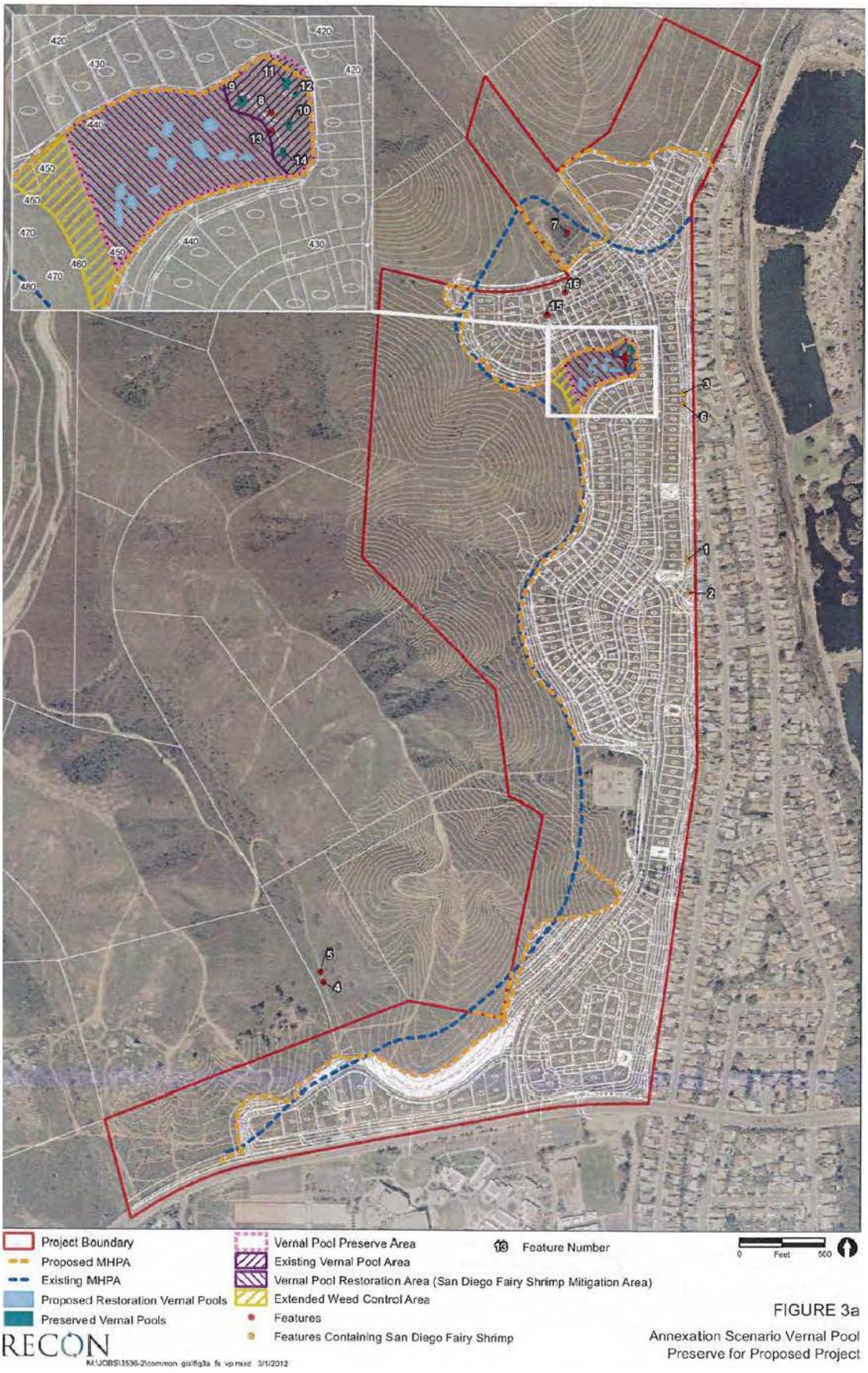
This chapter also includes a discussion of "pipeline projects," i.e., projects that have an approved development footprint for which conservation and loss of lands has been determined (Section 4.3). Conserved lands established as hardline preserve for pipeline projects are included in the MHPA. Impacts to vernal pools and Incidental Take of covered species associated with pipeline projects have been or will be permitted separately and are not considered in the impact analysis for the VPHCP (Chapter 5).

4.1 COVERED PROJECTS

4.1.1 Definition

Covered projects are projects involving land use development within the City for which hardline preserve boundaries have been established and any Incidental Take of covered species would be approved through the VPHCP. Conservation measures consistent with the VPHCP have been or will be specified as binding conditions of approval in such projects' plans and discretionary approvals.

Lands with covered projects have areas delineated for both development and preservation and/or mitigation. The MHPA hardline preserve boundaries for covered projects have been established on a project-by-project basis after evaluation of habitat and species data collected and/or surveys conducted as part of project entitlement processing, evaluation by the Wildlife Agencies, and consideration of how the proposed vernal pool conservation could best contribute to the overall VPHCP planning effort. covered projects are shown in Figures 4-1 through 4-4.



VPHCP- Castlerock Annexation Scenario

THE CITY OF SAN DIEGO

DRAFT

Figure 4-1A
Covered Project

FIGURE 3b

No Annexation Scenario Vernal Pool Preserve for Proposed Project

Date: 12/19/2013

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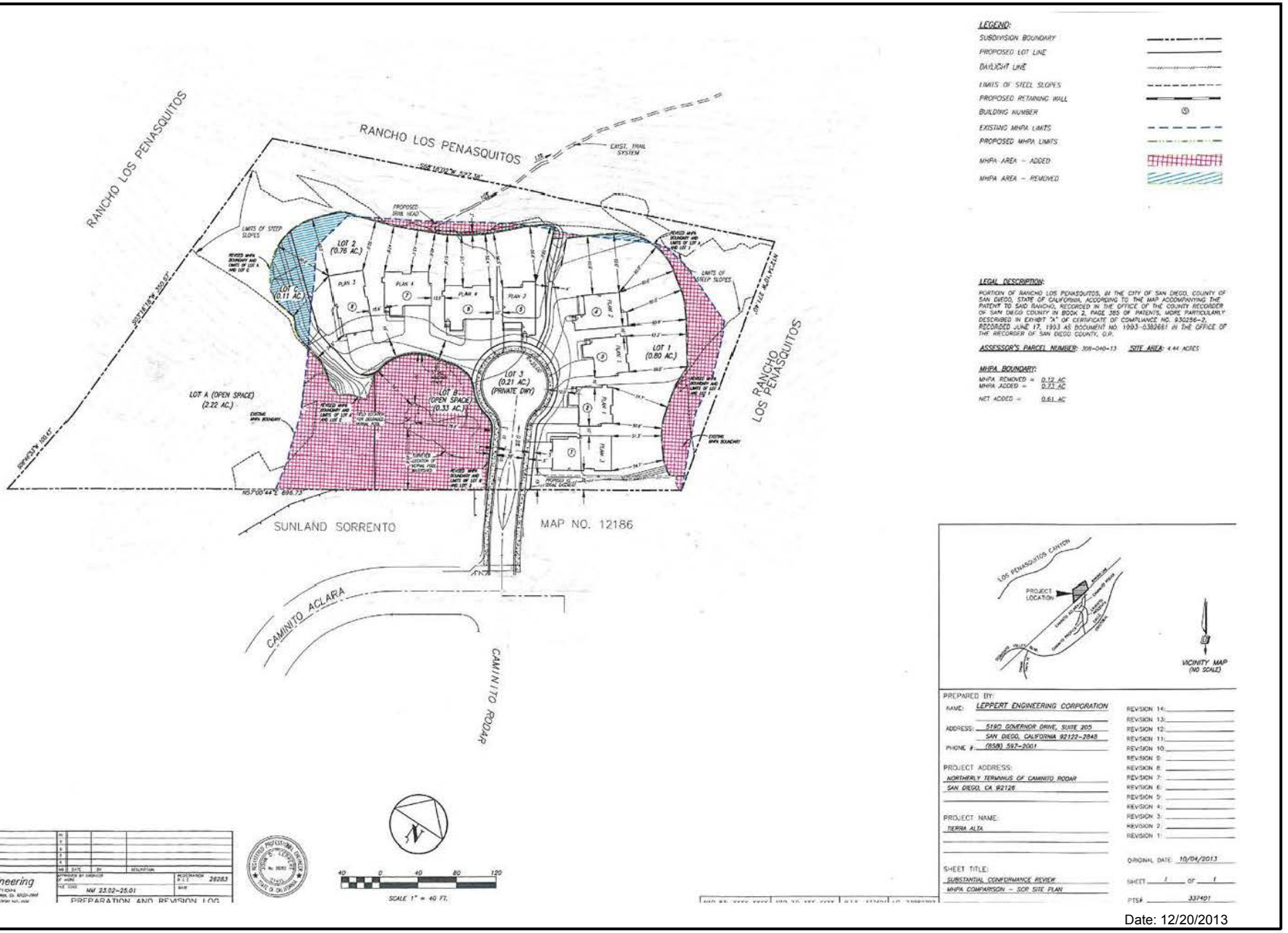
VPHCP- Castlerock No Annexation Scenario

THE CITY OF SAN DIEGO

DRAFT

Figure 4-1B
Covered Project



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VPHCP- Tierra Alta

THE CITY OF SAN DIEGO

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Figure 4-2
Covered Project

Date: 12/19/2013

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VPHCP- St. Jerome's Church

THE CITY OF SAN DIEGO

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Figure 4-3
Covered Project

Date: 12/19/2013

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VPHCP- Pasatiempo

THE CITY OF SAN DIEGO

DRAFT

Figure 4-4
Covered Project

Projects involving land use development within the City for which MHPA hardline preserve boundaries were not yet established prior to the adoption of the VPHCP will be analyzed pursuant to the requirements of the VPHCP and the MSCP SAP. These projects are not considered "covered" unless they comply with all provisions of the VPHCP.

4.1.2 List of Covered Projects

The covered projects described below have planned development footprints that have been negotiated as take-authorized areas along with associated conserved lands. The covered projects are identified in the MHPA with a hardline depicting the take-authorized development area and the associated 100% conservation area. The following covered projects are included in the VPHCP:

- Castlerock (Figures 4-1A and 4-1B)
- Tierra Alta (Figure 4-2)
- St. Jerome's Church (Figure 4-3)
- Pasatiempo Parks (Figure 4-4)

A description of these covered projects is provided below.

Castlerock

Castlerock is located on a vacant 191.8-acre site on the north side of Mast Boulevard between Medina Drive and West Hills Parkway within the East Elliott Community Plan area. The project (PTS No. 10046) and associated EIR were approved by City Council on September 16, 2013.

The project has two options under the VPHCP:

1. The Annexation Scenario (Figure 4-1A) will result in the construction of 283 detached single-family residences, 147 single-family detached units clustered on larger lots (referred to as green court units), approximately 4.0 acres (gross) of public parks, 0.64 acre (0.49 acre usable) of pocket parks, a pedestrian trail, and public streets and private driveways on the project site. The remaining 94.68 acres of the property will be preserved as MHPA open space under the Annexation Scenario.
2. The No Annexation Scenario (Figure 4-1B) will involve slight changes in the land uses with 282 detached single-family residences, 140 single-family green court units, approximately 4.0 acres (3.0 acres usable) of public parks, 0.50 acre (0.39 acre usable)

of pocket parks, a pedestrian trail, and public streets and private driveways and 94.49 acres of MHPA open space.

Both options will impact approximately 420 square feet of basin area supporting San Diego fairy shrimp. To mitigate for these impacts, the project will preserve and restore 1,260 square feet (3:1 ratio) of vernal pool basin area supporting San Diego fairy shrimp within an approximately 3-acre on-site vernal pool preserve, implement a long-term management and monitoring plan, record a covenant of easement over the preserve, and provide funding in perpetuity for management and monitoring.

Tierra Alta

The Tierra Alta project (Figure 4-2) has been redesigned and would develop 8 single-family residential dwelling units on a 4.44-acre site at the northerly terminus of Caminito Rodar within the Mira Mesa Community Plan Area. Open space of 2.56 acres will be protected in perpetuity by placement of the a covenant of easement over the area. Of this area, 0.33 acre will be designated as a vernal pool preserve. The project (LDR No. 98-0792) was approved in 2001 by the City Council and is in the process of obtaining a Coastal Development Permit from the California Coastal Commission.

The project will preserve the single on-site vernal pool, occupied by San Diego fairy shrimp, and its watershed. In addition, the project approved by the City included 1 lots and has subsequently been redesigned to eliminate three lots to allow for a connection between the vernal pool and the open space to the west and to increase the buffer on the north to range from 50 to 60 feet. However, constraints from an existing road alignment to the east and existing development to the south limit the buffer from the watershed. The buffer in these locations will range from 12 to 60 feet. To mitigate potential indirect impacts from the adjacent development and reduced buffer consistent with the VPHCP and Environmentally Sensitive Lands (ESL) Regulations, the project will implement a long-term management and monitoring plan, record a covenant of easement over the conserved area, and provide funding in-perpetuity for management and monitoring.

St. Jerome's Catholic Church

The proposed St. Jerome's Catholic Church site (Figure 4-3) occupies approximately 17.7 acres located on undeveloped land at the northwest corner of Otay Mesa Road and Ocean View Hills Parkway in the Otay Mesa Community Plan area. The proposed project includes a church, a parish hall/gymnasium, a preschool and elementary school, playfields, and parking on 10.42 acres. The remaining 7.24 acres of the property will be preserved as natural open space. An EIR (PTS No. 4480) was in process in 2006 but was never completed. The project will have direct

impacts to six vernal pools occupied by San Diego and/or Riverside fairy shrimp. To mitigate for these impacts, the project will preserve 18 vernal pools and restore additional pools within the 7.24-acre on-site vernal pool preserve, and record a covenant of easement over the preserve and implement a long-term management and monitoring plan that will be funded in-perpetuity. The agreed upon mitigation at a 4:1 ratio and conservation measures described above will constitute the conditions required to consider this a covered project under the VPHCP.

Pasatiempo Parks

The Pasatiempo Parks project (Figure 4-4) consists of two future parks with passive uses located within the Navajo Community Planning area. The parks are located on Pasatiempo Avenue north of Rancho Park Drive. A 10-acre neighborhood park site is located on the east side of the street and a 5.2-acre open space park is located on the west side of the street.

The neighborhood park consists of a fenced 5-acre vernal pool preserve area, where all the on-site pools will be managed and preserved in perpetuity. As shown in Figure 4-4, this site will include a parking area and children's play area/multi-purpose courts located in the northwest corner of the site. Other proposed amenities may include picnic tables, benches, trail with fitness stations, and interruptive signage. The native upland vegetation on-site will remain largely intact with these uses interspersed throughout the site. Final design of the park will be determined with input from the community through public workshops.

The adjacent open space park will include similar amenities, such as picnic tables, benches, trail with fitness stations, and interruptive signage interspersed within 2 acres of the native habitat. The site will not include parking or hardscape areas. An SDG&E easement that may contain vernal pool resources runs through the center of the site. The City does not have jurisdiction over this easement and uses within this easement are permitted through SDG&E's HCP (Permit No. PRT-809637). Site-specific surveys will be conducted as part of the project submittal to determine if any of the vernal pool resources exist within the City's jurisdiction. It would be the intent of the City to conserve, manage, and protect these resources if present. However, location of a trail within the existing SDG&E easement or pathways may have potential for indirect impacts to vernal pool resources.

Any proposed project within either park will require discretionary approval and will be consistent with ESL regulations. Any impacts to vernal pool resources in the open space park will be mitigated within the Neighborhood Park vernal pool preserve area.

4.1.3 Future Development Projects

The following types of projects are permitted under the VPHCP, subject to consistency with and ESL and VPHCP:

- Public and private development, including construction of buildings, structures, infrastructure and all alterations of the land, that are permitted through the City
- Third Party Beneficiaries[4] granted take authorization
- Other projects within the VPHCP Plan Area, but that are outside of the MHPA.

Current and future development projects not included on the above covered projects list would be required to analyze their impacts and conservation compared to the requirements and conditions of the VPHCP (see Chapter 5). Subsequent environmental review including consistency with the City's Biology Guidelines, CEQA, and NEPA (where applicable) would also be required. If projects are consistent with the VPHCP they would be granted the authority to impact vernal pools with endangered species through the City's Incidental Take Permit issued upon the adoption of the VPHCP. Incidental Take would be transferred upon the discretionary approval by the City on the proposed land development activity.

4.1.4 Development and Expansion of Roads

Expansion of existing roads and the development of new roads may be required to cross the MHPA to accommodate existing and planned land use. The City identifies the need to expand existing roads and the development of new roads in the circulation/mobility element of the City's General Plan and the corresponding Community Plans. Transportation modeling is used to determine the necessary road widths and required network to accommodate the "average daily trips" that result from existing and planned land uses. For the VPHCP, expansion of existing roads and development of new roads are considered conditionally compatible with the MHPA as listed in Table 4-1.

[4] Projects that are not subject to the City's discretionary land use authority (e.g., school district activities) may elect to utilize the City's land use permitting process as a Third Party Beneficiary to gain incidental take authorization under the VPHCP.

Table 4-1
Covered Road Projects

Covered Activity	Description	Conditions
Expansion of existing roads	Expansion of existing roads in and adjacent to the MHPA may be necessary to implement the transportation element of the adopted Community Plan.	Expansion of existing roads may not impact vernal pools within the MHPA unless no other feasible alternative exists. If avoidance is not feasible, the project must demonstrate that impacts have been minimized to the maximum extent practicable. The project must evaluate the need for the road expansion pursuant to the Community Plan and evaluate alternate development proposals (e.g., reduced medians, reduction in road width/classification). The City would document all of these steps as part of its determination of consistency with the VPHCP. Mitigation consistent with the VPHCP and project approval through the City's discretionary process would be required for all unavoidable impacts.
Development of new roads	New roads (e.g., Community Plan, local, and unclassified) may be required to implement the transportation element of the adopted Community Plan and the City's Street Design Manual. These roads may impact vernal pool resources.	New roads may not impact vernal pools within the MHPA unless no other feasible alternative exists. If avoidance is not feasible, the project must demonstrate that impacts have been minimized to the maximum extent practicable. The project must evaluate the need for the road expansion pursuant to the Community Plan and evaluate alternate development proposals (e.g., reduced medians, reduction in road width/classification). The City would document all of these steps as part of its determination of consistency with the VPHCP. Mitigation consistent with the VPHCP and project approval through the City's discretionary process would be required for all unavoidable impacts. Specific roads are further discussed and conditioned below.
Private roads	Private access roads are those that are used to service a single private lot or development.	Private roads would only be allowed in the MHPA if necessary to allow for access to an existing legal lot(s) and to maintain the existing legal rights of the underlying zone of the lot(s). Private roads would not be allowed in the MHPA if a viable access alternative exists. Private roads that are allowed would have to show that

Covered Activity	Description	Conditions
		they have avoided and minimized impacts to the maximum extent practicable and mitigated pursuant to the VPHCP. Road development would count toward the allowable development area of the proposed project. Mitigation consistent with the VPHCP and project approval through the City's discretionary process would be required for all unavoidable impacts.

The following roads within existing Community Plans have been preliminarily reviewed by the City and Wildlife Agencies, and as conditioned, meet the VPHCP compatibility criteria:

- Rancho Peñasquitos and Torrey Highlands Community Plans
  - Camino Del Sur and Carmel Mountain Road
- Otay Mesa Community Plan
  - Airway Road between Caliente and Heritage
  - La Media south of Aviator Road
  - Siempre Vive between Las Californias and La Media
  - Border Road between Las Californias and La Media (Truck Route)

The segment of La Media north of Aviator Road is not covered by the VPHCP. It has been specifically excluded. If this road is proposed for development in the future, separate authorization would be required for any vernal pool impacts.

4.1.5 Essential Public Projects (EPP)

There is a potential for impacts to occur to vernal pool resources during the construction of the City's essential public projects (EPP). Pursuant to the City's ESL, Section 143.0510 (d), a wetland deviation, including impacts to vernal pools, may be considered when a proposed project meets all the criteria as outlined under the EPP Option.

Any EPP project that would propose impacts to vernal pool resources would be analyzed in accordance with ESL, City's Biology Guidelines, and the VPHCP and would provide mitigation consistent with those requirements.

4.1.6 City of San Diego Airports

The City owns and operates Brown Field Municipal Airport in Otay Mesa and Montgomery Field Airport in Kearny Mesa. Vernal pools are located at both sites. The vernal pool complex at Montgomery Field (N5-6) contains the largest population of San Diego mesa mint within the City's jurisdiction. The VPHCP Baseline includes the MHPA and lands that have been identified for mitigation within the two airports per previously approved projects. No expansion of the MHPA is proposed on airport lands. Management and monitoring the vernal pool resources would be consistent with the respective approved projects: Montgomery Field Runway Extension Project/Biological Opinion number 1-6-94-F-32 and the Metropolitan Airpark project/PTS number 208889 for Brown Field. The HCP conservation analysis only includes vernal pools conserved at these locations. All development and operational activities at the airports are subject to Federal Aviation Administration (FAA) jurisdiction and any loss of vernal pool resources would be permitted through a separate Section 7 process. Therefore, no Incidental Take authorization would be required or permitted under the VPHCP.

4.2 COVERED ACTIVITIES

4.2.1 Definition and Discussion

Covered activities are land use and public infrastructure activities, as well as conservation activities identified in the VPHCP, which are subject to the City's jurisdiction and land use control that may result in Incidental Take of covered species by impacting potential vernal pool species and/or occupied habitat. The VPHCP provides the necessary Incidental Take for these species as authorized in the VPHCP Implementing Agreement. Each covered activity is conditioned for assurance that its potential impacts are either avoided or minimized and fully mitigated.

4.2.2 Operations for Public Safety and Fire Protection

The interface between current and future urban development and the MHPA requires increased coordination between Preserve Managers and the agencies responsible for public safety and protection.

Fire is natural phenomena in the Mediterranean climate of southern California. Frequent and intense fires can modify the natural landscape and poses a threat to public safety. The City has adopted Fire Safety and Brush Management Guidelines to reduce the risk of fire and create defensible space between structures and potential fuel sources (e.g., native vegetation). This defensible space slows down the fire, giving fire safety personnel time to stage and protect

structures. In addition, during major wildfires, fuel breaks and backfires are often used to proactively fight fires.

Fuel reduction (i.e., brush management) for fire protection proposes that are in conformance with the City Brush Management Regulations (Land Development Code Section 142.0412 are allowed in the MHPA, as listed in Table 4-2. All fire protection agencies would be allowed access to the MHPA as necessary to enforce local fire safety laws, and to protect public health, safety, and welfare as necessary to combat wildfires.

Table 4-2
Covered Police and Fire Activities

Covered Activity	Description	Condition for consistency
Homeless or itinerant worker camps abatement	Remove homeless or itinerant work camps located in the MHPA. This includes dismantlement and removal of structures.	City staff (i.e., Park and Recreation Department, Environmental Services Department) would provide maps of known vernal pool locations to the abatement crews and would provide oversight (i.e., identify areas to be avoided) to ensure impacts to vernal pool resources would be avoided and/or minimized as much as possible. If impacts to vernal pools occur, directly related to the action(s) of City abatement crews, the City would revegetate/remediate disturbed and/or destroyed habitat and any impacts would be mitigated according to the provisions of the VPHCP.
Brush management and weed abatement	The Park and Recreation Department conducts brush management (vegetation thinning) on 1,180 acres of City-owned open space adjacent to existing privately developed lots. Additional brush management on private property is a requirement of the property owner.	City staff (i.e., Park and Recreation Department) would provide maps of known vernal pool locations to the brush management crews and would provide oversight (i.e., flagging) to ensure impacts to vernal pool resources would be avoided. Brush management would occur within the MHPA boundaries as required per the San Diego Municipal Code. Since vernal pool vegetation poses no significant fuel load, no impacts to vernal pool basins and covered species are allowed. Thinning in the watershed would be limited to the standards set forth in the Municipal Code.

Law enforcement and fire control agencies, the National Guard, the Immigration and Naturalization Service (INS), the Border Patrol, and organizations and agencies operating within the MHPA area are subject to all applicable requirements of federal and state law. This VPHCP will create no additional permit requirements beyond those of existing federal and state law for the activities of these agencies.

The MHPA accommodates access for emergency response, fire control and management, homeless abatement, and other police and safety services. All law enforcement agencies are allowed access to the MHPA as necessary to enforce all local, state, and federal laws. All medical, rescue, and other emergency agencies are allowed access to carry out operations necessary to address an imminent threat to the health, safety, and welfare of the public. Emergency response is not considered a covered activity; rather, impacts associated with emergency response are evaluated in Chapter 9.

4.2.3 Operations for Safety on Solid Waste Sites

The City maintains 22 solid waste sites throughout the City. No known vernal pools occur on any old/closed, inactive, or active landfill sites, except for the Miramar Landfill, which is not included in this VPHCP due to its occurrence on land outside the land use control of the City (i.e., federal lands). While there are no known vernal pool resources on any solid waste sites at this time, over the course of years, there is a potential that vernal pools could form and may be encountered during management activities.

To protect public health, safety, and the environment, from methane, leachate, and/or surface water pollution contamination, laws and regulations apply to solid waste sites to periodically maintain the surface to avoid ponding water. Thus, maintenance activities may prevent the formation of vernal pools; however, exceptions may occur. Landfills, burn sites, and other solid and hazardous waste facilities are often capped with clay materials that resemble vernal pool soils and can subside causing depressions that capture water. Propagules may be dispersed by birds or other vectors resulting in one or more covered species occurring and resulting in the take of an endangered species due to the necessary management to protect public health, safety, and welfare.

Under the VPHCP, the maintenance activities specified below in Table 4-3 required for old/closed, inactive, and active site for the protection of public health and safety and the environment are considered covered activities, subject to the conditions of the VPHCP.

Table 4-3
Covered Solid Waste Activities

Covered Activity	Description	Condition for consistency
Cover installation, maintenance, and repair	Solid waste sites such as burn sites and landfills often require placement of cover material. This is a necessary part of protecting air and water resources. Cover may include soils, geotextiles, vegetation, or other material.	If possible, cover material would not be placed during the rainy season. If ponding is noticed within the activity area, a fairy shrimp survey would be required to document the presence or absence of any fairy shrimp and any impacts to San Diego or Riverside fairy shrimp would be mitigated according to the provisions of the VPHCP.
Road and access construction, use, and maintenance	Solid waste site may have dirt roads, paved roads, treated roads, trails to monitoring locations, and other access infrastructure.	No impacts to vernal pools are allowed for the creation of new access roads unless approved through the City's discretionary process consistent with the provision of the VPHCP. Maintenance of existing access roads would be allowed. Any vernal pools and/or road ruts with San Diego or Riverside fairy shrimp would be avoided if possible. Any unavoidable impacts would be minimized through specific techniques (e.g., metal plates over pools, operation in the dry season). Mitigation would be consistent with the provisions of the VPHCP.
Gas collection and management system installation, maintenance, and repair	With concerns about greenhouse gases, measures to contain, collect, and manage greenhouse gases are increasingly important. Gas infrastructure includes collection pipes, monitoring probes, flares, and other structures.	Use, maintenance, inspection, and repair of existing gas collection and management systems are allowed. Vernal pools and/or road ruts with San Diego or Riverside fairy shrimp would be avoided if possible. Any unavoidable impacts would be minimized through specific techniques (e.g., metal plates over pools, operation in the dry season). Mitigation would be consistent with the provisions of the VPHCP.
Use and maintenance of water collection, protection, and drainage structures	It is important to prevent various means of water contamination that may be caused by runon, runoff, and infiltration. Drainage systems, including berms, ditches, sedimentation basins, and other structures are required by the regulatory agencies.	Use, maintenance, inspection, and repair of existing water collection, protection, and drainage structures are allowed. Vernal pools and/or road ruts with San Diego or Riverside fairy shrimp would be avoided if possible. Any unavoidable impacts would be minimized through specific techniques (e.g., metal plates over pools, operation in the dry season). Mitigation would be consistent with the provisions of the VPHCP.

Covered Activity	Description	Condition for consistency
Installation of vegetation, removal of vegetation, maintenance of vegetation, brush management and other vegetation control	Although vegetation is needed in some areas to prevent sedimentation, deep-rooted species that may violate the cap are not allowed. Adjustments are needed from time to time to the vegetation to ensure that water protection, air protection, safety, and other regulatory goals are met.	Only appropriate vernal pool species would be allowed within the vernal pool basins; appropriate upland species would be allowed in the associated watersheds.
Installation, removal, modification, and maintenance of fencing and other barriers and signs	To prevent public exposure to hazardous materials and for other purposes, fencing and signage are necessary at some sites.	New signs, fences, and other barriers would not be allowed in the vernal pool basins, but would be acceptable within the vernal pool watershed where necessary due to property boundaries, topography, proximity to critical access points, or for other management reasons.
Animal abatement measures	Coyotes may pose problems by digging into waste; seagulls may collect waste and drop it on residences, or may pose a bird strike hazard near airports. To prevent public health or safety issues, wildlife sometimes must be excluded from solid waste sites.	City staff will avoid vernal pool resources when performing these activities.
Waste site abatement and/or remediation	Some sites need to be capped. At other sites, the wastes must be removed entirely. Various treatments may be needed to prevent public health and safety or environmental problems.	Waste removal should not occur during the rainy season. If ponding occurs within the area of proposed activity, a fairy shrimp survey would be required to document the presence or absence of any fairy shrimp and any impacts to San Diego or Riverside fairy shrimp would be mitigated according to the provisions of the VPHCP.

4.2.4 Operations for Public Utilities

The City Public Utilities Department provides safe, healthful drinking water to the 1.3 million residents of San Diego and regional wastewater treatment and disposal services for more than 2 million residents of San Diego County. The City's Water Branch has one of the largest and most complex water storage, treatment, and delivery systems in the nation. Nine reservoirs hold the raw water before it is moved to one of three plants for treatment. Water is then pumped through hundreds of miles of pipeline to customers.

The City's Wastewater Branch is responsible for the collection, treatment, and safe disposal of wastewater for the City. The Wastewater Branch operates the Point Loma Sewage Treatment Plant. It also provides regional wastewater treatment and disposal services for 15 other cities and

special districts within a 450-square-mile area stretching from Del Mar to the north, Alpine and Lakeside to the east, and San Ysidro to the south.

Within the vast operational service area of the City Public Utilities Department are contained miles of water and sewer lines, pump stations, access roads, reservoirs, dams, and other critical infrastructure. Routine and proactive maintenance is required to avoid environmental contamination from spills, and public health, safety, and welfare from disruption of services. Maintenance activities have the potential to impact vernal pool resources that may contain one or more of the VPHCP covered species.

Under the VPHCP, the maintenance activities[5] specified in Table 4-4 are required for the operation of the City water and sewer service are considered covered activities, subject to the conditions of the VPHCP.

Table 4-4
Public Utilities Covered Activities

Covered Activity	Description	Conditions
Maintenance, inspection, and repair activities for all existing sewer and water infrastructure	This includes meter inspections, assessments of the condition of pipelines, sonar and television of pipelines, cleaning of sewer lines, pipeline repairs, bypass pumping, manhole replacement, pump station maintenance, vaults, meters, maintenance of stormwater protection devices, access gates, access protections (bollards, rocks, etc.), fencing, and signage.	Maintenance, inspection, and repair of existing sewer and water infrastructure are allowed. Vernal pools and/or road ruts with San Diego or Riverside fairy shrimp would be avoided to the extent feasible. Any unavoidable impacts would be minimized through specific techniques (e.g., metal plates over pools, operation in the dry season). Mitigation would be consistent with the provisions of the VPHCP.
Maintenance and Improvements of existing access paths to sewer and water infrastructure	This includes all activities necessary to keep existing access and improvements needed to maintain existing access to sewer and water infrastructure.	Maintenance of existing access roads would be allowed. Any improvements to existing access paths may not extend beyond the limits of the existing access path. Vernal pools would be avoided if possible. Any unavoidable impacts would be minimized through specific techniques (e.g., metal plates over pools, operation in dry season). Mitigation would be consistent with the provisions of the VPHCP.

[5] Covered Activities for the operation water and sewer service do not include the expansion of existing infrastructure or replacement of existing infrastructure. New infrastructure would be analyzed consistent with the VPHCP to determine consistence with the Incidental Take provisions of the VPHCP.

4.2.5 Preserve Management

The City is required to manage species and habitats under the adopted MSCP (City of San Diego 1997) and this VPHCP. Management may include a range of stewardship activities, such as fencing, signage, and litter removal, and activities related to biological management such as restoration, enhancement, and weed removal. MHPA management in the City is done by the departments that own the land; for example, the City's Open Space is managed by the Park and Recreation Department, lands around the City reservoirs are managed by the Public Utilities Department, and the municipal airport land is managed by the Airport Division of the Real Estate Assets Department.

All of these City land managers, as well as other nonprofit or private land managers, may propose activities for the betterment of the vernal pool species. These activities have the possibility of inadvertently impacting vernal pool resources and/or the seven covered species. MHPA management activities are considered a covered activity under this VPHCP, subject to the conditions of the VPHCP, and are listed in Table 4-5.

Table 4-5
Parks and Recreation Covered Activities

Covered Activity	Description	Conditions
Existing and new fences, signs (denoting conserved area and/or educational), and interpretive panels	New signs, fences, and interpretive panels may be installed (and existing locations maintained or moved upon replacement) within the MHPA.	New signs, fences, and interpretive features are not allowed in the vernal pool basins, but are acceptable within the vernal pool watershed and buffer where necessary due to property boundaries, topography, proximity to critical access points, or for other management reasons.
Maintenance of access roads	Existing access roads for City staff, public safety, or as required as provisions of a utility access easement are allowed within the MHPA.	The City would monitor the use of existing access roads within the MHPA to assess for any options to reduce potential impacts to vernal pool resources.
Restoration and enhancement	This includes activities within the MHPA to restore and enhance native habitat and species. Associated activities such as herbicide application, hand and mechanical weeding, excavation using hand and mechanized equipment, planting of container stock, earth manipulation designed to improve habitat for native pollinators, and other restoration/enhancement activities.	This activity is allowed on City-owned land under the VPHCP if a restoration plan is developed by a qualified biologist and has been reviewed and accepted by the land owner/manager and City staff (i.e., Environmental Analysis Section [EAS] and MSCP).

Covered Activity	Description	Conditions
Litter and trash removal	The removal of litter and trash in the preserve is recognized as a necessary function of MHPA management.	Litter and trash removal would be consistent with requirements of the VPHCP. Access for the removal of litter and trash will be on existing access roads to avoid impacts to vernal pool resources. Removal of litter within vernal pools will be done by hand or other methods that would not damage the vernal pools and/or covered species.
Education features	Educational features such as kiosks, signage, educational trail segments, boardwalks, and viewpoints are acceptable within the vernal pool watershed, and/or buffer. Educational projects are currently planned for areas such as Del Mar Mesa, Carmel Mountain, and Otay Mesa, and may be expanded to other areas of the MHPA based upon the success of the current projects.	Educational features on City-owned land would be consistent with the VPHCP and would avoid vernal pool basins and covered species. Educational projects within vernal pool watersheds, and/or buffers would use construction techniques and designs that would avoid and minimize impacts to vernal pool resources and would use construction material that prolongs the life of the feature to avoid the need for continued replacement.
Monitoring and research	Monitoring and/or research activities are allowed within the MHPA and may take place within a vernal pool, watershed, or buffer. Monitoring and research may be focused on vernal pools, or other biological processes (e.g., wildlife corridors).	Monitoring and/or research activities on City-owned land are consistent with the VPHCP goals and objectives. Access to City-owned sites would be at the discretion of the land-owning department.

4.2.6 Parks and Recreation

The City of San Diego Park and Recreation Department operates and maintains a diverse and valued park system that serves millions of residents and visitors each year. The City operates and manages 24,655 total acres managed as open space within the City. Open Space Parks are used for purposes such as preservation of natural resources, passive outdoor recreation, and scenic and visual enjoyment.

Incidental impacts from recreational uses may occur to vernal pool resources that may contain one or more of the VPHCP covered species. Recreational uses in open space areas are considered a covered activity under this VPHCP, subject to the conditions of the VPHCP (see Table 4-6).

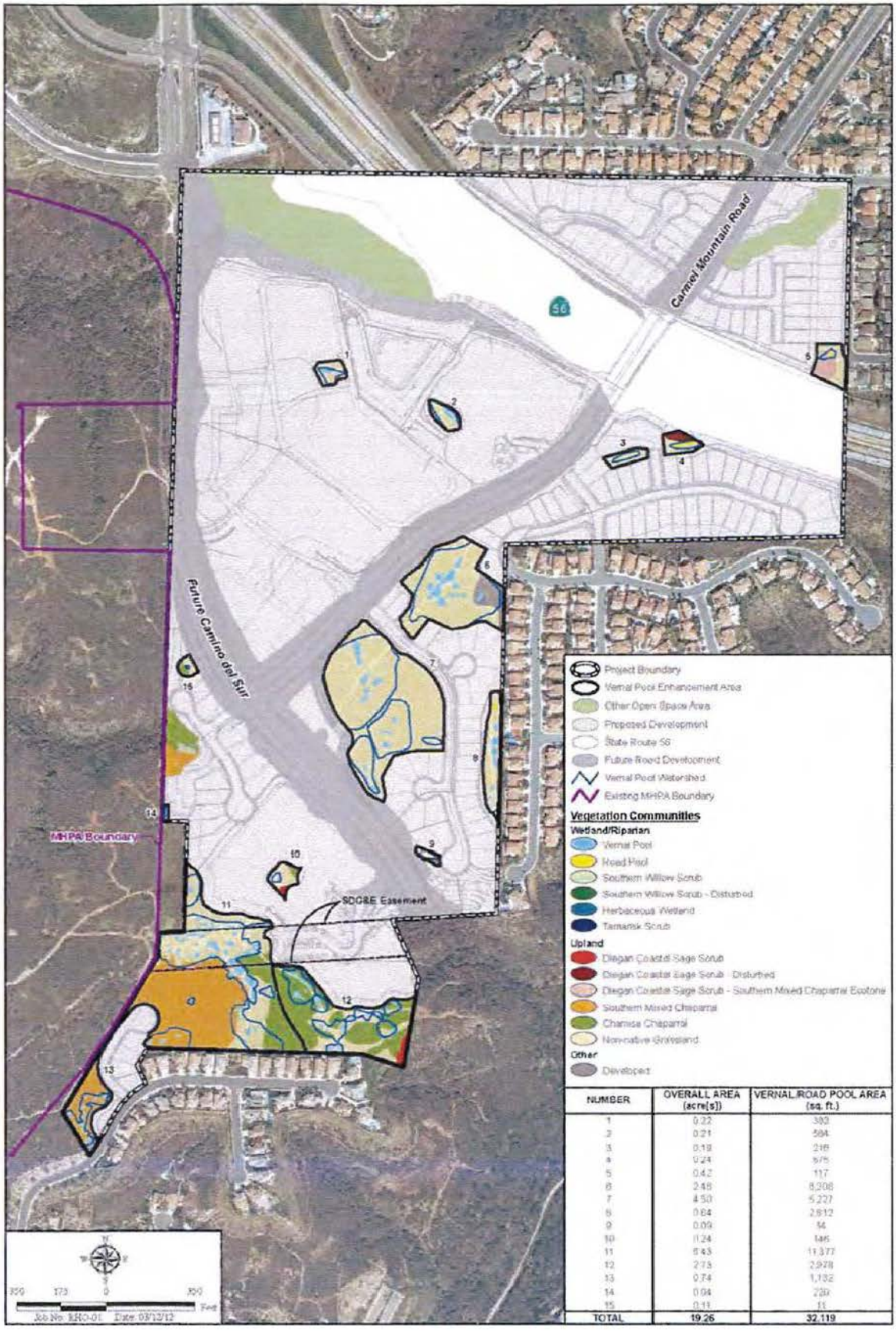
Table 4-6
Parks and Recreation Covered Activities

Covered Activity	Description	Conditions
Maintenance and use of existing trails	Existing trails, authorized for public use, would be allowed to remain in place and be maintained within the vernal pool preserve area. Use of these trails would be limited to nonmotorized forms of transportation and would be consistent with any applicable area-specific, Natural Resource Management Plan (NRMP).	The City would monitor and enforce the use of the trails consistent with the City of San Diego Municipal Code and any applicable NRMP. Park and Recreation staff would evaluate the need to prohibit and/or reroute trail use located adjacent to vernal pool resources or to protect the vernal pools through signage and fencing.
Use, maintenance, and repair of existing roads	Use of existing access roads for City staff is allowed within the MHPA.	The City would monitor the use of existing access roads within the vernal pool preserve area to assess for any options to reduce potential impacts to vernal pool resources.
Development of new trails	Recreation demand, public safety, and/or a biologically superior trail alignment may instigate the need for development of new recreational trails within the MHPA. Use of these trails would be limited to nonmotorized forms of transportation and would be consistent with any applicable area-specific NRMP that has been approved by the Wildlife Agencies.	New trails proposed within the vernal pool preserve area would avoid the vernal pool and watershed. Exceptions maybe allowed on a case-by-case basis where all alternatives would have a greater biological impact. Bridges are acceptable as a trail design feature to avoid direct impacts to vernal pool basins or watersheds.

4.3 PIPELINE PROJECTS

4.3.1 Definition

Pipeline Projects are projects involving land use development within the City for which hardline preserve boundaries have been established and take authority has been approved through a process other than VPHCP (such as an approved USFWS Biological Opinion [BO]). The Parties have determined that both the design of the project and the mitigation related to the covered species conforms to the VPHCP. Therefore, these projects will not require any further approvals related to Incidental Take of covered species, and no further mitigation related to the covered species would be required. Pipeline Projects are shown in Figures 4-5 and 4-6.



NUMBER	OVERALL AREA (acre[s])	VERNAL/ROAD POOL AREA (sq. ft.)
1	0.22	382
2	0.21	584
3	0.19	248
4	0.24	676
5	0.42	117
6	2.48	8,208
7	4.50	5,227
8	0.84	2,812
9	0.09	14
10	1.24	146
11	5.43	11,377
12	2.73	2,978
13	0.74	1,152
14	0.04	220
15	0.11	11
TOTAL	19.26	32,119

Date: 12/19/2013

Path: L:\MSCP\Vernal Pool HCP\Maps\VPHCP_PlanArea_2013\VPHCP_PlanArea_RhoadsCrossing_2013.mxd

VPHCP- Rhodes Crossing

THE CITY OF SAN DIEGO

DRAFT

Figure 4-5
Pipeline Project

Date: 12/19/2013

Path: L:\MSCP\Vernal Pool HCP\Maps\VPHCP_PlanArea_2013\VPHCP_PlanArea_Candlelight_2013.mxd

VPHCP- Candlelight

THE CITY OF SAN DIEGO

DRAFT

Figure 4-6
Pipeline Project

4.3.2 List of Pipeline Projects

The Pipeline Projects described below have planned development footprints that have been negotiated as take-authorized areas along with associated conserved lands. They are identified in the MHPA with a hardline depicting the take-authorized area and the associated 100% conservation area. Pipeline Projects included in the VPHCP are:

- Rhodes Crossing (BO No. 08B0401-12FC0578) (Figure 4-5)
- Candlelight (BO No. 08B0715-08F0817) (Figure 4-6)

CHAPTER 5
CONSERVATION STRATEGY

Chapter 5 describes the conservation strategy to meet the regulatory requirements of FESA and the NCCP Act and to streamline compliance with CEQA, NEPA, and other applicable environmental regulations (see discussion in Chapter 1). The conservation strategy provides habitat-based and species-specific objectives for conservation, management, and/or restoration of the vernal pools and covered species covered under this VPHCP. This chapter also describes the additional areas to be added to the MHPA via implementation of the VPHCP to provide increased protection of vernal pools and covered species in a configuration that provides long-term conservation value. Avoidance, minimization, and mitigation requirements for impacts to vernal pools and covered species resulting from covered projects and covered activities (as described in Chapter 6) are also provided.

5.1 VPHCP GOAL AND OBJECTIVES

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 5-1). The habitat-based objectives identify the number of specific vernal pools and complexes that will be conserved, managed, and/or restored through implementation of the VPHCP. The species-specific objectives include conservation, management, and/or restoration and enhancement actions for covered species. The VPHCP objectives were developed using the "SMART" method: **S**pecific, **M**easurable, **A**chievable, **R**esults-oriented, and **T**ime-fixed (Adamcik et al. 2004) and will be implemented through the mitigation, management and monitoring strategies identified in the VPHCP and through the complex-specific VPMMP (Chapter 7 and Appendix D).

Table D-1 of Appendix D includes the required management levels for each managed under the framework VPMMP. Note that not all vernal pool sites that are conserved under the VPHCP require management in the VPMMP. As noted in Table 5-1, 71 vernal pool sites will be conserved under the VPHCP. Of those, 63 will be actively managed via the VPMMP. In addition, 18 of the 63 sites that will be managed also require restoration to bring the sites from a Level 2 or Level 3 status to a Level 1 (stewardship) status. As shown in Table 5-1, restoration of some of the 18 sites will also reestablish viable populations of specific covered species. Population viability is defined as the ability of a population to persist and avoid extinction from external forces (e.g., natural disasters or introduced species) or internal forces (e.g., competition

or fluctuation in genetic composition) (Lehmkuhl 1984; Shaffer 1981; Thomas 1990; Trail et al. 2007). The viability of a population naturally will increase or decrease in response to changes in rates of birth/germination, death, and/or growth of individuals.

Table 5-1
VPHCP Conservation Objectives

Objectives	Conserve	Manage	Restore
Vernal Pools Objectives (Habitat Based)	Conserve in-perpetuity at least 2,343 vernal pools (totaling approximately 36.9 acres of basin surface area) at 71 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 63 vernal pool sites within the MHPA through implement-tation of the VPHCP Vernal Pool Management and Monitoring Plan or Site-Specific Management Plans (that are consistent with the VPHCP goals and objectives)	Restore 18 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 D-1 to stabilize covered species' populations	Manage specific sites identified in Appendix D-1 to maintain the covered species populations consistent with the VPMMP (Appendix D)	Restore specific complexes identified in Appendix D-1 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 consistent with the 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 339 vernal pools occupied by San Diego Mesa mint within 16 sites	Manage 11 sites as identified in Appendix D-1 and consistent with the VPMMP	Restoration is not necessary under the VPHCP for this Covered Species
Spreading navarretia	Conserve 95 vernal pools occupied by spreading navarretia within eight sites	Manage all conserved complexes/sites consistent with the VPMMP	Establish viable populations of spreading navarretia within J11E, J11W, J12, J13, J16-18, J20-21, J27, J28, R1
San Diego button-celery	Conserve 724 vernal pools occupied by San Diego button-celery within 19 sites	Manage 15 sites as identified in Appendix D-1 and consistent with the 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 consistent with the 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 six sites	Manage all conserved sites consistent with the VPMMP	Establish viable populations of Riverside fairy shrimp within J11E, J11W, J12, J13E, J14, J16-18, J20-21, J21, J27, and J28E
San Diego fairy shrimp	Conserve 449 vernal pools occupied by San Diego fairy shrimp within 31 sites	Manage 26 sites as identified in Appendix D-1 and consistent with the VPMMP	Restoration is not necessary under the VPHCP for this covered species

5.2 CONSERVATION MEASURES

5.2.1 Avoidance and Minimization Measures

As required by FESA, the VPHCP includes measures to avoid or minimize the impact of the taking of covered species. The primary focus of these measures is to avoid or minimize take of individual covered species (i.e., death or injury to species) and their high-quality habitat (vernal pools) that may be affected by covered activities. Others forms of take (e.g., harm or harassment of covered species) may still occur.

Indirect impacts will also be minimized by requiring development projects adjacent to the MHPA to be designed in ways that reduce impacts on covered species and their habitat. Areas designated for conservation and described in this chapter include substantial amounts of high-quality habitat for covered species and vernal pool habitat. covered activities that result in permanent impacts are anticipated to occur primarily in areas with low-quality habitat. Most vernal pool preservation and enhancement (Table 5-1 and Sections 5.2.2 and 5.2.3) will be concentrated within the MHPA away from covered activities.

General avoidance and minimization measures for covered projects and covered activities are as follows:

1. Any development adjacent to the MHPA will be constructed to slope away from the extant pools to be avoided, to ensure that runoff from the project does not flow into the pools.
2. Covered projects will require temporary fencing (with silt barriers) of the limits of project impacts (including construction staging areas and access routes) to prevent additional vernal pool impacts and prevent the spread of silt from the construction zone into adjacent vernal pools to be avoided. Fencing will be installed in a manner that does not impact habitats to be avoided. Final construction plans will include photographs that show the fenced limits of impact and all areas of vernal pools to be impacted or avoided. If work occurs beyond the fenced or demarcated limits of impact, all work will cease until the problem has been remedied to the satisfaction of the City. Temporary construction fencing will be removed upon project completion.
3. Impacts from fugitive dust that may occur during construction grading will be avoided and minimized through watering and other appropriate measures.
4. A qualified monitoring biologist is required to be on-site during project construction activities to ensure compliance with all mitigation measures identified in the environmental document. The biologist must be knowledgeable of vernal pool species biology and ecology. The biologist will perform the following duties:

a. Oversee installation of and inspect the fencing and erosion control measures within or up-slope of vernal pool restoration and/or preservation areas a minimum of once per week and daily during all rain events to ensure that any breaks in the fence or erosion control measures are repaired immediately.

b. Periodically monitor the work area to ensure that work activities do not generate excessive amounts of dust.

c. Train all contractors and construction personnel on the biological resources associated with this project and ensure that training is implemented by construction personnel. At a minimum, training will include (1) the purpose for resource protection; (2) a description of the vernal pool species and their habitat(s); (3) the conservation measures that should be implemented during project construction to conserve the vernal pool species, including strictly limiting activities, vehicles, equipment, and construction materials to the fenced project footprint to avoid sensitive resource areas in the field (i.e., avoided areas delineated on maps or on the project site by fencing); (4) environmentally responsible construction practices as outlined in measures 5, 6 and 7; (5) the protocol to resolve conflicts that may arise at any time during the construction process; and (6) the general provisions of project's the mitigation, monitoring and reporting program (MMRP), the need to adhere to the provisions of the Act, the penalties associated with violating the Act.

d. Halt work, if necessary, and confer with the City to ensure the proper implementation of species and habitat protection measures. The biologist will report any violation to the City within 24 hours of its occurrence.

e. Submit weekly letter reports to the City during project construction and a final report following completion of construction. The final report will include as-built construction drawings with an overlay of habitat that was impacted and avoided, photographs of habitat areas that were to be avoided, and other relevant summary information documenting that authorized impacts were not exceeded and that general compliance with all conservation measures was achieved.

5. The following conditions will be implemented during project construction:

a. Employees will strictly limit their activities, vehicles, equipment, and construction materials to the fenced project footprint.

b. The project site will be kept as clean of debris as possible. All food related trash items will be enclosed in sealed containers and regularly removed from the site.

c. Disposal or temporary placement of excess fill, brush, or other debris will be limited to areas within the fenced project footprint.

6. All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities will occur in designated areas within the fenced project impact limits. These designated areas will be located in previously compacted and disturbed areas to the maximum extent practicable in such a manner as to prevent any runoff from entering the vernal pools or their watersheds, and will be shown on the construction plans. Fueling of equipment will take place within existing paved areas greater than 100 feet from the vernal pools or their watersheds. Contractor equipment will be checked for leaks prior to operation and repaired as necessary. A spill kit for each piece of construction equipment will be on-site. "No-fueling zones" will be designated on construction plans.

7. Grading activities immediately adjacent to vernal pools will be timed to avoid wet weather to minimize potential impacts (e.g., siltation) to the vernal pools unless the area to be graded is at an elevation below the pools. To achieve this goal, grading adjacent to avoided pools will comply with the following:

    a. Grading will occur only when the soil is dry to the touch both at the surface and 1 inch below. A visual check for color differences (i.e., darker soil indicating moisture) in the soil between the surface and 1 inch below indicates the soil is dry.

    b. After a rain of greater than 0.2 inch, grading will occur only after the soil surface has dried sufficiently as described above, and no sooner than 2 days (48 hours) after the rain event ends.

    c. To prevent erosion and siltation from storm water runoff due to unexpected rains, best management practices (i.e., silt fences) will be implemented as needed during grading.

    d. If rain occurs during grading, work will stop and resume only after soils are dry, as described above.

    e. Grading will be done in a manner to prevent runoff from entering preserved vernal pools.

8. Prior to project construction, topsoil will be salvaged from the impacted vernal pools or road ruts with fairy shrimp on-site consistent with the requirements of the approved restoration plan (e.g., free of versatile fairy shrimp). Vernal pool soil (inoculum) will be collected when dry to avoid damaging or destroying fairy shrimp cysts and plant seeds. Hand tools (i.e., shovels and trowels) will be used to remove the first 2 inches of soil from the pools. Whenever possible, the trowel will be used to pry up intact chunks of soil, rather than loosening the soil by raking and shoveling, which can damage the cysts. The soil from each pool will be stored individually in labeled boxes that are adequately ventilated and kept out of direct sunlight in order to prevent the occurrence of fungus or excessive heating of the soil, and stored off-site at an appropriate facility for vernal pool inoculum. Inoculum from different source pools will not be mixed for seeding any restored pools, unless otherwise approved by the City and Wildlife Agencies. The collected soils will be spread

out and raked into the bottoms of the restored pools. Topsoil and plant materials salvaged from the upland habitat areas to be impacted will be transplanted to, and/or used as a seed/cutting source for, the upland habitat restoration/creation areas to the maximum extent practicable as approved by the City.

9. To ensure that the construction and operation of the project do not adversely affect the vernal pools on-site, monitoring will be conducted throughout the rainy season to determine whether the project is changing the hydrology of, or causing erosion and sediment delivery to, these vernal pools. Monitoring will occur during the construction of the project and 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 will continue in 1-year increments, to a maximum of 5 years. A monitoring report will be submitted to the City by September 1 following each monitoring season. The monitoring program will 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 will be required.

10. Permanent protective fencing along any interface with developed areas and/or use other measures approved by the City to deter human and pet entrance into on- or off-site habitat will be installed. Fencing shall be shown on the development plans and should have no gates (accept to allow access for maintenance and monitoring of the biological conservation easement areas) and be designed to prevent intrusion by pets. Signage for the biological conservation easement area will be posted and maintained at conspicuous locations. The requirement for fencing and/or other preventative measures shall be included in the project's mitigation program.

5.2.2 Habitat Protection

Baseline Conservation – Existing Conserved Lands

As shown in Table 5-2, a total of 2,148 vernal pools (totaling 34.0 acres of basin surface area) within 44 complexes are currently conserved under the Baseline conditions. This includes vernal pools on lands conserved within the MHPA, or within a hardline conservation area associated with an existing permit (i.e., USFWS BO) or Pipeline Project (see Chapter 4). Under the Baseline conditions, 86% of the vernal pools within the VPHCP Plan Area are conserved.

Addition of Conserved Lands to the MHPA

Land preservation is an important component of this conservation strategy, in particular lands with vernal pool resources that are not currently conserved. A gap analysis for vernal pools was

conducted to identify the areas within the VPHCP Plan Area where vernal pools were not adequately protected. When determining the additional areas to add to the MHPA through implementation of the VPHCP, the following approach for conserving vernal pool complexes and covered species populations was considered:

- Conserve complexes occupied with the covered species (75% or 100% conservation level[6]).
- Conserve complexes (75% or 100% conservation level) identified in the Recovery Plan (USFWS 1998a) as necessary to maintain the viability of covered species populations.
- Conserve the covered species population genetics within any given complex (i.e., at least 50% of occupied vernal pools within a complex are conserved to preserve the genetics of the effective population, see definition below)

An "effective population" is defined as the number of individuals in an idealized population that has a value of any given population genetic quantity equal to the value of that quantity in the population of interest (Wright 1938; Charlesworth 2009; Crow 2010). In more general terms, the "effective population size" refers to the portion of a population that is required to represent the full genetic potential of that population. In other words, some individuals are genetically similar to other individuals, so protecting every individual is not necessary to protect the genetic potential of the overall population within a complex. Research suggests that the effective population size is, in general, less than 50% of the census population (Wright 1938; Charlesworth 2009; Crow 2010). This means that conserving at least 50% of a census population would most likely conserve the entire genetic potential of that population.

The VPHCP proposes to add additional public and private lands to the City's existing MHPA to meet the goals and objectives for the covered species. Specifically, additional lands will be added in the following locations: Otay Mesa, Kearny Mesa, Mira Mesa, and Navajo. Once these additional lands are added, the MHPA will conserve a total of 2,343 vernal pools within 53 vernal pool complexes (Table 5-2). Approximately 94% of the vernal pools within the VPHCP Plan Area will be conserved under implementation of the VPHCP.

Implementation of the VPHCP will increase conservation from the Baseline conditions by adding 195 vernal pools (3.1 additional acres of basin area) within 9 additional complexes to the

[6] The City has designated conservation levels (75 or 100%) for each parcel within the VPHCP Preserve. The conservation level denotes the portion of a parcel that will be conserved. For example, for a parcel designated with a 75% conservation level, 25% of the parcel is available for development. Development would occur on the least environmentally sensitive area of the parcel, as determined by the City environmental review process.

MHPA. This is an approximately 8% increase in conservation of vernal pools from the Baseline conditions.

Table 5-2
Additional Conservation from Implementation of the VPHCP

	Number of Complex Series in the VPHCP Plan Area	Number of Complex Series Conserved	Total Number of Pools in VPHCP Plan Area	Number of Pools Inside Baseline Conserved Areas	Number of Pools Conserved Based on Conservation Level[2]	% of Total Pools in VPHCP Plan Area Conserved	Acreage of Pools Conserved
Baseline[1]	54	44	2,488	2,154	2,148	86%	34.0
MHPA after VPHCP Implementation	54	53	2,488	2,388	2,343	94%	36.9
Additional Conservation Resulting from VPHCP Implementation	**N/A**	**9**	**n/a**	**234**	**195**	**8%**	**3.1**

[1] The Baseline includes conserved lands within the City's existing MHPA, permitted projects, and pipeline projects. See Chapter 4 for more detail.

[2] Pools and species population conserved is an estimate based on 75% or 100% conservation level by vernal pool complex. See Attachment C for more detail on the conservation analysis for each vernal pool complex in the VPHCP Plan Area.

5.2.3 Species Protection

Baseline Conservation – Existing Conservation of Covered Species

Table 5-3 shows the total number of vernal pools occupied by the seven covered species within the VPHCP Plan Area under the Baseline conditions. The total number of occupied pools conserved within the VPHCP Plan Area and the percentage of occupied pools conserved are also shown for each species. Under the Baseline conditions, 100% of occupied pools would be conserved for two of the seven covered species (Otay Mesa mint and California Orcutt grass).

Additional Conservation of Covered Species in the MHPA

Table 5-3 summarizes the conservation of covered species under the VPHCP once additional lands are added to the MHPA, including the total conservation of occupied pools, as well as the percentage of occupied pools conserved. The increase in conservation of occupied vernal pools from the Baseline conditions is also shown. Addition of lands to the MHPA through implementation of the VPHCP will result in conservation of 100% of occupied pools for four of the seven covered species, including Otay Mesa mint, San Diego Mesa mint, California Orcutt grass, and Riverside fairy shrimp. Therefore, 100% conservation is afforded to two additional

Table 5-3
Conservation of Vernal Pools Occupied with Covered Species (Total and % Pools Conserved)

	PONU Total Pools in VPHCP Plan Area	PONU Total Pools Conserved	PONU % Pools Conserved	POAB Total Pools in VPHCP Plan Area	POAB Total Pools Conserved	POAB % Pools Conserved	NAFO Total Pools in VPHCP Plan Area	NAFO Total Pools Conserved	NAFO % Pools Conserved	ERAR Total Pools in VPHCP Plan Area	ERAR Total Pools Conserved	ERAR % Pools Conserved	ORCA Total Pools in VPHCP Plan Area	ORCA Total Pools Conserved	ORCA % Pools Conserved	RFS Total Pools in VPHCP Plan Area	RFS Total Pools Conserved	RFS % Pools Conserved	SDFS Total Pools in VPHCP Plan Area	SDFS Total Pools Conserved	SDFS % Pools Conserved
Baseline[1]	369	369	100%	339	336	99%	96	95	99%	733	721	98%	58	58	100%	131	128	98%	488	421	86%
MHPA after VPHCP Implementation	369	369	100%	339	339	100%	96	95	99%	733	724	99%	58	58	100%	131	131	100%	488	449	92%
Additional Conservation Resulting from VPHCP Implementation	**n/a**	**0**	**0**	**n/a**	**3**	**1%**	**n/a**	**0**	**0**	**n/a**	**3**	**1%**	**n/a**	**0**	**0**	**n/a**	**3**	**2%**	**n/a**	**27**	**6%**

n/a= Not applicable

[1] The Baseline includes conserved lands within the City's existing MHPA, permitted projects, and pipeline projects. See Chapter 4 for more detail.

[2] Pools and species population conserved is an estimate based on 75% and/or 100% conservation level by vernal pool complex. See Appendix C for more detail on the conservation analysis for each vernal pool complex in the VPHCP Plan Area.

PONU = Otay Mesa mint
POAB = San Diego Mesa mint
NAFO = Spreading navarretia
ERAR = San Diego button-celery
ORCA = California Orcutt grass
RFS = Riverside fairy shrimp
SDFS = San Diego fairy shrimp

species from the Baseline conditions (San Diego Mesa mint and Riverside fairy shrimp). In addition, conservation of occupied vernal pools will increase for two covered species: three additional pools occupied by San Diego button-celery will be conserved (an increase of 1% from the Baseline conservation) and 27 additional pools occupied by San Diego fairy shrimp will be conserved (an increase of 6% from the Baseline conservation).

A summary of conservation for each covered species is provided below. The conservation objectives for each species, including conservation, management, and/or restoration required under the VPHCP, are included in Table 5-1. Where complexes occupied by covered species are not conserved, or where the effective population within a complex is not conserved (see Chapter 5 for details), mitigation is required.

Otay Mesa Mint

All of the 369 vernal pools occupied with Otay Mesa mint (100%) within the VPHCP Plan Area are conserved under the Baseline conservation (Table 5-3). No additional conservation is added through the VPHCP.

San Diego Mesa Mint

Three additional vernal pools occupied by San Diego mesa mint will be conserved in the MHPA as a result of implementation of the VPHCP compared to the Baseline conservation, thereby conserving all 339 vernal pools (100%) that support San Diego mesa mint in the VPHCP Plan Area (Table 5-3).

Spreading Navarretia

All but one of the 96 pools occupied with spreading navarretia are conserved under the Baseline conditions (Table 5-3). No additional conservation will occur through implementation of the VPHCP. Although one vernal pool that supports spreading navarretia will be impacted at the NDU 1&2 site within the J13 complex series on Otay Mesa (see Chapter 5 for more discussion of impacts), there are two pools known to support spreading navarretia within this historically recognized J13 population. The other occupied pool will be conserved under the VPHCP. This means that the "effective population" will be protected at this occurrence (i.e., protection of at least 50% of the population in the complex). Therefore, the potentially unique genetics of spreading navarretia at the J13 complex will be preserved.

Mitigation is required for direct impact to the one pool at the NDU 1&2 complex that supports spreading navarretia, including salvage of potentially impacted spreading individuals preserve the population genetics. A restoration plan consistent with the requirements outlined in Section

5.3 that includes restoring vernal pools with the salvaged spreading navarretia (i.e., in-kind restoration) would be required to mitigate for the one impacted pool that supports spreading navarretia.

San Diego Button-Celery

Three additional vernal pools that support San Diego button-celery will be conserved in the MHPA as a result of implementation of the VPHCP compared to the Baseline conservation, thereby conserving 724 vernal pools (99%) that support San Diego button-celery in the VPHCP Plan Area (Table 5-3). However, of the 11 pools known to support San Diego button-celery within the J13 complex series, only 3 will be conserved. Because less than 50% of the occupied pools at the J13 complex are conserved, the "effective population" has not been conserved. To prevent the loss of the unique genetics of the J13 San Diego button-celery population, mitigation for impacted pools will occur consistent with the mitigation requirements outlined in Section 5.3, including salvage of impacted San Diego button-celery individuals and in-kind restoration.

California Orcutt Grass

All of the 58 vernal pools occupied with California Orcutt grass within the VPHCP Plan Area are conserved within the Baseline conservation (Table 5-3). No additional conservation is added through the VPHCP.

Riverside Fairy Shrimp

Three additional vernal pools occupied by Riverside fairy shrimp will be conserved in the MHPA as a result of implementation of the VPHCP compared to the Baseline conservation, thereby conserving all 131 vernal pools (100%) that support Riverside fairy shrimp in the VPHCP Plan Area (Table 5-3).

San Diego Fairy Shrimp

Twenty-seven additional vernal pools that support San Diego fairy shrimp will be conserved in the MHPA as a result of implementation of the VPHCP compared to the Baseline conservation, thereby conserving 448 vernal pools (92%) that support San Diego fairy shrimp in the VPHCP Plan Area (Table 5-3). At three complexes, more that 50% of the pools occupied by San Diego fairy shrimp are conserved (La Media ITS, Southview, and Teledyne Ryan); therefore, the effective population would be conserved at these three complexes. However, at the other six complexes (Rhodes, Pueblo Lands, NDU 1&2, Bachman, Castle Rock, and Cubic) fewer than 50% of the pools supporting San Diego fairy shrimp will be conserved. In order to conserve the

"effective population" at these occurrences, salvage of unique genetic material and in-kind restoration is required. Mitigation for impacted pools that supports San Diego fairy shrimp will occur consistent with the mitigation requirements outlined in Section 5.3.

5.2.4 Protection of Designated Critical Habitat

Baseline Conservation – Existing Conservation of Designated Critical Habitat

Table 5-4 shows the total acres of Critical Habitat conserved under the Baseline conditions (for three covered species with designated Critical Habitat: spreading navarretia, Riverside fairy shrimp, and San Diego fairy shrimp), as well as the percentage of critical habitat acres within the overall VPHCP planning area that is conserved under the Baseline.

Additional Conservation of Designated Critical Habitat in the MHPA

As shown in Table 5-4, additional lands with Critical Habitat would be added to the MHPA through implementation of the VPHCP. While no vernal pools occur within the additional areas of Critical Habitat that will be added to the MHPA, the high-quality habitat is suitable for vernal pool restoration, either as restoration associated with the VPHCP objectives (Table 5-1), mitigation on a project-specific basis (see Section 5.3.2), or as a potential mitigation bank (see Section 5.3.3). Although there will be some overall loss of Critical Habitat for each of the three covered species (see Chapter 6), the additional lands to be added to the MHPA are of higher biological value and are arranged in a configuration that maintains long-term viability of the VPHCP covered species. Management, maintenance, enhancement, and/or restoration of conserved vernal pool complexes containing Critical Habitat, as described in the VPMMP (see Chapter 7 and Appendix D), would result in a net biological benefit for all three species and their critical habitats.

A discussion of additional Critical Habitat conservation for the three covered species with designated Critical Habitat is provided below.

Spreading Navarretia

As shown in Table 5-4, the VPHCP, when fully implemented, will conserve approximately 2 additional acres of spreading navarretia Critical Habitat from the Baseline conservation, to total 399 acres (6% of the total designated spreading navarretia Critical Habitat). The additional 2 acres are located in West Otay Mesa Critical Habitat Subunit 5H within the Unit 5 Southern Coastal Mesa Management Area (see Figure 6-1). In addition, approximately 37 acres of habitat that supports PCEs and will be restored on west Otay Mesa are in close proximity to Subunit 5H.

Table 5-4
Summary of Critical Habitat Conservation

	Spreading Navarretia Critical Habitat (Acres)	Riverside Fairy Shrimp Critical Habitat (Acres)	San Diego Fairy Shrimp Critical Habitat (Acres)
Total Critical Habitat Designation	**6,720**	**1,724**	**2,931**
Total Critical Habitat in VPHCP Plan Area (% Total Designation)	450 (7%)	585 (34%)	1,314 (45%)
Baseline Critical Habitat Conserved (% Total Designation Conserved)	397 (6%)	510 (29%)	932 (32%)
Critical Habitat Conserved in MHPA through VPHCP (% Total Designation Conserved)	399 (6%)	521 (30%)	1,032 (35%)
Total Additional Acres Conserved (% Increase in Total Designation Conserved)	**2 (<1%)**	**11 (1%)**	**100 (3%)**

Riverside Fairy Shrimp

Once fully implemented, the VPHCP will conserve approximately 11 additional acres of Riverside fairy shrimp Critical Habitat from the Baseline conservation, to total 521 acres (30% of the total designated Riverside fairy shrimp Critical Habitat), as shown in Table 5-4. The additional 11 acres are located within the San Diego South Coastal Mesa Critical Habitat Unit 5, within Subunits F (1 acre), G (4 acres), and H (6 acres) (see Figure 6-2). The additional lands with designated Riverside fairy shrimp Critical Habitat that will be added through implementation of the VPHCP have high biological value and potential for restoration.

San Diego Fairy Shrimp

As shown in Table 5-4, the VPHCP, once fully implemented, will conserve approximately 100 additional acres of San Diego fairy shrimp Critical Habitat from the Baseline conservation, to total 1,032 acres (35% of the total San Diego fairy shrimp Critical Habitat designation). The additional 100 acres are located within the following six Critical Habitat Units (see Figure 6-3): Del Mar Mesa (17.1 acres), Lopez Ridge (1.3 acres), Cubic (5.4 acres), SANDER and Magnatron (22.2 acres), Otay Mesa Northwest (7.3 acres), and Otay Mesa Southwest (46.8 acres). The additional lands with designated San Diego fairy shrimp Critical Habitat that will be added through implementation of the VPHCP have high biological value and potential for restoration.

5.3 MITIGATION MEASURES

5.3.1 Compensatory Mitigation

Impacts within the MHPA will be limited to covered projects and covered activities (Chapter 4). Mitigation will be consistent with requirements established in the City's Land Development Code (LDC) Biology Guidelines of the Land Development Manual and the Environmentally Sensitive Lands regulations for wetland impacts. Mitigation will prevent any net loss of vernal pool functions and values of impacted vernal pools.

Consistent with the ESL, mitigation will include compensatory measures that would result in a biologically superior net gain in overall function and values of (a) the type of wetland resource being impacted and/or (b) the biological resources to be conserved. The biologically superior mitigation will include either:

(1) Standard mitigation including wetland creation or restoration of the same type of wetland resource that is being impacted) that results in high-quality wetlands; AND a biologically superior project design whose avoided area(s) (i) is in a configuration or alignment that optimizes the potential long-term biological viability of the on-site sensitive biological resources, and/or (ii) conserves the rarest and highest quality on-site biological resources; or

(2) For a project not consistent with (1) above, extraordinary mitigation is required.

Examples of increased function and value include, but are not limited to, an increase in the availability of habitat for native fauna, an increase in native flora diversity, a decrease in invasive species, an increase in ground water recharge, water quality improvements and sedimentation deposition rates. Success criteria using the best currently available information for the particular mitigation habitat will be required as part of the restoration or creation plan.

Mitigation for projects impacting vernal pools will include salvage of sensitive species from vernal pools to be impacted, introduction of salvaged material into restored vernal pool habitat where appropriate (e.g., same vernal pool series), and maintenance of salvaged material pending successful restoration of the vernal pools. Salvaged material will not be introduced to existing vernal pools containing the same species outside the vernal pool series unless approved by USFWS. The mitigation sites will include preservation of the entire watershed and a buffer based on functions and values; however, if such an analysis is not conducted, there will be a default of a 100-foot buffer from the watershed.

Impacts to vernal pool habitat require a deviation from the City's ESL (Appendix E). Any impacts to vernal pools must be mitigated "in-kind" and achieve a "no-net loss" of wetland function and values (except as provided for in the City's ESL Wetland Deviation Section 143.0510 (d)(2) Economic Viability Option, see Appendix E). Standard mitigation ratios for vernal pools can range from 2:1 when no listed species are present, up to 4:1 when listed species with very limited distributions (e.g., *Pogogyne abramsii*) are present. Extraordinary mitigation ratios for vernal pools can range from 4:1 when no listed species are present, up to 8:1 when listed species with very limited distributions (e.g., *Pogogyne abramsii*) are present

5.3.2 General Conditions for Mitigation

Project-specific vernal pool restoration and enhancement plans will be consistent with the general requirements outlined in the City's LDC Biology Guidelines. In addition, general conditions specific to vernal pool enhancement and restoration are as follows:

1. The applicant will submit a vernal restoration plan to the City and Wildlife Agencies for approval as part of the development review process and shall be included as an attachment to the project's CEQA document. The restoration plan will include the following information and conditions:

    a. Implementation of the enhancement/restoration will 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 USFWS.

    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 should also be implemented at the restoration site and thus specified in the restoration plan.

    c. All vernal pools to be avoided and their watersheds will be enhanced as appropriate to achieve the same success criteria 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).

    d. All restoration/enhancement activities will commence the first summer-fall season prior to or concurrently with the initiation of project impacts.

e. All final specifications and topographic-based grading, planting and watering plans will 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 will be restored. The grading plans will 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.

f. A hydraulic analysis that shows each proposed vernal pool and its watershed, and hydrologic connection between the pools. The restored pools and their watersheds will not impact the watersheds of any extant pools except where needed to establish hydrologic connections.

g. If inoculum will be used for restoration and enhancement, the plan will 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 will be used for collection of inoculum. Collection of inoculum from donor pools will be coordinated with the USFWS.

h. Inoculum and planting will not be installed until the City and USFWS have approved of habitat restoration site grading. All planting will be installed in a way that mimics natural plant distribution, and not in rows. Inoculum will 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 and have been surveyed for versatile fairy shrimp to the satisfaction of the City and USFWS. If versatile fairy shrimp are detected in the restored or enhanced pools, inoculum will not be introduced until appropriate measures to address versatile fairy shrimp are approved by City and USFWS. Inoculum will be spread evenly over the surface, no more than 0.25-inch deep. If there is any ponding water at the time of soil inoculation, the soil will only be placed on the wet soil adjacent to the ponded areas. Inoculum will 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 will be shallowly distributed within the pond so that cysts have the potential to be brought into solution upon inundation).

i. Plant palettes (species, size, and number/acre) and seed mix (species and pounds/acre) will be included in the restoration/enhancement plan. The plant palette will 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 will be provided.

j. Native plants and animals will 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 USFWS. 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. Exotic weed control will be implemented within the restoration/enhancement areas to protect and enhance habitat remaining on-site.

k. 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. Any artificial watering will be done in a manner that prevents ponding in the pools. Any water to be used will be identified and documented to be free of contaminants that could harm the pools.

l. All weeding within and immediately adjacent to the enhanced/restored pools will be performed by hand. No herbicide will be used within or adjacent to the restored and preserved vernal pools. Herbicide may be used in the uplands adjacent to pools only as approved by the City and Wildlife Agencies. All workers conducting weed removal activities will be educated to distinguish between native and nonnative species so that local native plants are not inadvertently killed by weed removal activities.

m. A final implementation schedule that indicates when all vernal pool impacts, as well as vernal pool restoration/enhancement grading and planting, will begin and end. A temporal loss of vernal pools should be avoided by initiating the restoration work prior to or concurrent with impacts. This will minimize the length of time inoculum is kept in storage and ensure that there is appropriate habitat to translocate it to.

n. Five years of monitoring and success criteria for vernal pool and upland habitat restoration/enhancement areas that includes quantitative hydrological, vegetation transects, fairy shrimp protocol surveys, or other measurements as approved by 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 monitoring, cobbles should be oriented within the restored vernal pools to serve as stepping stones.

o. Restoration success for fairy shrimp will 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 will 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 will be taken in the restored pools to determine the density of viable cysts in the soils. Wet samples will also be taken in the restored 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 will be identified and described in the restoration plan. Alternate methods of determining success may be used upon approval by the City and USFWS.

p. Monitoring and success criteria for vernal pool and upland restoration/enhancement areas will include coastal sage scrub, native grassland and chaparral species richness and cover criteria for all 5 years of monitoring. Success criteria for weed cover will 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 will be 80% of the initial plantings for the first 5 years. At the first and second anniversaries of plant installation, all dead plants will be replaced unless their function has been replaced by natural recruitment. The method used for monitoring will be described and a map of proposed sampling locations will be included. Photo points will be used for qualitative monitoring and stratified-random sampling will be used for all quantitative monitoring;

q. Verification that restoration/enhancement of vernal pools is complete will 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 applicant will prepare an analysis of the cause(s) of failure and, if deemed necessary by the City and 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 applicant's maintenance and monitoring obligations will continue until the City and Wildlife Agencies deem the restoration/enhancement successful, or contingency measures must be implemented. Restoration/enhancement will not be deemed

successful until at least 2 years after any significant contingency measures are implemented, as determined by the Agencies;

r. Annual reports will 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 will also summarize the project's compliance with all Agencies' biological opinion conservation measures and terms and conditions;

2. The applicant will ensure the long-term management of the on-site areas will occur in perpetuity (see Chapter 7).

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 will be required in the form of salvage and restoration for the impact to the new occurrence. Mitigation will occur consistent with Conditions 1 and 2 above, as well as the City's LDC Biology Guidelines.

5.3.3 Mitigation Banking

Lands contributed to the MHPA preserve system by public or private owners in excess of the VPHCP mitigation requirements may either be used by such owner as vernal pool mitigation for that owner's subsequent development project(s), or it may be "banked" by those owners. Such banked lands can later be used to provide mitigation for future development projects of other owners within the MHPA. A vernal pool "Conservation Bank" must comply with the "Official Policy on Conservation Banks" issued by the California Resources Agency (April 7, 1995) and the "Supplemental Policy Regarding Conservation Banks within the NCCP Area of Southern California" issued by USFWS and CDFW (January 24, 1996), as they may be modified. To set up a vernal pool Conservation Bank, a land owner must prepare a restoration plan consistent with the requirements outlined in Section 6.3.2 above, and submit to the City and Wildlife Agencies for approval. Note that a vernal pool Conservation Bank is not a Wetland Mitigation Bank regulated by USACE.

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CHAPTER 6
IMPACT ANALYSIS

This chapter analyzes the potential impact to vernal pools and covered species resulting from covered projects, Future Projects, and/or covered activities consistent with the VPHCP (refer to Chapter 4). It also discusses loss of Critical Habitat for the three species for which USFWS has designated Critical Habitat: spreading navarretia, San Diego fairy shrimp, and Riverside fairy shrimp. Direct impacts are assessed quantitatively, while indirect impacts are assessed qualitatively; permanent and temporary impacts are also evaluated based on the definitions below.

Impacts are those actions affecting vernal pools and covered species in the VPHCP Plan Area. Impacts can be direct or indirect.

Direct impacts are defined as the removal or alteration of vernal pools and/or covered species populations or occurrences (or portions thereof) as a result of covered and Future Projects or covered activities. Direct impacts are a result of land development and occur at the time and place of project implementation (e.g., grading, ground disturbance, trampling of plants). Direct impacts can be either permanent or temporary (see below).

Permanent impacts are direct impacts that permanently remove or alter vernal pools or associated watershed as a result of covered projects or covered activities (e.g., land development). Permanent impacts also include indirect impacts to vernal pools that result in a permanent change to vernal pool functions (e.g., development around a vernal pool complex that reduces watershed). Impacts that result in reduction of long-term viability of a covered species occurrence are also considered permanent.

Indirect impacts are defined by USFWS as "those that are caused by the proposed action and are later in time, but are still reasonably certain to occur" (50 CFR 402.02). Indirect impacts in the context of this VPHCP also include those impacts that occur at the time of the proposed action but beyond the footprint of a project or activity (i.e., beyond the area of direct disturbance). While more difficult to detect and track, indirect impacts can undermine species viability or habitat quality, especially if multiple indirect or direct impacts work cumulatively to impair the species or to degrade the habitat. Indirect impacts can be either temporary or permanent.

Temporary impacts are impacts resulting from covered projects or covered activities that cause temporary habitat disruption but do not permanently alter landforms, and do not result in

permanent habitat loss or negative impacts to vernal pool watersheds (e.g., recontoured vernal pool basins that will be restored).

The impact analysis for the VPHCP was conducted based on the best available data at the time of preparation. Data were compiled from a variety of sources that include the City's 2004 vernal pool inventory, site-specific vernal pool reports, restoration and enhancement plans, biological reports submitted to the City, and digital geographic information from USFWS.

Local site conditions, such as rainfall, likely influence numbers of standing plants and their local distribution (Schiller et al. 2000). Annual variability in rainfall can also alter the proportion of ponding in each pool, which can result in variability in species distribution within and among pools given the species' narrow habitat preferences (Bauder 2005). Despite seasonal fluctuations, the potential for finding additional pools with covered plant species within the City is considered low. Therefore, distributional information for the covered plant species within the City is considered to be accurate and complete for purposes of this impact analysis.

Seasonal variability in ponding as a result of varying rainfall amounts and patterns can also affect shrimp occupancy in vernal pools from year to year (Bauder 2005; Simovich and Ripley 2008). This variability can result in substantial differences in fairy shrimp occupancy data at a site between years. For example, protocol surveys conducted by RECON in 1997 and 1998 on Marine Corps Base Camp Pendleton identified 216 vernal pools on the base as occupied by fairy shrimp (RECON 1998). Base-wide protocol surveys in 2005 identified 279 occupied vernal pools (USFWS 2008a), which is a 29% increase in observed occupancy.

In contrast to the covered plant species, the distributional information for San Diego fairy shrimp is not nearly as accurate and complete for many of the complexes in the City. For some sites where development has been proposed and extensive surveys have been conducted (such as the J13 and J34 complexes in the Otay Mesa area), existing data for shrimp species are relatively accurate. On other sites, surveys for fairy shrimp (protocol or otherwise) have not occurred or data is incomplete. For example, protocol surveys have not been conducted in over 75 pools at Otay Lakes (K5). However, San Diego fairy shrimp are fairly common within nearby vernal pools in the County; therefore, it is likely that San Diego fairy shrimp could occur in some of these pools. Riverside fairy shrimp are much rarer; therefore, the same conclusion cannot be assumed for this species.

These examples, as well as qualitative assessments and general observations, suggest the possibility that additional San Diego fairy shrimp occurrences are possible in the City and, therefore, distributional data for San Diego fairy shrimp is likely incomplete. It is possible that additional vernal pools with San Diego fairy shrimp may be lost or conserved within the MHPA

than is currently estimated. However, it is likely that more comprehensive surveys have been conducted for vernal pools that will be lost to development compared to pools that are already conserved or planned for conservation. Detailed surveys are required for development projects to determine impacts and, therefore, more data is available for pools that will be lost as a result of proposed development projects. For this reason, it is assumed that data related to the impact analysis for San Diego fairy shrimp is generally accurate and complete. However, the conservation of pools occupied by San Diego fairy shrimp within the VPHCP Plan Area is assumed to be underestimated. Conservation of covered species is addressed in Chapter 5.

The following sections evaluate the impacts to vernal pools, covered species, and Critical Habitat as a result of covered projects, and/or covered activities in the VPHCP (Chapter 4). The detailed quantitative impact and conservation analysis for each complex in the VPHCP is included in Appendix C, and results of the impact analysis are summarized and discussed below.

6.1 DIRECT IMPACTS TO VERNAL POOLS

This section evaluates the potential impacts to vernal pools as a result of covered projects and covered activities identified in this VPHCP implementation. Specifically, it analyzes the potential loss of vernal pools resulting from development of lands outside the MHPA, as well as potential loss of vernal pools inside the MHPA resulting from covered projects (described in Chapter 4). Both direct and indirect impacts to vernal pools are possible, as discussed below.

Indirect impacts to vernal pools from covered projects, and/or covered activities are discussed in Section 6.3.

Under the VPHCP, each vernal pool site within a complex is assigned a conservation level (75% or 100%) depending on ownership and preservation status. Impacts to vernal pools are based on conservation levels. For purposes of this impact analysis, the worst-case scenario has been assumed, (i.e., for sites with a 75% conservation level, 25% of the pools were assumed to be impacted). However, during the development entitlement process, all proposed development inside the MHPA would be limited to impacts to the least sensitive portion of the parcel and would be required to avoid vernal pools to the maximum extent practicable (see Chapter 5). Therefore, impacts would most likely be less with actual implementation of the VPHCP. The 100% conservation level has been applied to existing conserved vernal pool sites.

As shown in Table 6-1, a total of 145 pools would potentially be directly impacted by development, including 100 pools impacted outside the MHPA (due to complexes that are 0% conserved) and 45 pools impacted inside the MHPA as a result of covered projects, covered activities, and/or future development necessary to allow reasonable use of private property in the

MHPA (i.e., within a 75% conservation level area). One complex, KK1 Lake Murray, would be completely lost to development. This complex has only one vernal pool, which is not occupied by any covered species. The direct impact to vernal pools resulting from implementation of the VPHCP represents an approximate 6% loss of the total number of vernal pools within the VPHCP Plan Area, totaling 2.9 acres of basin surface area.

Table 6-1
Summary of Vernal Pools Impacts in VPHCP Plan Area

Total Number of Complexes in VPHCP Plan Area	Number of Complexes Lost	Total Number of Pools in VPHCP Plan Area	Total Pools Lost to Development Based on Conservation Level[1]	Pools Lost to Development Outside MHPA (0% Conservation)	Pools Lost to Development Inside MHPA Based on Conservation Level[1]	% Total Pools Lost to Development Based on Conservation Level[1]	Total Surface Area of Pools Lost Based on Conservation Level[1] (Acres)
54	1	2,488	145	100	45	6%	2.9

[1]Pools and species population conserved is based on 75% or 100% conservation level by vernal pool complex. The conservation level denotes the portion of a parcel that will be conserved. For example, for a parcel designated with a 75% conservation level, 25% of the parcel is available for development. Development would occur on the least environmentally sensitive area of the parcel, as determined by the City environmental review process.

While the total loss of vernal pools is a relatively low percentage, with only 6% vernal pools impacted within the VPHCP Plan Area (145 total pools; 100 outside the MHPA and 45 inside the MHPA) and only approximately one-third of those occupied with covered species, the loss is substantial with respect to the remaining vernal pool habitat in the southern California region. It is estimated that over 90% of the pools that once occurred in southern California have already been lost, so any loss of vernal pool habitat must be evaluated in that context.

The City's ESL Wetland Deviation requires no net loss of vernal pool habitat. Therefore any direct impacts to vernal pools within the VPHCP Plan Area will be mitigated consistent with these regulations (see Chapter 5).

6.2 DIRECT IMPACTS TO COVERED SPECIES

This section addresses the potential direct impacts to the seven covered species resulting from implementation of the VPHCP. This includes potential impacts to occupied pools resulting from development of lands outside the MHPA, as well as impacts to occupied pools inside the MHPA resulting from Planned Covered and Future Projects and covered activities (described in Chapter 4). Both direct and indirect impacts to covered species are possible, as discussed below.

Indirect impacts to covered species from covered projects and covered activities are discussed in Section 6.3.

Most of the vernal pools that would be lost both inside and outside the MHPA are low quality pools, the majority of which occur in disturbed areas, such as roads and ditches. However, some are moderate quality with relatively high diversity, 49 of which support one or more of the covered species. The direct loss of vernal pools that support covered species will diminish the viability and continued persistence of covered species. Direct impacts to low quality pools would not affect the continued persistence of covered species, because the low quality habitat in disturbed pools is unlikely to support covered species.

A summary of potential direct impacts to covered species is provided in Table 6-2. A discussion of impacts for each species is then provided. Mitigation requirements for impacts to covered species are included in Chapter 5.

Table 6-2
Summary of Covered Species Impacts Inside and Outside MHPA

Covered Species	Total Occupied Pools in VPHCP Plan Area	Total and % Occupied Pools Lost	Total and % Occupied Pools Lost Outside MHPA	Total and % Occupied Pools Lost Inside MHPA
Otay Mesa mint	369	0 (0%)	0 (0%)	0 (0%)
San Diego mesa mint	339	0 (0%)	0 (0%)	0 (0%)
Spreading navarretia	96	1 (1%)	1 (1%)	0 (0%)
San Diego button-celery	733	9 (1%)	9 (1%)	0 (0%)
California Orcutt grass	58	0 (0%)	0 (0%)	0 (0%)
Riverside fairy shrimp	131	0 (0%)	0 (0%)	0 (0%)
San Diego fairy shrimp	488	39 (8%)	38 (8%)	1 (<1%)

[1]Pools and species population conserved is based on 75% or 100% conservation level by vernal pool complex.

6.2.1 Direct Impacts to Otay Mesa Mint

There will be no direct impacts to any of the 369 vernal pools occupied by Otay Mesa mint that occur within the VPHCP Plan Area (refer to Appendix C for specific locations) as a result of covered and future projects or covered activities (Table 6-2). All of the vernal pools occupied

with Otay Mesa mint within the VPHCP Plan Area are conserved through implementation of the VPHCP (see Chapter 5 for further details).

6.2.2 Direct Impacts to San Diego Mesa Mint

There will be no direct impacts to any of the 339 vernal pools occupied with San Diego Mesa mint that occur within the VPHCP Plan Area (refer to Appendix C for specific locations) as a result of covered and future projects or covered activities (Table 6-3). All of the vernal pools occupied with San Diego Mesa mint within the VPHCP Plan Area are conserved through implementation of the VPHCP (see Chapter 5 for further details).

6.2.3 Direct Impacts to Spreading Navarretia

One of the 96 vernal pools that support spreading navarretia could be directly impacted at the NDU 1&2 site on Otay Mesa (Table 6-2). The NDU 1&2 site is part of the J13 complex that was historically recognized as a single spreading navarretia population (Bauder 1986). Within this historically recognized J13 population, there are two pools known to support spreading navarretia; one of these pools (located at NDU 1&2) will be impacted under the VPHCP.

Mitigation is required for any direct impact to spreading navarretia, and must also include the salvage of seed or plants to preserve the population genetics (see Chapter 5.

6.2.4 Direct Impacts to San Diego Button-Celery

A maximum of nine of the 733 vernal pools supporting San Diego button-celery will potentially be directly impacted within the J13 complex series, located at the NDU 1&2 site (two pools impacted) and South Otay J13 South complex (seven pools impacted). The population of San Diego button-celery in the J13 complex series was historically recognized as a single population (Bauder 1986). Of the 11 pools known to support San Diego button-celery within the J13 complex, nine will be impacted.

Mitigation for any direct impacts to San Diego button-celery (see Chapter 5), and must also include the salvage of seed or plants to preserve the population genetics (see Chapter 5).

6.2.5 Direct Impacts to California Orcutt Grass

There will be no direct impacts to any of the 58 vernal pools occupied with California Orcutt grass that occur within the VPHCP Plan Area (refer to Appendix C for specific locations) as a result of covered projects or covered activities (Table 6-3). All of the vernal pools occupied with

California Orcutt grass within the VPHCP Plan Area are conserved through implementation of the VPHCP (see Chapter 5 for further details).

6.2.6 Riverside Fairy Shrimp

There will be no direct impacts to any of the 131 vernal pools occupied with Riverside fairy shrimp that occur within the VPHCP Plan Area as a result of covered projects or covered activities (Table 6-3). All of the vernal pools occupied with Riverside fairy shrimp within the VPHCP Plan Area are conserved through implementation of the VPHCP (see Chapter 5 for further details).

6.2.7 Direct Impacts to San Diego Fairy Shrimp

Within the VPHCP Plan Area, a total of 488 pools are occupied by San Diego fairy shrimp within 35 complexes (refer to Appendix C for specific locations). As a result of implementation of the VPHCP, a maximum of 39 vernal pools that support San Diego fairy shrimp will potentially be directly impacted at the following vernal pool complexes: Rhodes (i.e., Camino del Sur; six out of eight occupied pools impacted), Pueblo Lands (four out of six occupied pools impacted), NDU 1&2 (15 out of 15 occupied pools impacted), La Media ITS (one out of six occupied pools impacted), Bachman (one out of one occupied pool impacted), Southview (three out of 12 occupied pools impacted, Teledyne Ryan (three out of 11 occupied pools impacted), Castle Rock (four out of four occupied pools impacted, and Cubic (five out of seven occupied pools impacted).

Mitigation is required for any direct impacts to San Diego fairy shrimp. Where appropriate, the salvage of shrimp cysts may also be required to conserve the potentially unique genetics of impacted populations (see Chapter 5).

6.3 INDIRECT IMPACTS TO VERNAL POOLS AND COVERED SPECIES

As discussed above, indirect impacts (and potential incidental take), are those that will occur later in time with reasonable certainty. Indirect impacts can be detrimental to vernal pool habitat and covered indirect impacts are much more difficult to track and quantify. Indirect impacts from covered projects and covered activities will be avoided and minimized to the extent feasible through implementation of measures identified in Chapter 5. The VPHCP monitoring program (Chapter 7) has been designed to identify indirect impacts so decisions can be made on the appropriate mitigation measures to implement over time.

The primary potential indirect impact that is likely to affect covered species is degradation of habitat quality resulting from "edge effects." Edge effects occur at the interface of conserved and developed lands and may include (but are not limited to) trampling or disturbance from human traffic (foot, bike, vehicle, or equestrian), damage or harassment from pets, spread of invasive exotic plants and/or wildlife, increased risk of wildfires, increased runoff, pollution, or other hydrological changes. Edge effects can reduce vernal pool functions and degrade the quality of habitat that supports covered species.

New development projects will require a fuel modification zone (Brush Management Zone 1 and 2) consistent with the City's Municipal Code Brush Management requirements (Section (142.0412). For new development, Brush Management Zone 2 shall not be allowed within the MHPA containing vernal pool basins, but may be considered on a case by case basis within the associated watershed and buffer with approval from the Wildlife Agencies. The potential for other edge effects will be identified during the development review process and addressed through implementation of the avoidance and mitigation measures identified in Chapter 5. Thus, indirect impacts from edge effects would be temporary and no permanent indirect impacts are anticipated.

6.4 IMPACTS FROM RESTORATION, LONG-TERM MANAGEMENT, AND MONITORING

Maintenance and monitoring prescribed in the VPMMP (Chapter 7 and Appendix D) could result in potential direct impacts (e.g., incidental take of covered species) and indirect impacts (e.g., habitat disturbance and trampling from sign and fence installation and repair, use of access trails and roads, monitoring activities, and weed control). Potential direct impacts from maintenance and monitoring are expected to be avoided to the extent feasible through implementation of the avoidance measures identified in Chapter 5. Direct and indirect impacts to habitat from maintenance and monitoring are expected to be minimal.

Some restoration and enhancement activities (e.g., rut removal and recontouring of vernal pools, soil replacement, removal of nonnative invasive plant species, and planting container plants) in occupied habitat have potential to damage or destroy a small number of covered species. Under these types of activities, there is not only potential for changes in the basic micro-habitat provided in each pool, but it is also possible that cysts and/or seeds could be damaged or destroyed by personnel conducting restoration and enhancement activities. For example, cysts and/or seeds could be covered too deeply by soil when vernal pools are recontoured. To minimize this potential impact, disturbance will be limited to the area that is being enhanced, and soil within areas that are being recontoured will be salvaged and reintroduced to the pool where

they were collected following contouring. Additional measures to ensure that temporary impacts associated with restoration and enhancement activities are minimized are included in Chapter 5.

Temporary habitat disturbance during management, monitoring, restoration and enhancement activities will be minimal and these activities will ultimately improve ecological function of the site from conditions prior to ground disturbance. Therefore, no permanent impacts from restoration, long-term management, or monitoring are anticipated.

6.5 CRITICAL HABITAT

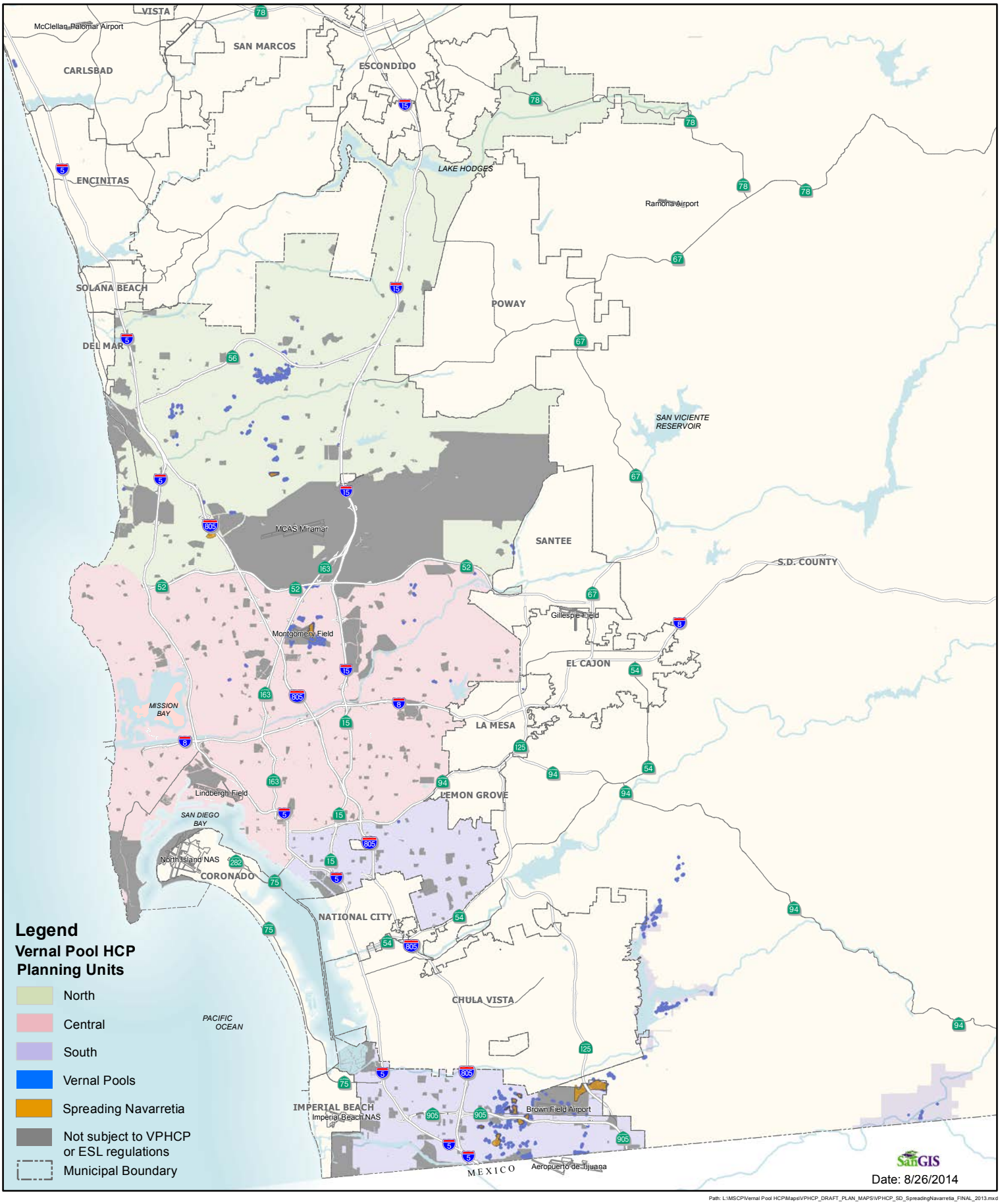
Critical Habitat is designated for the conservation of lands that contain or could contain endangered species, as determined by USFWS. Designated Critical Habitat for three of the seven covered species (spreading navarretia, Riverside fairy shrimp, and San Diego fairy shrimp) has been designated. Table 6-3 summarizes the acreage of Critical Habitat that is conserved within the MHPA, and the potential loss of Critical Habitat for each of the three species. Critical habitat designation within and outside the MHPA are shown for the three species on Figures 6-1 through 6-3.

Table 6-3
Summary of Designated Critical Habitat Conservation and Loss

	Spreading Navarretia Critical Habitat (Acres)	Riverside Fairy Shrimp Critical Habitat (Acres)	San Diego Fairy Shrimp Critical Habitat (Acres)
Total Acres Designated	**6,720**	**1,724**	**2,931**
Total Acres in VPHCP Plan Area	**450**	**585**	**1,314**
Acres Conserved in MHPA[1]	**399**	**521**	**1,032**
Total Acres Lost (Inside and Outside MHPA)	**51**	**64**	**282**
Acres Lost Inside MHPA[1]	1	54	68
Acres Lost Outside MHPA	50	10	214
% Loss of Total Designation	**<1%**	**4%**	**10%**

[1] Based on conservation level of each vernal pool complex with designated Critical Habitat (75% or 100%)
Note: Acreages are rounded so individual acreages may not equal sum of total acreages

A discussion of designated Critical Habitat for each species that would not be conserved in the MHPA through implementation of the VPHCP is provided below. Note that the Critical Habitat Unit names are not directly correlated with the vernal pool complex ID names.



Path: L:\MSCP\Vernal Pool HCP\Maps\VPHCP_DRAFT_PLAN_MAPS\VPHCP_SD_SpreadingNavarretia_FINAL_2013.mxd

THE CITY OF SAN DIEGO

Note:
Vernal pool symbols on this map have been enlarged to help identify their locations and are not to scale and do not represent the exact limits of the vernal pool basins.

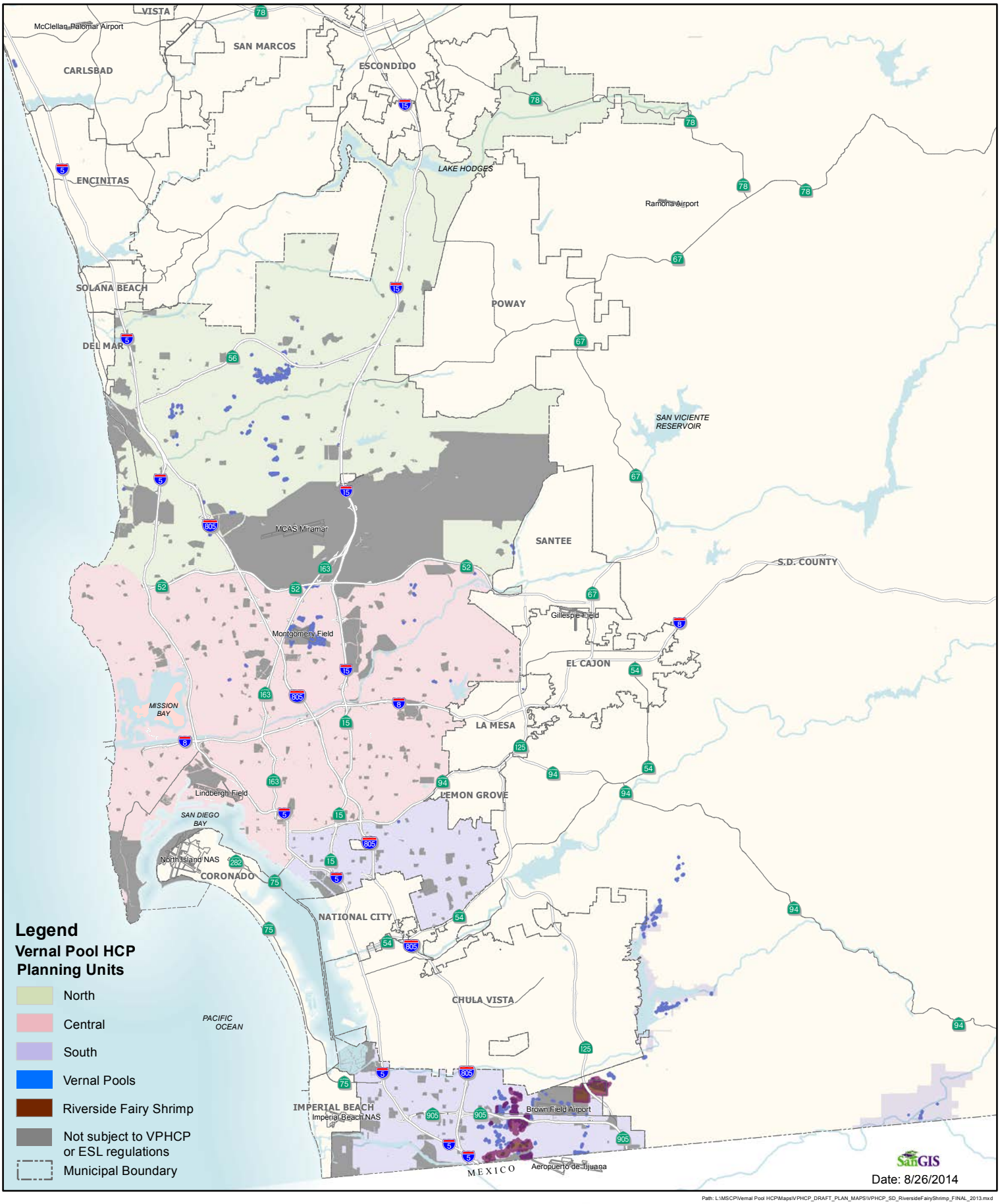
N

0 7,700 15,400 23,100 Feet

SanGIS

DRAFT

Figure 6-1
Vernal Pool HCP Critical Habitat for Speading Navarretia



Path: L:\MSCP\Vernal Pool HCP\Maps\VPHCP_DRAFT_PLAN_MAPS\VPHCP_SD_RiversideFairyShrimp_FINAL_2013.mxd

THE CITY OF SAN DIEGO

Note:
Vernal pool symbols on this map have been enlarged to help identify their locations and are not to scale and do not represent the exact limits of the vernal pool basins.

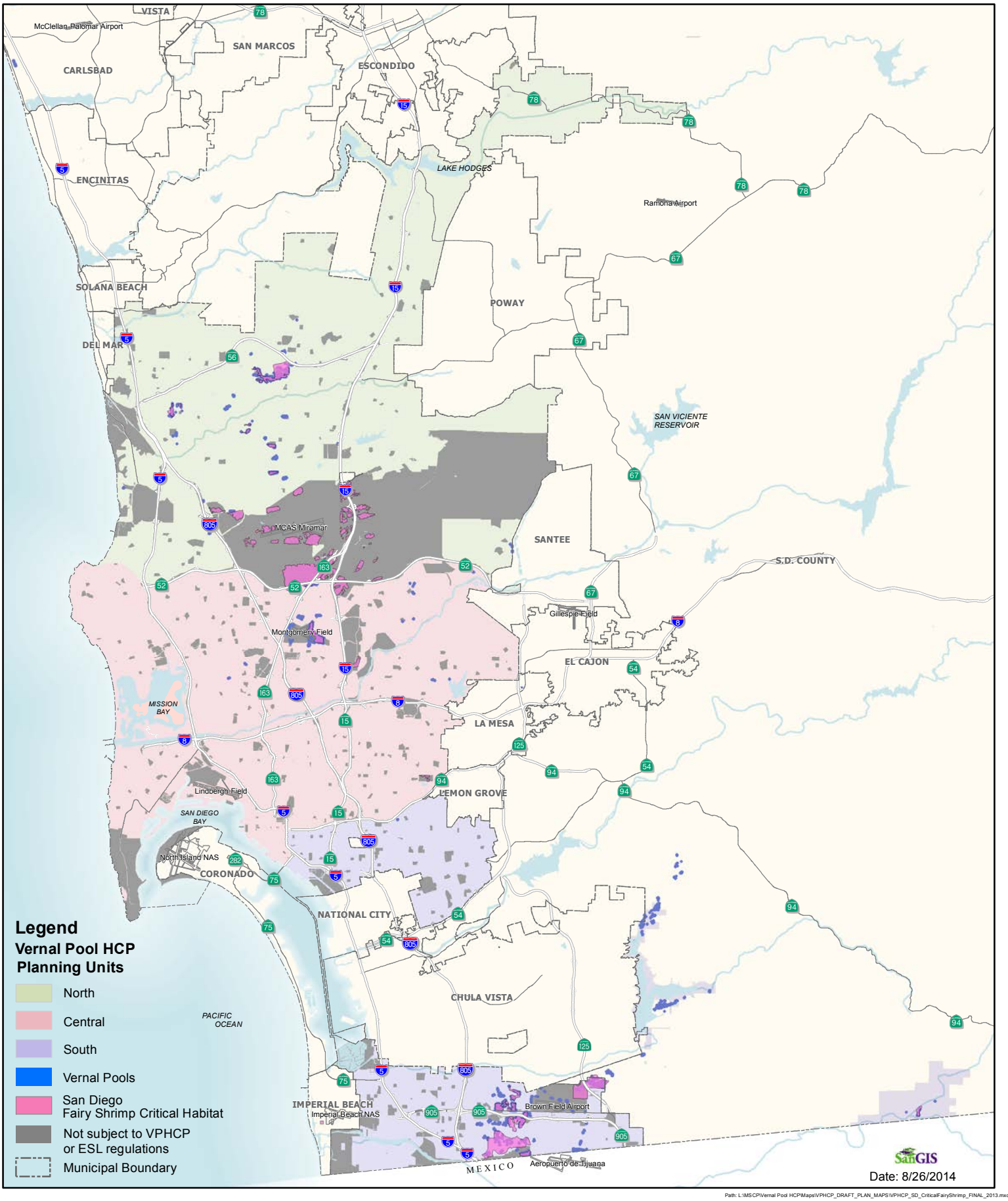
N

0 7,700 15,400 23,100 Feet

SanGIS

DRAFT

Figure 6-2
Vernal Pool HCP Critical Habitat for Riverside Fairy Shrimp



Path: L:\MSCP\Vernal Pool HCP\Maps\VPHCP_DRAFT_PLAN_MAPS\VPHCP_SD_CriticalFairyShrimp_FINAL_2013.mxd

THE CITY OF SAN DIEGO

Note:
Vernal pool symbols on this map have been enlarged to help identify their locations and are not to scale and do not represent the exact limits of the vernal pool basins.

N

0 7,700 15,400 23,100 Feet

DRAFT

Figure 6-3
Vernal Pool HCP Critical Habitat for San Diego Fairy Shrimp

6.5.1 Spreading Navarretia Critical Habitat

The VPHCP, when fully implemented, will result in the permanent loss of approximately 51 acres of designated spreading navarretia Critical Habitat within Subunits 3C, 5H, and 5G (Figure 6-1, Table 6-4).Of the total loss, 44 acres support primary constituent elements (PCEs) for the spreading navarretia. The six acres lost in Subunit 3C have either already been impacted by Caltrans (under a separate BO) or do not support PCEs. The loss of one acre in Subunit 3B is a result of the 75% conservation level designation and would not affect PCEs.

The total designation of spreading navarretia Critical Habitat in Subunit 5H is 139 acres and is one of seven subunits that comprise Unit 5 (San Diego Southern Coastal Mesa Management Area). Designated Critical Habitat for spreading navarretia totals 6,720 acres, of which 749 acres are within Unit 5. The loss of approximately 44 acres in Unit 5 represents a 32% reduction in the extent of Subunit 5H and an approximate 6% reduction in Unit 5. The impact from the VPHCP to the overall spreading navarretia designation is less than a 1% reduction in the total acreage of 6,720 acres.

Table 6-4
Loss of Spreading Navarretia Critical Habitat

	Units where Critical Habitat is Lost					
	TOTAL (Acres)	**UNIT 3 Central Coastal Mesa Management Area (Acres)**	**Nobel Drive Subunit 3C (Acres)**	**Carroll Canyon Subunit 3B (Acres)**	**UNIT 5 Southern Coastal Mesa Management Area (Acres)**	**West Otay Mesa Subunit 5H (Acres)**
Total Designation	**6,720**	**103**	37	18	**749**	139
Total in VPHCP Plan Area	**450**	**55**	37	18	**395**	136
Acres Lost [1]	**51**	**7**	6	1	**44**	44
% Total Designation Lost	**<1%**	**7%**	16%	<1%	**6%**	32%

[1] Based on conservation level of each vernal pool complex with designated Critical Habitat (75% or 100%)
Note: Acreages are rounded so individual acreages may not equal sum of total acreages

6.5.2 Riverside Fairy Shrimp Critical Habitat

Implementation of the VPHCP will result in the permanent loss of approximately 64 acres of designated Critical Habitat for Riverside fairy shrimp within Unit 5 (San Diego Southern Coastal Mesa Management Area), as shown in Table 6-5. While small areas of designated Critical Habitat may be lost within the MHPA (due to 75% conservation levels) in Subunits 5D, 5E, 5F, and 5G, the majority of the acreage that would be lost (inside and outside the MHPA) occurs in Subunit 5H (Table 6-5 and Figure 6-2). The estimated loss is a worst case scenario, and assumes

that 25% of the MHPA not currently conserved may be impacted. In reality, most of Subunit 5H will be conserved. The total designation of Riverside fairy shrimp Critical Habitat in Subunit 5H acres is 244 acres, and is one of 7 subunits that comprise Unit 5. Approximately 17% of Critical Habitat would be lost in in Subunit 5H.

Designated Critical Habitat for Riverside fairy shrimp totals 1,724 acres in Unit 5 (San Diego Southern Coastal Mesas). The loss of approximately 64 acres of Riverside fairy shrimp Critical Habitat represents an approximate 4% reduction overall in Unit 5.

Table 6-5
Loss of Riverside Fairy Shrimp Critical Habitat

	Units where Critical Habitat is Lost					
	UNIT 5 San Diego Southern Coastal Mesas (Acres)	**J29–31 Subunit 5D**	**J2 N, J4, J5 Subunit 5E**	**J2 S and J2 W Subunit 5F**	**J14 Subunit 5G**	**J11, J12, J16–18 Subunit 5H**
Total Designation	**1,724**	346	44	33	136	244
Total in VPHCP Plan Area	**585**	140	44	33	123	244
Acres Lost [1]	**64**	1	4.5	0.5	16	41
% Total Designation Lost	**4%**	<1%	10%	2%	12%	17%

[1] Based on conservation level of each vernal pool complex with designated Critical Habitat (75% or 100%)
Note: Acreages are rounded so individual acreages may not equal sum of total acreages

6.5.3 San Diego Fairy Shrimp

The VPHCP, when fully implemented, will result in the permanent loss of approximately 282 acres of designated Critical Habitat for San Diego fairy shrimp (Table 6-6 and Figure 6-3). Approximately 48 acres would be lost in Unit 4 (Central Coastal Mesa), from Subunits A/B, 4H, and 4K, and approximately 234 acres would be lost within Unit 5 (San Diego Southern Coastal Mesas), from Subunits 5G and 5F (Table 6-6). Of the 48 Critical Habitat acres lost in Unit 4, XX acres contain PCEs. Within Unit 5, approximately XX acres of the 234 Critical Habitat acres lost contain PCEs.

Designated Critical Habitat for San Diego fairy shrimp totals 2,931 acres. The loss of approximately 282 acres of San Diego fairy shrimp Critical Habitat within Units 4 and 5 represents an approximate 10% reduction in the overall designation area.

Table 6-6
Loss of San Diego Fairy Shrimp Critical Habitat

	TOTAL	Units where Critical Habitat is Lost						
		UNIT 4 Central Coastal Mesa (Acres)	Del Mar Mesa Subunit A/B (Acres)	Lopez Ridge Subunit 4H (Acres)	SANDER and Magnatron Subunit 4K (Acres)	UNIT 5 San Diego Southern Coastal Mesas (Acres)	Otay Mesa Northwest Subunit 5G (Acres)	Otay Mesa Southwest Subunit 5F (Acres)
Total Designation	**2,931**	**554**	253	11	56	**1,785**	132	622
Total in VPHCP Plan Area	**1,314**	**261**	131	11	56	**1,053**	132	598
Acres Lost [1]	**282**	**48**	12	2	34	**234**	10	224
% Total Designation Lost	**10%**	**9%**	**5%**	**18%**	**61%**	**13%**	**22%**	**36%**

[1] Based on conservation level of each vernal pool complex with designated Critical Habitat (75% or 100%)
Note: Acreages are rounded so individual acreages may not equal sum of total acreages

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CHAPTER 7
MANAGEMENT, MONITORING, AND REPORTING

This chapter describes the VPHCP management and monitoring strategy, which will be implemented by the City through its VPMMP (Appendix D). The 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, as described in Chapter 5 and outlined in Table 5-1. Site-specific management plans will be prepared for each complex included in the framework VPMMP, consistent with the requirements and regulations in the VPHCP and City LDC Biology Guidelines, for approval by the City and Wildlife Agencies.

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), there are numerous other conserved pools that 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. The management of benign neglect (i.e., "let nature take care of itself") does not result in sustainability (Chase 1987; Botkin 1990). Management and monitoring of the vernal pool resources must be both proactive and continuous to achieve the goal and objectives of the VPHCP (as defined in Chapter 6). 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 for further detail regarding VPHCP implementation costs and funding).

7.1 VERNAL POOL CONCEPTUAL MODEL

"Conceptual models have been identified as a key part of the adaptive management framework (Gross 2003, WWWF 2005, Hierl et al. 2007). These models can come in many forms from a basic narrative or flow chart, to a complex diagram with numerous inter-connected elements. All of these types of models serve to formalize our current understanding of system process and dynamics, identify critical linkages and relationships within the system, and facilitates the articulation of assumptions of how we think a system works, provides us an opportunity to document the source of that knowledge (e.g., expert opinion, published research), and helps direct future management, monitoring, and research efforts by identifying critical sources of uncertainty. Conceptual models also facilitate constructive communication among stakeholders with different expertise and experiences (e.g., scientists, land managers, rangers, and planners; see Etienne et al. 2011, Evely et al. 2011)." (Excerpt from Lewison et al. 2012)

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 builders must balance the complexity of a natural system with parsimony.

Figure 7-1 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.

7.2 OVERVIEW OF ADAPTIVE MANAGEMENT

The Habitat Conservation Planning and Incidental Take Permit Processing Handbook (USFWS 1996) and its Addendum (USFWS 2000) require 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 7-2). This approach requires the establishment of (1) a conceptual model (Figure 7-1), (2) goals and objectives (Chapter 5), (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*."

Adaptive management has been described at length in the literature (Journal of Environmental Management 2011).

Figure 7-1
Vernal Pool Conceptual Model

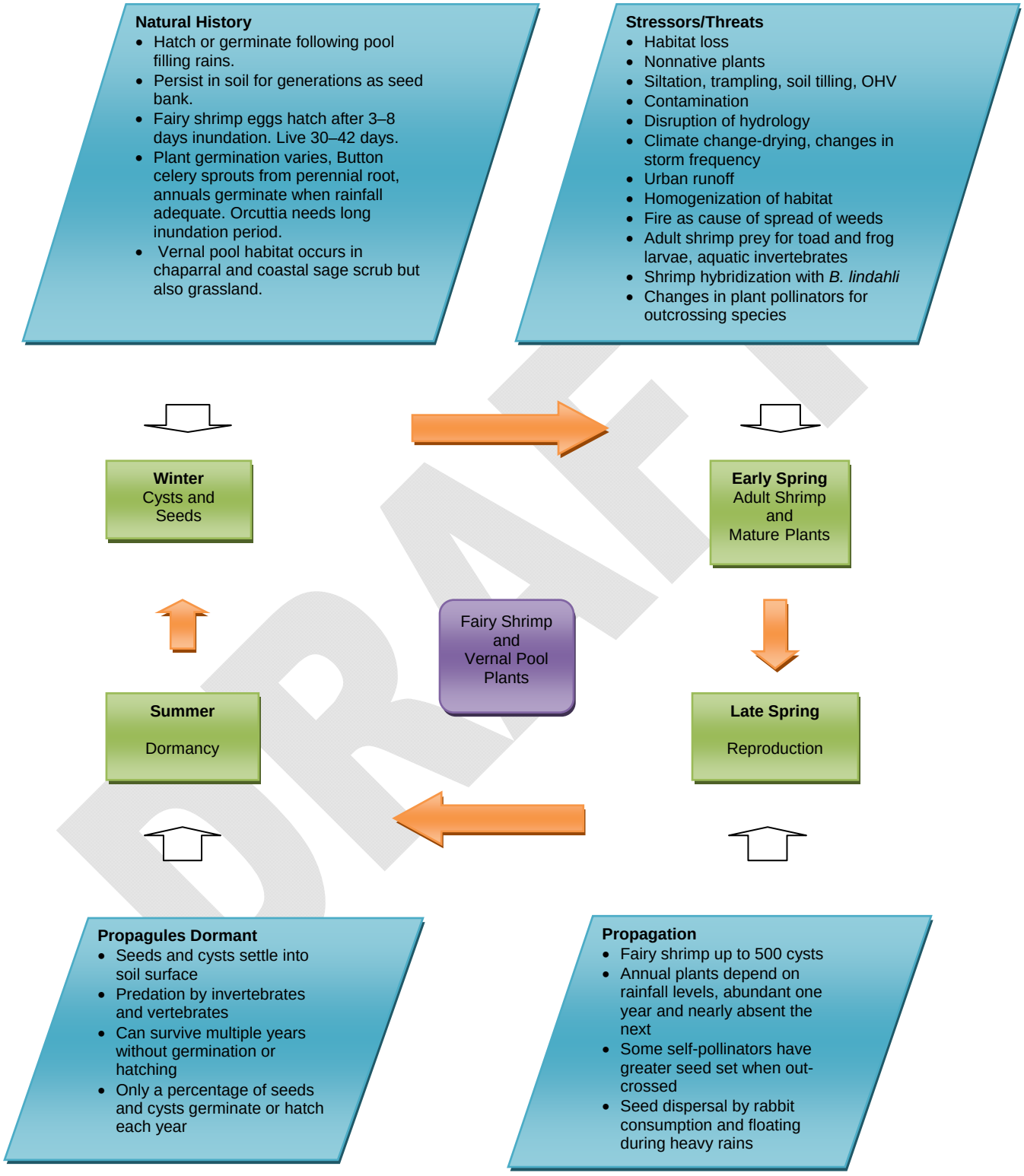
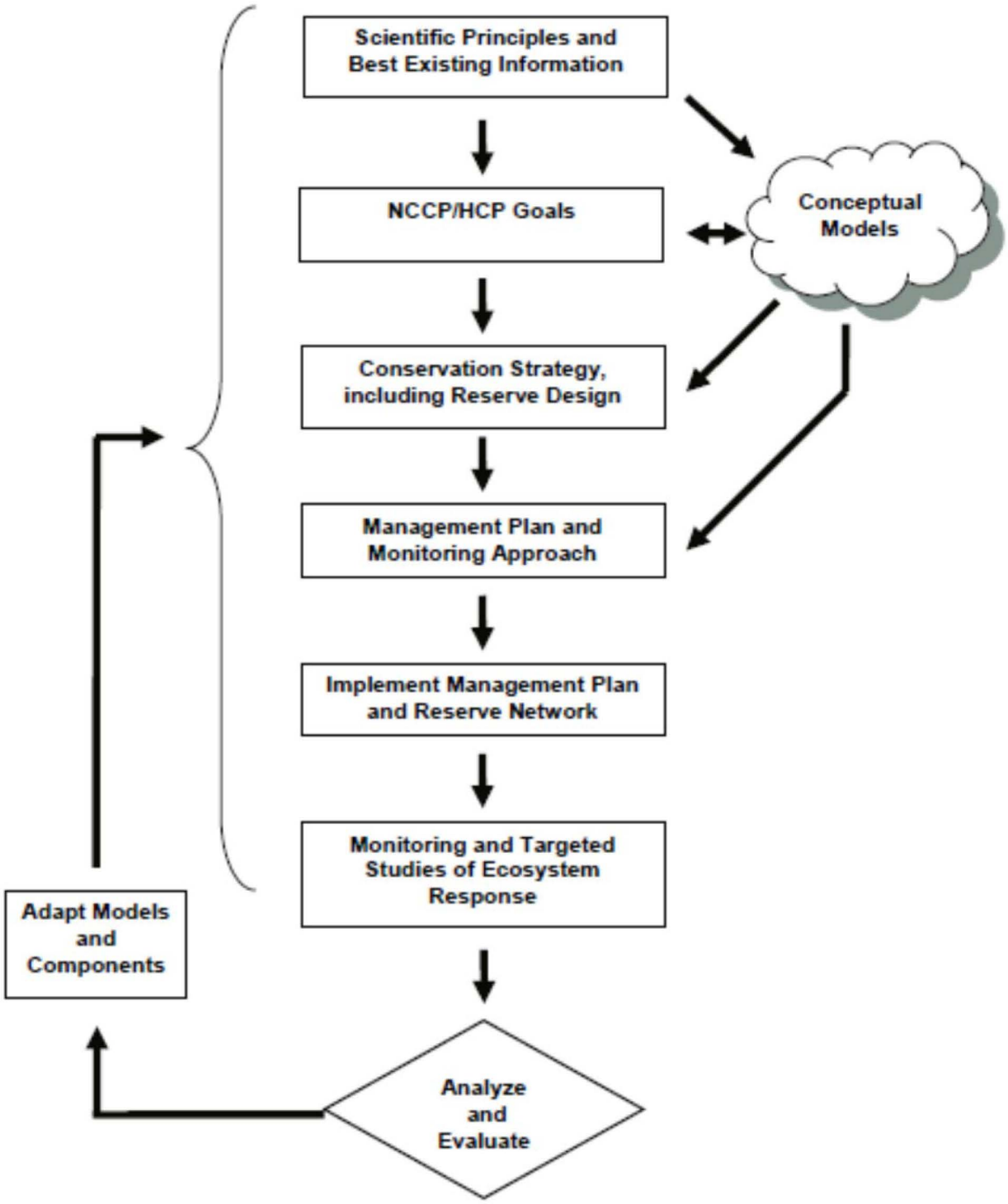


Figure 7-2
HCP Adaptive Management Feedback Loop (Atkinson et al. 2004)



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.
- *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.

7.3 VPMMP STANDARDS

To achieve the VPHCP objectives (Chapter 5), complex-specific management actions are required to be implemented via the framework VPMMP. To assess the status and need for complex-specific management actions, the following standards will be implemented and monitored under the framework VPMMP. 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 standards for management and monitoring at each vernal pool complex that will be managed under the framework VPMMP are:

A. Annually identify threats (invasive species, trampling, OHV activity, etc.) in all pools monitored, and implement actions to prevent or reduce those threats.
B. Prevent an average decline of at least one cover class[7] of any covered plant species over 3 years for years having at least 65% average rainfall.

[7] 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.

C. Prevent a 20% decline in the density of the covered shrimp species over 3 years (average within complex).
D. 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.
E. Maintain vernal pool hydrological network (i.e., inlet and outlet features) and water storage (maximum depth within +/-10% of baseline) functions.

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

7.4 OVERVIEW OF VPHCP MONITORING AND MANAGEMENT STRATEGY

The 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 (Table 5-1) and monitored via the VPMMP standards (Section 7.3). 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 Chapter 5, Table 5-1). 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 (Chapter 5, Table 5-1).
- Level 3 – *restore* habitat conditions to a level that can increase declining covered species populations identified in the species-specific objectives (Chapter 5, Table 5-1).

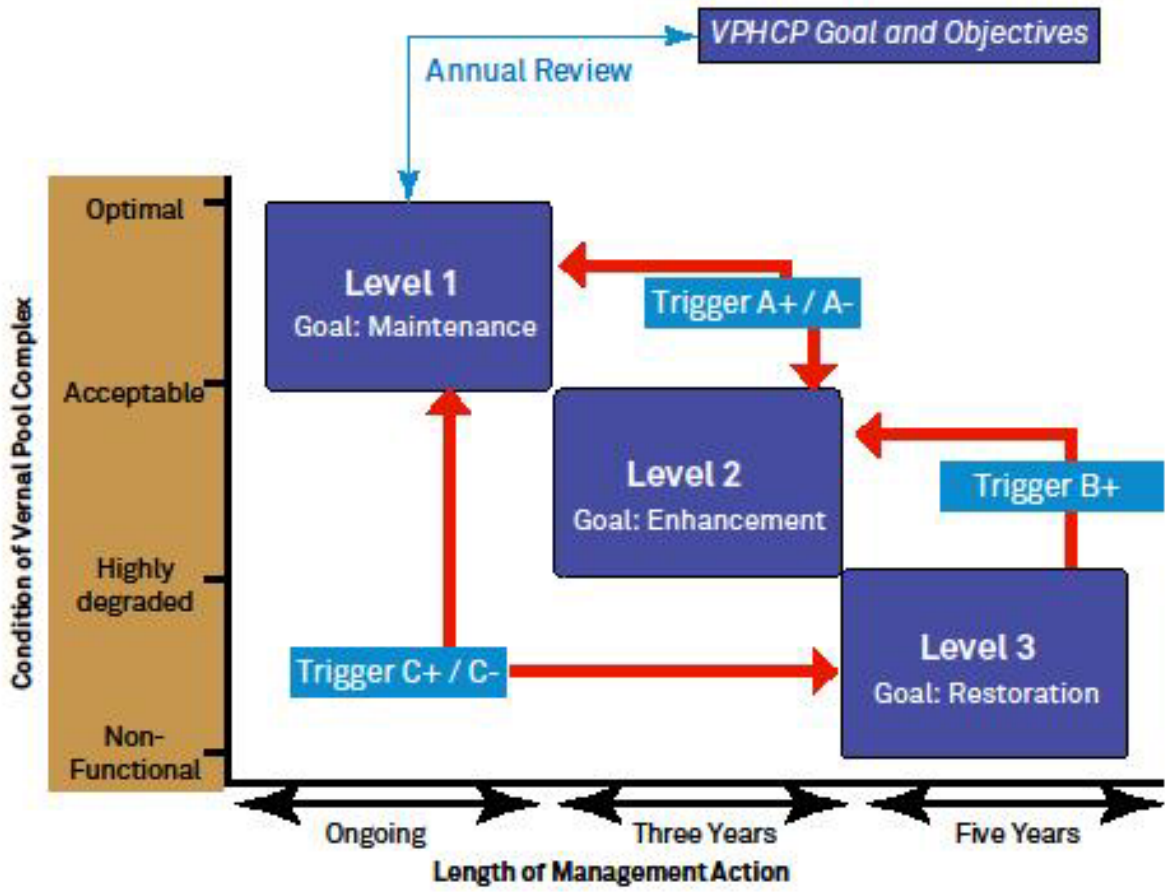
Specific monitoring and management actions are identified in Sections 7.5 and 7.6, respectively, for each of the three levels to achieve the VPHCP objectives. The monitoring and management actions have been developed to address the threats/stressors identified in the conceptual model.

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 5-1.

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 7-3. 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 exists and is available, the more recent data will be used as the baseline for comparison to the VPMMP standards.

Figure 7-3
VPHCP Management and Monitoring Levels and Triggers



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 through the life of the VPHCP permit.

7.5 MONITORING APPROACH

The monitoring methods and sampling design for the framework 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 the VPMMP is not intended for statistical evaluation of vernal pools for research purposes, but rather 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.

7.5.1 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 7-1). Monitoring will be performed on City-owned lands or lands that the City has a legal access to manage and monitor. Specific complexes that will be monitored under the VPHCP are included in the framework VPMMP (Appendix D). The VPHCP allows the collection of monitoring data by City staff, paid consultants, or nonprofits, provided that all follow a standard monitoring protocol.

Table 7-1 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 (Sections 7.5.2 through 7.5.4). The decision to move to a different monitoring level is based on triggers directly tied to the VPMMP standards identified in Section 7.3. Figure 7-4 illustrates the decision process for determining the appropriate monitoring and management level, based on the VPMMP standards applied at each level.

Figure 7-4
VPHCP Monitoring and Management Level Flow Chart

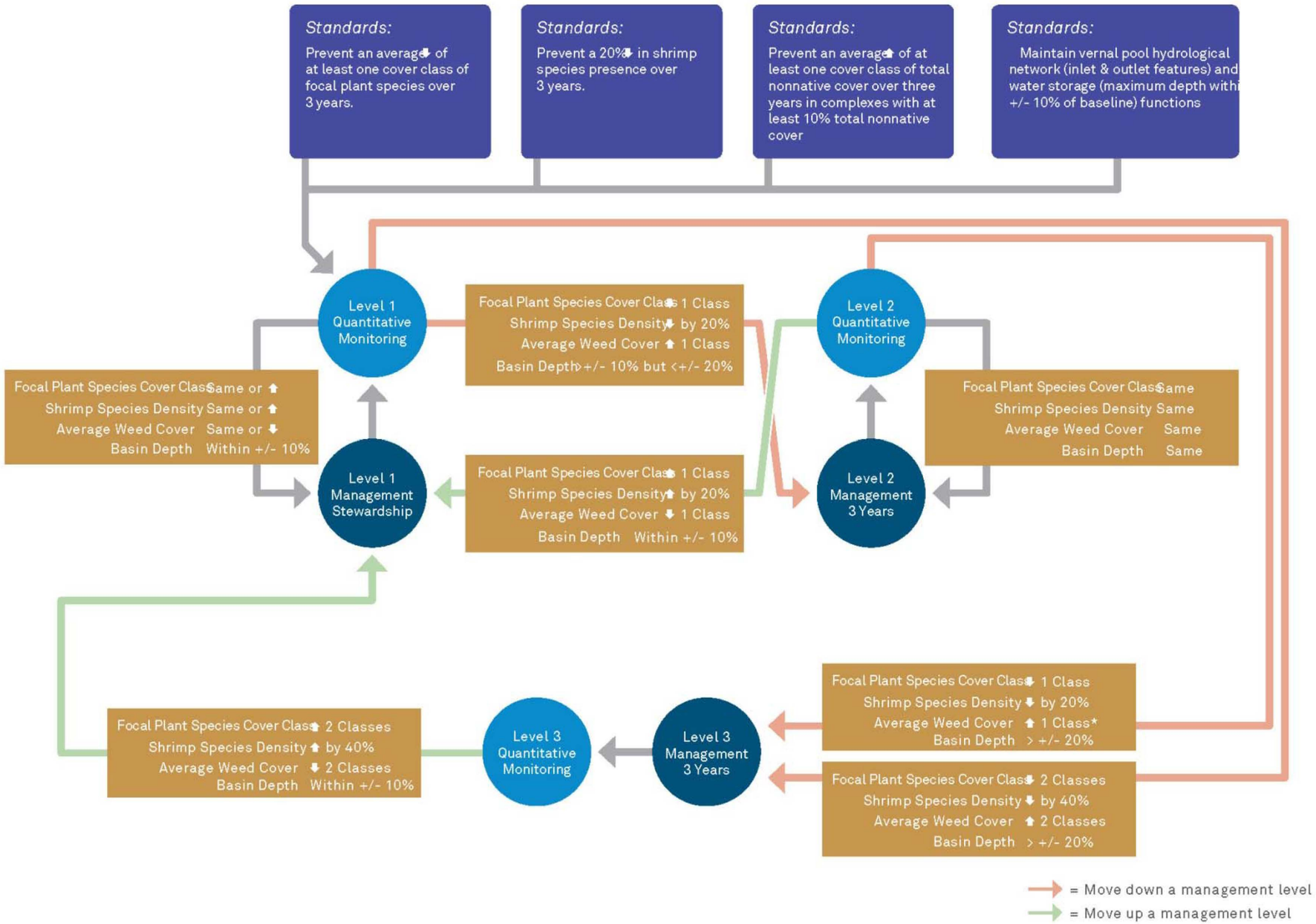


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Table 7-1
Monitoring Methods, Frequency, and Sample Size

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 frame-work 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 will be aggregated into one cover class estimate for comparison to the triggers. Individual nonnative species and problematic invasive exotics will be listed on the monitoring form (VPMMP Attachment A) 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	Every 3 years, dry season	Dry season sampling with genetic identification of cysts	**Level 1:** Up to 10 pools or 5% of pools with covered shrimp species, whichever is greater **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 will be measured and inlet and outlet locations will be recorded for comparison against baseline hydrologic data. If basin reconstruction is required to address topographic disturbance, then monitoring will 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)

Table 7-2 illustrates an example of the annual monitoring cycle for Level 1 (Stewardship). As shown, each vernal complex managed under the 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.

7.5.2 Baseline Hydrologic Surveys

Baseline hydrologic surveys will be conducted for all vernal pools within complexes managed under the framework VPMMP, regardless of the assigned VPMMP monitoring and management level. Baseline surveys 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.

The timing to complete baseline hydrologic surveys will depend on City staff and funding availability. If surveys occur over multiple years, the City will prioritize Level 2 and 3 complexes for baseline hydrologic data collection.

7.5.3 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 will be conducted at each applicable vernal pool complex managed under the framework VPMMP, regardless of the designated monitoring level. General site assessment information will be collected, including current or potential threats (such as invasive plants, dumping, OHV activity, and trampling), and recommendations for management will be generated.

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

- Fencing and Signage: The conditions of fencing or other site protection measures will be checked to verify that the site is secured and that appropriate signage is in place.
- Edge Effects: Each complex will 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 7-2
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 will be evaluated for impacts to the site (loss of native habitat, weed invasion, erosion, etc.).
- Trespass: Each complex will be inspected for signs of trespass or illegal OHV activity.
- Topographic Disturbance: Each complex will be evaluated for topographic disturbance or altered hydrology from vehicle damage, illegal trespass, or other landscape-damaging impacts. The qualitative assessment of topographic disturbance will 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 will be made during each qualitative survey for the vernal pool and upland areas. Observations of invasive plant species and invasive wildlife presence will be noted.
- Inundation: A visual check for pool inundation will be performed; inundation of at least 1.5 inches in depth will be noted.
- Other: Any additional observed disturbances that could affect habitat quality will be noted.

In addition, the overall disturbance category of the complex will be identified, based on the disturbance categories defined in the Hydrogeomorphic (HGM) Manual (Bauder et al. 2009). The categories range from minimal/no disturbance to severe disturbance.
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 7.5.4). An example of a combined qualitative and quantitative monitoring form that can be used for data collection is included as an attachment to the VPMMP (Appendix D). This form incorporates disturbance categories from the HGM Manual (Bauder et al. 2009).

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

7.5.4 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.

Annual quantitative monitoring will 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.

Covered Shrimp Species Monitoring

The sample size for covered plant and shrimp species monitoring will depend on the assigned monitoring level (see Table 7-1). Monitoring will include cover estimates within the pool basins using 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 this methodology, 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: <1%, 1–5%, 5–10%, 10–25%, 25–50%, 50–75%, and 75%+. Use of the CNPS 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 the CNPS class system.

Monitoring for floral and faunal components will 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.

Wet season sampling and/or dry season sampling of cysts with genetic identification to species will 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 7-2).

Sampling for shrimp cyst density and identification will be done in accordance with the USFWS protocol, as modified by Andrew Bohonak, PhD, at San Diego State University (USFWS 1996; 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 will 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 7-2).

If topographic or hydrologic disturbance is observed in a vernal pool, then maximum basin depth will be measured and inlet and outlet locations will be recorded for comparison against baseline hydrologic data (Section 7.5.2). If topographic reconstruction is required, then monitoring will be performed (Level 2 or 3) to determine if restored hydrological function achieves the VPMMP Standard "E" (Section 7.3).

Covered Plant Species Monitoring

At Monitoring Level 1, quantitative monitoring will 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 will be assessed quantitatively. If a complex has less than 10 pools for a particular covered species, survey will take place for at least one pool where that covered species is known to occur. Only the covered species will be assessed in each pool. Pools in a given complex with more than one covered species will 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 will be chosen randomly in each complex to meet the 10% criterion. The sentinel pools and the randomly chosen pools will 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, will 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 7-3 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 will 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 7-3
Monitoring Level 1 Example Vernal Pool Complex Sampling Selection

Complex Characteristics	Number of Pools[1]	Sample Size (10% of occupied pools or at least 1 pool if <10 occupied pools)	Permanent Pool Selection[2]
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), summarized in Appendix C.
[2] Pools for permanent sampling will be selected for each complex the first year a complex is part of Monitoring Level 1.

7.6 MANAGEMENT APPROACH

The tiered monitoring program described in Section 7.5 will be used to evaluate site conditions for each complex managed under the 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 will 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 7-4). 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 will be conducted annually, regardless of rainfall; however, only those years with 55% average rainfall will be compared to the VPMMP standards described in Section 7.5.4.

Table 7-4
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	6.3
South	Brownfield	9.6	5.3

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

7.6.1 Management Action Triggers

The required management level (Level 1, 2, or 3) for each complex managed under the framework VPMMP is determined by evaluating monitoring results against the VPMMP standards. The triggers to move between management levels are outlined in Table 7-5 and illustrated in Figure 7-4.

Table 7-5
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 with adequate rainfall, **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.
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 adequate rainfall, **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.

Management Trigger	Monitored Vernal Pool Resource	Monitoring Observation Compared to VPMMP Standards
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 adequate rainfall, **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 adequate rainfall, **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 adequate rainfall, **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.

7.6.2 Management Actions

Management levels were assigned to each complex in the 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 noted in the VPMMP and listed in Table D-1 of Appendix D.

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 will 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 7-6.

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 to be 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 will occur annually, at a minimum, at each site, or more frequency (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 7-3.

Management Level 2

The objective of Level 2 is *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 7-6. The required management actions are expected to result in an improvement in those conditions to Level 1.

Table 7-6
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 noncovered 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 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.

Level	Management Action	Management Requirement
Level 2 (con't.)	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 ±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 Lindahl's 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 noncovered 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 7-6. The required management actions are expected to result in an improvement in those conditions to Level 1.

7.7 VPMMP DATA COLLECTION, ANALYSIS, AND REPORTING

Over the life of the IA for the VPHCP, 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 7-2), the monitoring data should 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 will be responsible for determining how the monitoring data is collected on an annual basis. Monitoring data could be collected by qualified City staff, consultants, nonprofits, or other trained individuals. Collection of the information will be done in a standardized method and would collect sufficient information needed to determine the status of a complex. The following actions would occur under the VPHCP:

- Within 1 year, City departments that manage lands identified in the VPMMP will coordinate with the Planning Department on an approach to implementing the protocols for the following spring.
- Each spring, all conserved vernal pool complexes managed under the VPMMP will be monitored where legal access is available to the City.
- Each July, the City's Planning Department will gather the data collected by the various parties, including private land-owners and third-party beneficiaries as required by their development permit approvals. The monitoring results will be summarized into a report along with information on any associated management activities.
- Each September, the City will provide the summarized results[8] to the Wildlife Agencies for analysis. The Wildlife Agencies may choose to use outside assistance to analyze the data and formulate changes to the management and monitoring strategy.

[8] 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.

- Each December, the signatories to the Permit will meet to discuss the results of the monitoring and analysis. The parties will also discuss any necessary adaptations to ongoing vernal pool management and monitoring.
- Data will be provided annually to SANDAG for inclusion in the Multi-Taxa Database, and to the San Diego Management and Monitoring Program (SDMMP), a science-based program seeking to provide a coordinated approach to management and biological monitoring of conserved lands in San Diego County.

7.8 FUTURE REGIONAL POPULATION TREND ANALYSIS

Monitoring methods for the 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 5-1). Since many of the complexes are geographically isolated from each other, it is generally appropriate for monitoring and management to 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 and that there would be value to tracking the covered species' populations regionally. 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 USFWS or others.

7.9 OPPORTUNISTIC MANAGEMENT-RELATED RESEARCH

This section identifies opportunistic management-related research opportunities, which are not required under the VPHCP.

Options for research efforts to better understand covered species population dynamics include the following:

- Develop and test a methodology to better estimate population density or population size for fairy shrimp. This study would help to resolve the current lack of quality data collected from USFWS protocols for fairy shrimp population estimates. Improved data quality would allow for more accurate monitoring of management activities for fairy shrimp under the VPMMP.
- Conduct studies to determine the extent of hybridization with versatile fairy shrimp and its effects on San Diego fairy shrimp reproduction, population genetics, and viability.

- Conduct genetic studies for fairy shrimp to better understand population genetics and the relationships between and among vernal pool complexes.
- Research the relationship between covered plant and fairy shrimp presence and/or densities to better understand which species, or assemblage of species, are the best for use in habitat-quality evaluation benchmarks.
- Research which pollinators are important to each of the covered plant species, where these pollinators occur, and how these species can be targeted in habitat restoration and management.

SANDAG is currently funding research on the genetics, hybridization, and conservation of San Diego fairy shrimp. The research project is being conducted by Andrew Bohonak, PhD, at San Diego State University and will include the following tasks:

- Evaluation of San Diego fairy shrimp genetics at the landscape level by quantifying the genetic variation across the species' range for individuals, within pools, and within complexes. This will include an interpretation of the genetic patterns in terms of landscape connectivity, disturbance, recreational activities, and other environmental parameters. Microsatellite markers will be developed to provide insight of the biological meaning of the two potential clades identified in Dr. Bohonak's mitochondrial DNA research of the species.
- Determination of the level of hybridization between San Diego fairy shrimp and versatile fairy shrimp by developing and applying morphological and genetic hybrid indices to the two species across southern California. This will include a morphological review of historic vouchered specimens.
- From the results of the first two tasks, provide recommendations for management, conservation, and mitigation in terms of impacts on the genetic integrity and recovery of San Diego fairy shrimp.

Options for data collection and analysis efforts to better understand covered species population dynamics include the following:

- Perform vernal pool monitoring using the CRAM Vernal Pool Module. CRAM is a statewide program that looks at various wetland types across California, and it is important to incorporate the City's vernal pool data into the statewide CRAM database.
- Perform vernal pool monitoring using the HGM approach. While the data collection methods for the covered plant species can be used in the HGM evaluation, the covered

shrimp species data collection methods are not adequate for this model. Collection of HGM-level crustacean data will provide key information for use in an HGM model, providing another method for habitat evaluation and adding to the HGM model database.

- Perform long-term trend analysis on vernal pool complex monitoring data to develop individualized monitoring and management triggers for each complex to allow for complex differences that are not being evaluated with the current methods (i.e., universal triggers for all VPHCP complexes).

CHAPTER 8
IMPLEMENTATION

This chapter describes implementation of the VPHCP, including the processes for adding conserved lands to the MHPA, amending the MHPA boundary, and annexation of private lands. The roles and responsibilities for VPHCP implementation are also defined.

8.1 IMPLEMENTATION OVERVIEW

The City will collectively implement the VPHCP through use of existing City-owned land for the conservation of vernal pools, conservation of private lands through the development entitlement process, and the long-term management and monitoring of these lands. The City will extend take coverage to third-party beneficiaries (i.e., private entities that receive coverage under the VPHCP) after confirming that a project within its jurisdiction is eligible for coverage and the project proponent has complied with all application requirements and other relevant terms of the VPHCP. Owners of private properties and third-party beneficiaries must submit a site-specific management and monitoring plan that is consistent with the requirements of VPHCP and City's LDC Biology Guidelines for City and Wildlife Agencies' approval. The City will also be responsible for reporting the relevant details of approved projects to the Wildlife Agencies and for monitoring developer compliance with the VPHCP conservation measures (see Chapter 5) and VPMMP (Appendix D), as specifically applied to approved covered and future projects. The Wildlife Agencies will be responsible for managing and monitoring their lands within the VPHCP Plan Area consistent with the goals and objectives of the VPHCP.

8.2 MHPA PRESERVE ASSEMBLY

Implementation of the VPHCP will expand the MHPA by 381 acres to include a total of 2,340 vernal pools located within a total of 54 vernal pool complexes (see Chapter 6). The expanded MHPA will be assembled primarily through the development entitlement process via application of the ESL regulations. However, for certain small parcels, acquisition of these lands with public funds may be the only option to assemble preserve lands for the MHPA. Opportunist acquisition by the City and/or other entities through grant funds is encouraged.

The MHPA hardline preserve areas for covered projects identified in Chapter 4 have or will be incorporated into adopted project plans and entitlements and will be made conditions of individual project approvals. Specific project conditions (e.g., restoration or enhancement) would be identified through the development entitlement process.

Future projects would be required to follow the siting criteria in Figure 1 of the City's Biology Guidelines and all development regulations described below. For the purposes of the VPHCP, as shown in Table C-1 of Appendix C, it is assumed that 25% of all private and public lands that have not been conserved and are wholly within the MHPA will be lost (i.e., 75% conservation). Development under the VPHCP would be restricted to minimize impacts to vernal pools while allowing some reasonable use of the property. Therefore, this is a conservative assumption since any proposed development will be required to avoid the MHPA if more than 25% of the parcel is outside the MHPA. In addition, the Biology Guidelines require avoidance of vernal pools inside the MHPA to the maximum extent practicable.

Project applicants will be required to fund long-term management and monitoring of conserved lands consistent with Chapter 7 of this VPHCP and the City's Draft VPMMP (Appendix D). In addition, all lands conserved as part of the development entitlement process would be placed within a Covenant of Easement with the Wildlife Agencies as third-party beneficiaries.

If vernal pool restoration and/or enhancement is required, a project applicant will post a performance bond or letter of credit with the City for grading, planting, irrigation, and 5 years of maintenance and monitoring of vernal pool mitigation (including a 20% contingency to be added to the total costs). At the end of the 5-year restoration/enhancement period, the site must be at a Level 1 status. The bond or letter of credit is to guarantee the successful implementation of the mitigation construction, maintenance and monitoring.

Lands that are within the VPHCP Plan Area, but not under the City's land use jurisdiction (e.g., military lands, state-owned mitigation property), would not be afforded Take Authority under the VPHCP, unless the land-owning entity applied for third-party beneficiary status under the City's ESL regulations. City airports are not covered by the VPHCP.

8.2.1 Implementation Tools

The City will implement the requirements of the VPHCP through (1) conservation and/or management of existing open space with vernal pools, (2) exaction of future open space within the MHPA through the development entitlement process, and (3) annual reporting on the status of ongoing management and monitoring of conserved vernal pool sites. Implementation of the VPHCP will be consistent with the implementation regulations set forth by the City's ESL regulations.

8.2.2 Implementation within Existing Conserved Lands

The following City departments own lands in the existing MHPA: Park and Recreation Department, Open Space Division; Public Utilities Department, Water/Wastewater Divisions; Environmental Services Department; and Real Estate Assets Department, Airport Division. Chapter 10 of the VPHCP discusses the funding and options for implementation of the VPHCP. Airport lands (e.g., Montgomery Field and Brown Field) are not currently part of the VPHCP and will be managed in accordance with requirements pursuant to existing and future City approvals and associated state and federal permits (i.e., Biological Opinions).

The City will continue to manage their lands consistent with the standards and requirements of the MSCP SAP. In addition, for the vernal pool complexes within the MHPA, the City will provide management, monitoring, and reporting consistent with Chapter 7 of the VPHCP and will implement the City's VPMMP (Appendix D). Existing resource/land management plans will be updated to reflect the vernal pool management and monitoring requirements per the schedule included in the VPMMP.

Activities that may impact vernal pools on existing conserved lands will be limited to those identified in Chapter 4. Mitigation in accordance with the VPHCP, ESL regulations, and City's Biology Guidelines would be required.

8.2.3 Discretionary Actions Required to Implement the VPHCP

The City's General Plan provides public policy for the distribution of future land use, both public and private. The Conservation Element of the General Plan includes goals and policies for the protection, preservation and long-term management of the City's open space and MHPA lands. The City will amend the General Plan to add policies the related to the VPHCP and to revise the existing MHPA discussion and maps/graphics to include the expanded boundaries.

The City's Community Plans contain more detailed land use designations and community-specific details that can be used in the review process for both public and private development projects. The City will amend the Otay Mesa and Kearny Mesa Community Plans to revise the land use maps to include the expanded MHPA boundaries. Policies related to the protection, preservation, and long-term management of vernal pool resources were added to the Otay Mesa Community Plan as part of the 2014 update process. Similar policies will be added to the Kearny Mesa Community Plan. Policies included:

- Require preservation, restoration, management, and monitoring within identified vernal pool preservation areas in accordance with City, state, and federal policies and

regulations. The boundaries of vernal pool preserve areas should be of sufficient size and shape to protect the vernal pool basins, watersheds, functional buffers, and areas necessary to maintain vernal pool ecosystem function and species viability.

- Design, as feasible, the preserve areas to provide connectivity between vernal pools, surrounding open space, and nearby vernal pool complexes.
- Conduct management and monitoring of preserved and restored vernal pool sites in accordance with the citywide regulations and Biology Guidelines.

Land development within the City is regulated by the Land Development Code(Chapters 10 through 14 of the City's Municipal Code). The Land Development Code "*sets forth the procedures used in the application of land use regulations, the types of review of development, and the regulations that apply to the use and development of land in the City of San Diego. The intent of these procedures and regulations is to facilitate fair and effective decision-making and to encourage public participation*" (Section §111.0102.). In addition, technical documents that set forth standards and guidelines have been established by the City in the Land Development Manual. These regulations and guidelines currently provide the tools to implement the City's MSCP SAP and will be modified to implement the VPHCP.

The City will amend the Land Development Code/ESL Regulations and the Land Development Manual/Biology Guidelines as follows:

1. The Environmental Lands Section of the Land Development Code (Municipal Code Chapter 14, Article 3, Division 1) will be amended to reflect the expanded boundaries of the MHPA as identified in the VPHCP as a sensitive biological resource area.
2. Per Land Development Code section 143.0141 (a) (5), development in the MHPA is permitted only in accordance with the regulations set forth in the OR-1-2 zone, pursuant to section 131.0250 (b). The Open Space-Residential Zone (OR-1-2) of the Land Development Code (§131.0250) would be amended to incorporate the and expanded MHPA and the VPHCP.
3. The Development Regulations for Sensitive Biological Resources (§143.0141) will be amended to include the provisions for inclusions of the conservation strategy as discussed in Chapter 6 of the VPHCP.
4. The Wetland Deviation Section (§143.0150) of the Land Development Code and associated sections of the Biology Guidelines (i.e., Section III, Biologically Superior Option) will be amended to allow impacts to vernal pools if consistent with the VPHCP.

5. Amend the Biology Guidelines, Mitigation Element to require that vernal pool mitigation sites include watersheds and buffers consistent with the VPHCP and expanded MHPA.

6. Chapter 11 of the Land Development Code and Biology Guidelines, Section 1 will be amended to include definitions related to the VPHCP (i.e., Vernal Pool Habitat Conservation Plan, Critical Habitat) and expanded MHPA boundaries.

8.3 AMENDMENTS

During the implementation of the VPHCP, changes may arise due to new information, requests from private or public development seeking entitlements, or other modifications that are unforeseen. Changes that relate to mapping corrections (Section 8.3.1) or boundary line adjustments (Section 8.3.2) do not require a major amendment. Changes that would affect the level of conservation envisioned by VPHCP may be accommodated, in specific cases, through major amendment to the VPHCP, as described in Section 8.3.3.

8.3.1 Mapping Corrections

Mapping corrections are the simplest type of VPHCP revisions. Parcel level information was used to develop the VPHCP, therefore, it is anticipated that corrections would not be needed. However, in the unlikely event that there is an error in the spatial accuracy of the information, the GIS data layer will be reviewed to ensure that the development and preservation areas are correctly identified and a boundary line correction can be processed. Mapping corrections will be discussed and receive mutual agreement with the Wildlife Agencies and will not require a major amendment to the VPHCP. The City will be required to track and include these changes in the VPHCP Annual Report.

8.3.2 Boundary Line Adjustments

Boundary line adjustments to the MHPA may be made without the need to for a major amendment to the VPHCP in cases where the new boundary results in an area of equivalent or higher biological value in the MHPA. A proposed boundary line adjustment will be required to evaluate the change in conservation levels and the change in impacts to vernal pools and covered species that would occur with the adjustment. This evaluation will be provided in the biological technical report and summarized in the environmental document. The determination of the biological value of a proposed boundary line adjustment will be made by the City in accordance with this Plan, with the concurrence of the Wildlife Agencies, typically at boundary line adjustment meetings prior to release of the environmental document for public review. The City

will summarize and track changes from boundary line adjustments in their Annual Report. An adjustment that does not meet the equivalency test shall require a major amendment to this Plan.

8.3.3 Major Amendments to the VPHCP

Major Amendments to the Plan will be required if a proposed action were to include but not be limited to any of the following:

- Increased level of take of a Covered Species.
- Addition of a Covered Species.
- Addition or substantial modification to a Covered Activity that could reduce conservation commitments in the Plan.
- Annexations that are inconsistent with the VPHCP

Major Amendments to the Plan will require detailed analyses of the anticipated effects of the proposed action on the MHPA and Covered Species, sensitive habitats and species not addressed in the Plan, and the additional conservation to be provided through the Major Amendment process. Major Amendments will be processed as Permit Amendments in accordance with all applicable federal and state statutory and regulatory requirements, including NEPA and CEQA. The Service will provide technical assistance to the City during the amendment process. All Major Amendments to the Plan will be memorialized through an addendum to the Plan and a Permit Amendment and will be documented in the Annual Report.

8.4 TRANSFER OF TAKE AUTHORIZATION AND ANNEXATIONS

Take Authorization may be transferred to other jurisdictions for impacts to habitat on annexed land, provided that these impacts are consistent with this Plan. Transfer of Take Authorization should be part of Annexation Agreements negotiated through the annexation process overseen by the Local Agency Formation Commission. If the conservation goals cannot be met or found equivalent, the Plan must be amended as described in section 8.3.3 including CEQA and NEPA requirements.

Future annexations of land by adjacent jurisdictions must be consistent with the Plan's requirements, including the project review and approval process (see Section 8.2) if development is proposed in the annexed area. Conservation goals must not be compromised by development proposed in annexed areas. For all annexations to or from the Plan area the following steps must be taken:

- Notify the Wildlife Agencies in writing of all annexation proposals affecting the Plan Area boundary.
- Submit to the Wildlife Agencies, in the appropriate GIS format, proposals to adjust Plan boundaries.
- Submit findings that impacts proposed are consistent with the overall conservation goals and objectives and preserve design strategy of this Plan.
- If no approved HCP/NCCP Plan exists for the jurisdiction to which the land is being annexed, the annexing jurisdiction must assure the City and the Wildlife Agencies that the jurisdiction will conform to this Plan.
- If an approved HCP/NCCP Plan exists for the jurisdiction to which the area is being annexed, the existing approved plan must be modified through the boundary line adjustment or amendment process and the monitoring and management portion for that HCP/NCCP must be modified to assure that development design is consistent with overall conservation goals and the preserve design strategy of this Plan.

8.5 ROLES AND RESPONSIBILITIES

Implementation of the VPHCP will require the coordinated action of several City departments to ensure compliance. City departments have been coordinating on the implementation of the City MSCP SAP since 1997. The implementation of the VPHCP will be folded into the existing implementation structure.

8.5.1 Permittee Responsibilities

Upon approval of the VPHCP, the USFWS will issue the City a permit for take of the seven covered species. For projects conducted by the City, the City will be responsible for ensuring that the project conforms to the requirements of the VPHCP and will follow the process for utilizing take authorization as described in Chapter 6.

Through the discretionary process, the City may extend VPHCP coverage to private entities within the permit area that are under the City's jurisdiction. Projects or activities to be covered by the VPHCP must be implemented in accordance with the terms and conditions of the VPHCP, and state and federal permits.

The City will be responsible for implementing the following actions:

- Review of proposed discretionary land use projects for consistency with the provisions of the VPHCP, the City Land Development Code, and the appropriate Community Plans. Project approval requires adoption of findings of consistency with the City's adopted regulations.
- Facilitate and resolve issues related to the VPHCP with applicants, public stakeholders, Wildlife Agencies, and City departments.
- Track and report on the progress on the implementation of VPHCP annually.
- Implement management and monitoring efforts of vernal pool resources on City-owned lands consistent with the VPMMP and applicable Natural Resource Management Plans (NRMP).
- Determine the acceptance and conditions of any land offered to the City from private owners through the land use entitlement process.
- Manage special funds established for vernal pool management and monitoring.
- Coordination between City departments to implement the VPHCP management and monitoring strategy and to provide information for the annual VPHCP reporting.
- Coordination with City departments for early review of lands with vernal pool resources within the MHPA that are being considered for lease or sale to ensure compliance with the VPHCP.
- Coordination on the development of information for property owners requiring brush management to make sure they comply with the VPHCP. Utilize City-wide vernal pool mapping in fire prevention planning and identification of access points that would avoid impacts to vernal pools. Coordination on the development of any wildfire access and management plans for consistency with the VPHCP.
- In the event of a conflict between the VPHCP requirements and other City development criteria, the City will coordinate with the Wildlife Agencies to determine an appropriate resolution.

8.5.2 Wildlife Agency Responsibilities

The Wildlife Agencies will not be involved in approving take authorization for Permittees nor for private development projects within the City's jurisdiction on a project-by-project basis except in limited circumstances or as required by this VPHCP. A small subset of the covered activities/projects will require additional review and approval by the Wildlife Agencies (i.e., projects that include an ESL/Wetland Deviation/biologically superior option) to ensure that the

Covered Activity is adequately defined, consistent with the VPHCP, and incorporates the conservation measures described in Chapter 5. Early consultation with the Wildlife Agencies is strongly encouraged to ensure that relevant conditions of the VPHCP are incorporated into project designs and proper surveys are conducted in advance of project approvals.

The primary responsibility of the Wildlife Agencies will be to ensure that the City is in compliance with the state and federal permits, and VPHCP. Reviewing and commenting on annual reports and monitoring reports (see Chapter 7) will be a key means for the Wildlife Agencies to monitor compliance. In addition, the Wildlife Agencies will manage and monitor their lands that support vernal pool resources within the City, consistent with the biological goals and objectives of the VPHCP.

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CHAPTER 9
CHANGED AND UNFORESEEN CIRCUMSTANCES

On February 23, 1998, the Department of the Interior, USFWS, and the Department of Commerce, National Marine Fisheries Service codified the assurances provided through HCPs issued under Section 10(1)(1)(B) of the Endangered Species Act (USFWS and NMFS 1998). This policy of "No Surprises" was intended to provide sufficient financial and regulatory certainty to HCP permittees to gain the participation of non-federal entities. This chapter addresses Unforeseen Circumstances (Section 9.1) and Changed Circumstances (Section 9.2), consistent with the "No Surprises" policy.

Unforeseen Circumstances are defined under the "No Surprises" policy as changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and USFWS at the time of the conservation plan's negotiation and development and that result in a substantial and adverse change in the status of the covered species.

Changed Circumstances are defined under the "No Surprises" policy as changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and USFWS and that can be planned for.

9.1 UNFORESEEN CIRCUMSTANCES

9.1.1 Assurances for Unforeseen Circumstances

The City will be assured that if "Unforeseen Circumstances" arise, USFWS will not require the commitment of additional land, property interests, financial compensation, or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed to in the HCP without the consent of the City. The government will honor these assurances as long as a City is implementing the terms and conditions of the VPHCP, permit, and other associated documents in good faith. As indicated in the Final *No Surprises* Rule (USFWS and NMFS 1998), "*Once an HCP permit has been issued and its terms and conditions are being fully complied with, the permittee may remain secure regarding the agreed upon cost of conservation and mitigation. If the status of a species addressed under an HCP unexpectedly worsens because of Unforeseen Circumstances, the primary obligation for implementing additional conservation measures would be the responsibility of the federal government, other government agencies, or other non-federal landowners who have not yet developed an HCP.*" This provision only applies to species considered "adequately covered" under the VPHCP.

9.1.2 Finding of Unforeseen Circumstances

Pursuant to the No Surprises Rule at 50 C.F.R. Section 17.22(b)(5)(iii)(C), USFWS has the burden of demonstrating that Unforeseen Circumstances exist using the best scientific and commercial data available. The findings must be clearly documented and based upon reliable technical information regarding the status and habitat requirements of the affected species. In its evaluation, the USFWS will consider, but not be limited to, the following factors:

- The size of the current range of the affected covered species.
- The percentage of the range of the affected covered species that has been adversely affected by covered activities under the VPHCP.
- The percentage of the range of the affected covered species that has been conserved by the VPHCP.
- The ecological significance of that portion of the range of the affected covered species affected by the VPHCP.
- The level of knowledge about the affected covered species and the degree of specificity of the covered species conservation program under the VPHCP.
- Whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected covered species in the wild.

If either of the Wildlife Agencies or the City becomes aware of the existence of a potential Unforeseen Circumstance, they will immediately notify the other Agencies of the existence of the potential Unforeseen Circumstance. Except where there is substantial threat of imminent, significant, adverse impacts to a covered species, USFWS will provide the City and CDFW written notice within thirty (30) calendar days of a finding of Unforeseen Circumstances, during which time the Wildlife Agencies will meet with the City to discuss the proposed finding, provide the City and any affected Third-Party Beneficiary an opportunity to submit information to rebut the proposed finding, and consider any proposed changes to the conservation strategies for the Preserve (i.e., the area conserved under the VPHCP, including the MHPA and existing conserved lands) and the SAP's operating conservation program. During the time necessary to determine the nature and extent of any additional or modified mitigation, the City will avoid contributing to appreciably reducing the likelihood of the survival and recovery of the affected covered species in the wild.

Pursuant to the provisions of the No Surprises policy, USFWS may impose additional mitigation or other measures on the City without its consent only to the extent allowed by and in conformance with the No Surprises policy currently codified at 50 C.F.R. 17.22(b)(5).

9.1.3 Effects of Unforeseen Circumstances or Jeopardy on Take Authorization

Notwithstanding the limits on conservation and mitigation measures identified above, the Permit for this HCP may be revoked if USFWS determines that continuation of the covered activities would be inconsistent with the criterion set forth in 16 U.S.C. 1539(a)(2)(B)(iv). See also 50 C.F.R. 17.22(b)(8). Nothing in this VPHCP will preclude USFWS and any federal, state, local or Tribal government agency, or a private entity, from taking additional actions at their own expense to protect or conserve the covered species. The existence of Unforeseen Circumstances does not authorize USFWS to violate any federal, state, or local laws, ordinances, regulations or policies.

9.2 CHANGED CIRCUMSTANCES

Overview of Changed Circumstances

Changed Circumstances related to vernal pools and covered species addressed by this VPHCP are limited to the following:

- Fire
- Vandalism
- Invasive plants
- Versatile fairy shrimp
- New listings of threatened or endangered species
- Climate change

USFWS and the City agree that the Changed Circumstances listed above represent all Changed Circumstances to be addressed by this VPHCP. These Changed Circumstances provisions are not intended to cover the same or similar circumstances outside City jurisdiction nor if they occur within the City of San Diego, but outside of the Preserve and where the City has no legal authority to carry out the Planned Responses described below. If Changed Circumstances occur within the MHPA, but before the land is lawfully dedicated or conveyed to the MHPA, the City would be responsible for enforcing Planned Responses implemented by private property owners.

Each of the defined Changed Circumstances includes an assessment of risk, a description of preventative measures (where feasible), and a summary of Planned Responses (measures to be undertaken in the case of Changed Circumstances) as provided below. Preventative measures are those measures that are, or will be, undertaken by the City to reduce the potential for occurrence of the Changed Circumstance, and/or that reduce the potential for damage to the MHPA resulting

from a Changed Circumstance. Planned Responses are the specific responses that will be undertaken in the event of a Changed Circumstance. Planned Responses will not include any actions beyond those expressly identified in this chapter, nor for any event not specifically identified as a Changed Circumstance. Planned Responses will be implemented to the extent that it is possible to do so and remain consistent with the primary goal to prevent harm to the public health, safety, and welfare. Planned Responses will be implemented by using the funding sources described in Chapter 10 for Changed Circumstances, and only to the extent provided by the identified funding sources.

Relationship of Changed Circumstances to Adaptive Management

Preventative measures and responses to Changed Circumstances are generally addressed through the adaptive management element of this VPHCP. The adaptive management program requires monitoring of species and habitat conditions, with a management response to observed threats. In anticipating and reacting to Changed Circumstances, adaptive management allows for revisions to the operating conservation program, thereby enhancing future strategies for the conservation of species and their habitat. Changed Circumstances allow specific triggers and management actions to be applied to foreseeable threats. The ability to carry out the preventative measures and adaptive management actions for Changed Circumstances, described below, is included in the funding calculations for this VPHCP.

The adaptive management program presented in the VPMMP (Appendix D) allows this VPHCP to be revised as new information on the life history or ecology of covered species is gained through continuing research and/or as data regarding the effectiveness of mitigation measures (gained through the monitoring programs) is generated. As a result, revisions may be made to several of the VPHCP's conservation components, including land management and monitoring of covered species.

Changed Circumstances Considered but Rejected

Other potential changed circumstances were considered but rejected. For example, emergency situations and their corresponding remedial actions are not addressed under the VPHCP. While over the course of a 31-year permit term there will likely be emergency situations, it is impossible to predict exactly what types of emergencies may occur. Past emergency situations in the VPHCP Plan Area that have resulted in Take of covered species include, for example, pipeline breaks and police activity. Because of the difficulty in predicting the size, type, frequency, and effect of emergency situations, the City does not consider such events to be Changed Circumstances under the VPHCP. If such an emergency event occurs as a result of the City's facility or action, the City is responsible for any Take that may occur. The City will

assume responsibility for the emergency situation and remedial measures if and when they do occur in the future, just as they would in the absence of a VPHCP Permit.

9.2.1 Fire

Risk Assessment

Fires are natural phenomena in the Mediterranean climate of southern California. Frequent and intense fires can modify the natural landscape and pose a threat to public safety. Fire frequency and intensity influence community regeneration, composition, and extent. Due to the fragmented nature of most vernal pool complexes in the VPHCP Plan Area, a large-scale fire that would burn multiple vernal pool complexes is unlikely and, therefore, considered an Unforeseen Circumstance. However, a localized fire that burns an individual complex (e.g., Del Mar Mesa) is a foreseeable Changed Circumstance.

For purposes of this VPHCP, it is assumed that a catastrophic fire will burn two average-size vernal pool complexes (i.e., 50 vernal pools, based on the average number of pools within each complex in the VPHCP Plan area,) once every 10 years (based on average fire cycle for southern California).

Impacts from fire can occur within vernal pool complexes from the fire itself, as well as from the fire suppression activities. If not controlled, increased erosion and weed invasion may occur following a fire due to loss of upland vegetation in the watershed. In addition, pools may be damaged by emergency response vehicles and personnel during the fire suppression. Erosion is addressed below and weed invasion is addressed in Section 9.2.3.

Increased fire risk associated with climate change is addressed in Section 9.2.6.

Preventative Measures

The City has adopted Fire Safety and Brush Management Guidelines to reduce the risk of fire and create defensible space between structures and potential fuel sources (e.g., native vegetation). This defensible space slows down the fire, giving fire safety personnel time to stage and protect structures. In addition, during major wildfires, fuel breaks and backfires are often used to proactively fight fires. Preventative measures to reduce the likelihood of and harm from a single fire in the Preserve are included in the adaptive management provisions in the VPMMP. In addition, such measures will be more specifically identified in the site-specific Resource Management Plans (that will be developed for each vernal pool site under the VPMMP framework), which will include a comprehensive strategy for reducing risks of negative effects wildfire, including preventative actions and planning for fire suppression activities in advance.

Planned Responses

The Resource Management Plans will include fire management and protection measures that will minimize the risk of damage to habitats and natural communities from fire outside the normal range of wildfires. Preventative measures include the following actions:

- Create or redesign fuel breaks to limit fire spread.
- Work with local fire agencies to improve fire suppression preparedness and strategies to protect habitat during fire response.
- Incorporate public awareness programs into recreational plans and Preserve site-specific Resource Management Plans.

Should a fire take place, Preserve managers will follow protocols established in Resource Management Plans and work closely with local fire response crews to ensure that impacts on sensitive communities and covered species are minimized within safety limits. In addition, landscape-level monitoring will assess changes to land cover type, and natural community–level monitoring will assess the response of exotic plants. In the event of habitat loss, land management and habitat restoration measures will be implemented within affected Preserve sites to ensure the reestablishment of native vegetation through active or passive management, as appropriate.

Within 30 days of a fire, City staff biologists and/or Preserve manager(s) will make a preliminary assessment of the effects of the fire within the Preserve areas. Based on the extent and severity of fire damage, as determined by City staff biologists and/or Preserve manager(s) with concurrence of the Wildlife Agencies, the City will develop and implement specific adaptive management tasks in accordance with the VPMMP and/or Resource Management Plans for specific Preserve areas. Restoration, maintenance, and management activities are assumed to be similar to those described under Level 3 Management to restore Covered Species (see Chapter 7). City staff biologists and/or Preserve manager(s) will address monitoring of natural regrowth within the damaged area for a period of 5 years, implement measures to minimize the invasion by exotic species, potential for excessive soil erosion, and/or changes to hydrology (i.e., minor recontouring may be needed to repair impacts from emergency vehicles). Qualitative and quantitative monitoring will be required to evaluate post-fire restoration success (based on pre-fire conditions). As data are gathered, adaptive management actions will be initiated and modified as needed to reduce potential threats and their adverse impacts. It is assumed that, following 5 years of post-fire restoration, a burned complex will be elevated to Stewardship (i.e., Level 1) monitoring and management, as described in Chapter 7.

9.2.2 Vandalism

Risk Assessment

While access control is required under the VPMMP, vandalism is still possible. Structures in the Preserve System such as gates, fences, or signs could be vandalized during the permit term. Such damage is considered reasonably likely to occur during the permit term and is therefore considered a changed circumstance. Remedial measures funded in the VPHCP include the repair or replacement of structures or facilities damaged by vandalism. In addition, the vernal pools themselves maybe impacted from intentionally damaging, destroying, or removing covered species. Examples include (but are not limited to) unpermitted grading, construction and use of new trails by mountain bikers, and off-road vehicle use. Vandalism can result in permanent impacts to covered species and reduce vernal pool ecological functions.

Preventative Measures

Measures to prevent vandalism include access control (installing and/or maintaining fencing and/or signage) and patrolling, which are activities that would be implemented as part of Stewardship management (i.e., Level 1), as discussed in Chapter 7.

Planned Responses

If vandalism does occur, enhancement and/or restoration activities (see Chapter 7 for details) would be implemented to restore impacted areas to pre-impact conditions. For example, topographic reconstruction may be required to address illegal grading of vernal pool basins or watersheds. Seeding and/or installation of container plants may be necessary to restore impacted covered plant species. The time-frame to complete enhancement and/or restoration of habitat and covered species populations would depend on the severity of impact from vandalism.

9.2.3 Invasive Plants

For the purpose of defining Changed Circumstances, invasion of invasive exotic species is defined as an introduction of a species within a Preserve that has either (a) not previously been known to occur in County and has been noxious elsewhere; or (b) is a particularly noxious variety of nonnative species that is resistant to typical control measures. Unforeseen Circumstances (which are not covered under this VPHCP) are defined as invasion within a Preserve of a species not currently known to be noxious elsewhere, but that becomes so upon introduction to the Preserve.

Risk Assessment

Invasive plant species are considered to be the greatest risk to the VPHCP covered species. Although invasive, exotic, or pest species of plants may currently exist within the areas identified for inclusion in the MHPA, they are expected to be controlled through the adaptive management process. An unexpected and/or sudden increase in new invasive species may create the potential for a significant adverse effect on one or more of the covered species. Opportunities for increases in invasive species could occur as urban development expands in areas surrounding the MHPA (primarily in Otay Mesa) and/or increases in recreational use around the MHPA occur.

Preventative Measures

The VPHCP Management and Monitoring Strategy (Chapter 7) contains extensive preventative actions to monitor and manage exotic species both within the vernal pool basin areas and in the surrounding uplands. In addition, as site-specific Resource Management Plans are developed, they will identify specific actions to monitor, reduce, and/or eliminate such species. Invasive species will be monitored annually along with the conditions of the complex and the status of the covered plant species. Methods to promote native species cover (thereby reducing potential for invasion of nonnatives) include weed control, seed bank enhancement and/or restoration, and installation of container plants.

Planned Responses

Responses to manage invasion by exotic species are incorporated into the VPMMP and will be included in the Resource Management Plans developed for individual Preserve areas. If an unanticipated invasion by exotic species occurs as a result of another Changed Circumstance identified in this section, the City staff biologists and/or Preserve manager(s) will notify the Wildlife Agencies of this Changed Circumstance. The County staff biologists and/or Preserve manager(s) will assess the damage caused by the unanticipated invasion by exotic species and initiate the following actions:

- Map invasive species and note abundance at each location;
- Recommend actions to address the threat(s) resulting from the unanticipated invasion by invasive species (such actions may involve efforts to improve habitat conditions);
- Implement responses prescribed in the VPMMP or Resource Management Plans; and,
- Monitor the response of species/habitats to the action(s) taken.

If the influx of invasive species involves a species included on the California Invasive Plant Council (Cal-IPC) "List A" or state or federal "noxious" weeds, within 30 days of such notice to the Wildlife Agencies, City staff biologists and/or Preserve manager(s) will assess and implement changes to adaptive management actions that may be necessary to control the invasive species. If the influx of invasive species involves a species listed on the Cal-IPC "Red Alert" list, City staff biologists and/or Preserve manager(s) will also notify other relevant agencies as recommended by Cal-IPC. Within 30 days of obtaining responses from the agencies contacted, recommendations of the agencies will be used by the City, with concurrence of the Wildlife Agencies, to determine appropriate modifications to adaptive management procedures in the affected portion of the Plan area.

9.2.4 Versatile Fairy Shrimp

Risk Assessment

Specific threats to the San Diego fairy shrimp include the hybridization and direct competition with the versatile fairy shrimp. The versatile fairy shrimp is common throughout western North America, is found in a wide variety of habitats, and tends to inhabit disturbed sites (Gonzalez et al. 1996). The versatile fairy shrimp has been documented within the range of the San Diego fairy shrimp in relatively disturbed pools at Otay Mesa, MCAS Miramar, Carmel Mountain, and MCB Camp Pendleton. The two species are known to hybridize in the laboratory (Fugate 1998) and in the field (Simovich et al. in press). If hybridization becomes too frequent in the natural environment, the unique genetics of San Diego fairy shrimp could be lost. The disturbance of vernal pool habitat by vehicles used in military training may increase the distribution of the versatile fairy shrimp on MCB Camp Pendleton. Although the known distribution of versatile fairy shrimp is still fairly limited within the range of the San Diego fairy shrimp, hybridization and competition could threaten the San Diego fairy shrimp in the future should the range of the versatile fairy shrimp expand (USFWS 2008a).

Another recent issue of concern for San Diego fairy shrimp reproduction and genetics is the cytoplasmic incompatibility induced by *Wolbachia* (or similar) endoparasitic bacteria. These bacteria reside in the intracellular space of reproductive tissue of many invertebrates and are maternally inherited from generation to generation. If males and females are infected with different strains of the bacteria, they are usually not reproductively compatible. Because of this, the bacteria can initiate lineage isolation and speciation (Werren et al. 2008). In addition to incompatibility, the bacteria also can lead to biased sex ratios, parthenogenesis (female asexual reproduction), feminization of males, and a high juvenile male mortality. There is substantial evidence that the versatile fairy shrimp harbors feminizing endoparasitic bacteria (Krumm 2006). While there is no evidence of the bacteria in San Diego fairy shrimp, the potential hybridization

of the two species suggests that this could be a concern for the genetics and reproduction of the San Diego fairy shrimp.

Preventative Measures

To prevent introduction of versatile fairy shrimp in vernal pools, the City will require that staff and contractors performing monitoring or restoration activities of vernal pools clean their shoes and equipment to avoid any artificial dispersal of fairy shrimp cysts. Additional measures to prevent introduction of versatile fairy shrimp at vernal pool complexes are identified in Chapter 5 (Section 5.3.2).

Planned Responses

If monitoring detects versatile fairy shrimp at a vernal pool complex managed under the VPMMP, management priorities will be adjusted to use existing funds (see Chapter 10) to adaptively manage and monitor the complex to address this issue as directed by USFWS.

9.2.5 New Listing

Risk Assessment

The City recognizes, as noted in the USFWS discussion of the "Habitat Conservation Plan Assurances ('No Surprises') Rule" (63 FR 8859; February 23, 1998), that the future listing of a species whose conservation was not provided for in the Plan to a level sufficient enough to allow it to be included as a covered species Subject to Incidental Take can be viewed as a Changed Circumstance. In the event that a species that is not a covered species pursuant to this VPHCP is listed by the USFWS subsequent to the issuance of Incidental Take permits pursuant to this VPHCP, such listing will be considered a Changed Circumstance.

Future listings of non-covered species are unlikely to require that additional land be added to the Preserve. This conclusion is justified because the proposed Preserve includes almost all ecologically viable areas of natural habitat in the VPHCP area. Therefore, the inclusion of additional areas is unlikely to increase the long-term viability of any vegetation community or species.

Preventative Measures

Proper implementation of this VPHCP, and other regional HCP/NCCP plans, constitutes preventative measures for future listings.

Planned Responses

Measures that will be taken for new listings include the following:

- Evaluation of the potential impacts of covered activities on the newly listed species.
- Implementation of measures by the City to avoid impacts on the newly listed species until the Plan is amended to include the newly listed species.

In the event that a non-covered species is found to have insufficient coverage under the VPHCP, the City and Wildlife Agencies will jointly identify measures that the City could follow to include the newly listed species as a covered species. The City may request that USFWS and CDFW add the species to the Section 10(a)(1)(B) permit and NCCP permit, respectively. In determining whether to seek incidental take coverage for the species, the City will consider, among other things, whether the species is present in the permit area and if otherwise lawful activities could result in incidental take of the species. If incidental take coverage is desired, the Plan and permits could be modified or amended. Alternatively, the City could apply for new and separate permits. If the City does not implement the agreed upon measures, prior to the City's issuance of any permit for land development, clearing, and/or grubbing, applicants must obtain independent Incidental Take authority for any listed, non-covered species through appropriate federal and/or state permit processes.

9.2.6 Climate Change

Risk Assessment

Risk to vernal pools and covered species associated with climate change include (but are not limited to):

- Drought (i.e., less than 55% average rainfall for 3 consecutive years)
- Increased fire (frequency and/or area burned)
- Weed invasion

Drought

Drought is a cyclical weather phenomenon that is beyond human control. Drought is not uncommon in southern California, and it is a phenomenon to which vernal pool habitats and vernal pool species have, of necessity, adapted over time through development of seed and cyst banks.

The climate change model simulations indicate that San Diego will retain its strong Mediterranean climate with relatively wetter winters and dry summers. Projections of future precipitation have mixed results: three of the simulations become drier (12–35% drier than historical annual average) and three are wetter (12–17% wetter than historical annual average) overall. This reflects the reality that precipitation cannot yet be modeled with the same degree of consistency as other climate change parameters. The models vary in their projections of storminess, but none show a significant change from past patterns. One important aspect of all of the climate model projected simulations is that the high degree of variability of annual precipitation that the region has historically experienced will prevail during the next five decades. As such, the VPHCP will use the historical precipitation record to help identify drought conditions.

Indirect impacts to covered species from drought may include a reduction in basin ponding time and/or frequency, thereby reducing species viability and reproduction potential.

The potential for drought to impact vernal pool plant and crustacean species increases with the length of a drought. Per the VPHCP's monitoring strategy (Chapter 7), 55% of average rainfall represents a dry year where proper expression of vernal pool flora and fauna cannot occur. A review of the past 162 water years (Water Year, 1850–2012),[9] have indicated that 21 (12.9%) of the years have received less than 55% (13.9 centimeters at Lindbergh Field) of average rainfall, but there have never been 3 consecutive dry years. Bauder et al. (2009) includes the timing of precipitation as well as the annual total. The Bauder definition results in 43 (26.5%) dry years within the 162-year record, with 3 years having occurred only three times and never for 3 consecutive years.

For the purposes of this VPHCP, a drought consisting of 4 consecutive dry years (less than 55% of average rainfall) is considered a Changed Circumstance. A drought lasting longer than 4 years is not foreseeable and would be considered an Unforeseen Circumstance.

Increased Fire

Climate change can also influence fire frequency within the VPHCP Plan Area. Fire occurrence in California has been correlated with drought, moisture availability, and biomass (fuel) accumulation (Lenihan et al. 2003). Although climate change models predict different climate scenarios, many predict a dryer and warmer climate, which would result in more frequent or

[9] Data is from Lindbergh Field.
Source: 1850–1913: http://www.wrh.noaa.gov/sgx/climate/san-pcpn.htm
Source: 1914–2005: http://www.wrcc.dri.edu/cgi-bin/cliMONtpre.pl?casand
Source: 2006-2012: http://www.wrh.noaa.gov/sgx/obs/rtp/linber.html

longer drought periods. An increase in drought frequency or longevity has the potential to increase fire frequency. For purposes of addressing Changed Circumstances in this VPHCP, it is assumed that fire occurrence frequency and area burned will increase by 25% by 2050.

Weed Invasion

Drought induced by climate change may also indirectly result in increased weed invasion in native habitats, including vernal pools and surrounding watersheds. Weed invasion is likely following a fire event. A reduction in native plant populations as a result of drought could lead to invasion of drought-tolerant invasive plant species.

Preventative Measures

Climate change is not preventable, and drought induced by climate change is not preventable. However, certain risks associated with climate change can be minimized with preventative measures. Preventative measures are provided for fire in Section 9.2.1 and weed invasion in Section 9.2.3.

Planned Responses

Drought

To address drought, conservation of existing species populations could occur through collection of seed and shrimp cysts for storage and possible future reintroduction at a time deemed appropriate by City and the Wildlife Agencies.

Increased Fire

Planned Responses for fire are provided in Section 9.2.1. It is assumed that the frequency and/or duration of Planned Responses for fire would increase as a result of climate change.

Weed Invasion

Planned Responses for weed invasion are provided in Section 9.2.3. It is assumed that the frequency and/or duration of Planned Responses for weed invasion would increase as a result of climate change.

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CHAPTER 10
PRESERVE MANAGEMENT AND FUNDING MECHANISMS

This chapter is based on a financial analysis prepared for the City by SANDAG's Service Bureau (SANDAG 2012) and presents an overview of the City's finances, vernal pool locations and ownership, the process used to identify and select potential funding mechanisms, the amount of funding required implementation of the framework VPMMP, and proposed funding options for the VPHCP. The detailed cost analysis for the VPMMP is provided in Appendix F.

10.1 COST OF PRESERVE ASSEMBLAGE

Assembly of the City's VPHCP does not rely on public acquisition of private property. Instead, the VPHCP Preserve was created based on existing conserved lands with vernal pools as well as additional lands inside the VPHCP Plan Area that contain vernal pools (refer to Chapter 6 for more detail).

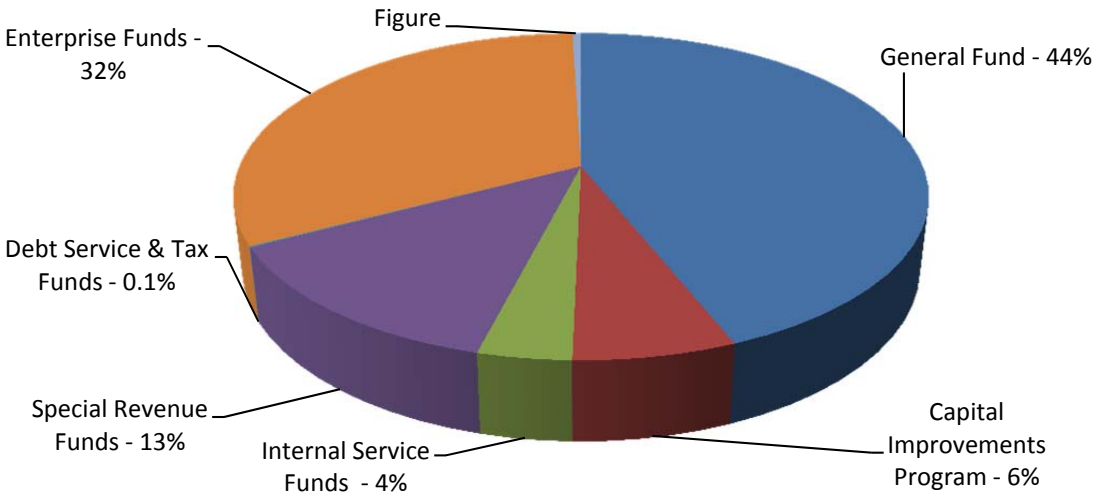
10.2 CITY OF SAN DIEGO FINANCIAL OVERVIEW

The City relies on many sources of revenue to pay for operations, such as taxes, fees, licenses, permits, interest earnings and dividends, and rents and concessions, as well as revenue from federal and other agencies (e.g., federal and state grants, allocations of federal and state funds for transportation and public safety programs). Revenues included in the City's budget are the following seven funds: General, Enterprise, Special Revenue, Internal Service, Capital Project, Debt Service, and Tax Funds. The General Fund, about 44% of the City's total budget, is the only fund from which expenditures are authorized by the City Council and is, therefore, discretionary. The latter six funds account for about 56% of total FY 2014 budgeted revenues of $2.8 billion and are allocated to specific uses. For example, one of the Special Revenue Funds (Environmental Growth) was established for the "exclusive purpose of preserving and enhancing the environment of the City in whatever manner is deemed appropriate by the City Council.[10]"

The City's expenditures are budgeted from the same seven funds listed above, in addition to a Capital Improvements Program (Figure 10-1). These funds are described below in order of magnitude, from largest to smallest.

[10] City of San Diego Charter Section 103.1a.

Figure 10-1
City of San Diego Expenditures
FY 2014 Adopted Budget: $2.8 Billion



10.2.1 General Fund

The General Fund is used to provide community services, such as public safety (police and fire protection and rescue), transportation, storm water, parks and recreation, library services, public works, and refuse collection. It also supports administrative functions including finance, legal, and human resources. Over half of the revenue for the General Fund comes from property tax and sales tax. Other major revenue sources include a portion of the transient occupancy tax, which is a tax imposed on occupants of hotel and motel rooms in the City of San Diego, as well as franchise fees, which are fees resulting from agreements with private utility companies in exchange for use of the City's ROWs. The General Fund accounted for 44%, or $1.23 billion, of the City's total FY 2014 expenditures.

10.2.2 Enterprise Funds

There are several Enterprise Funds that account for specific services funded directly through user fees. A user fee is a charge for use or consumption of a specific public service. These funds include Water, Sewer, Refuse Disposal, Recycling, Golf Course, and Airports. Revenue generated from these funds must be spent on the purpose that the fund was generated. For example, sewer fees must be spent on sewer infrastructure. Typically, these funds are intended to be fully self-supporting and are not subsidized by the General Fund. The Enterprise Funds account for 32%, or $901.3 million, of the City's total FY 2014 expenditures.

10.2.3 Special Revenue Funds

Special Revenue Funds account for revenues received that must be used for specific purposes. There are nearly 40 such funds in the City's FY 2014 approved operating budget, the largest of which are the Transient Occupancy Tax Fund and the Underground Surcharge Fund. These two funds account for about 30% of the total Special Revenue Funds. For example, transient occupancy taxes are to be directed toward promoting the City as a tourist destination, general government purposes (the General Fund), and other purposes approved by the City Council. Surcharges on San Diego residents' electricity bills are collected in the Underground Surcharge Fund and are to be used for under-grounding overhead utilities such as electricity, telephone, and cable. The Special Revenue Funds account for 13%, or $370 million, of the City's total FY 2014 expenditures.

10.2.4 Internal Service Funds

Internal Service Funds are created to finance and account for services provided by one City department to another City department. As such, the fund's expenses are repaid by fees or fund transfers from other City departments and account for 4%, or $103.1 million, of the City's total FY 2014 expenditures.

10.2.5 Capital Project Funds

Capital Project Funds are primarily used for the acquisition or construction of major capital facilities. The FY 2014 budget is composed of the Capital Outlay Fund, *TransNet* Extension Fund, and *TransNet* ARRA Exchange Fund (American Recovery and Reinvestment Act of 2009). The Capital Project Funds account for 1.0%, or $13.4 million, of the City's total FY 2014 expenditures.

10.2.6 Debt Service and Tax Funds

Debt Service Funds are used for the payment of principal and interest on General Obligations. The Tax Fund contains monies to pay for interest and the costs of issuing annual notes for cash flow borrowing (General Fund Tax and Revenue Anticipation Notes, or TRANs). These notes are, in effect, short-term loans issued to finance the City's need for working capital before receiving tax proceeds and other revenues later in the fiscal year. Debt service for all other City-related financings, including General Fund lease revenue bonds and water and wastewater revenue bonds, are budgeted within each department's operating budgets. Debt Service and Tax Funds combined represent 0.1%, or $2.6 million, of the City's total FY 2014 expenditures.

In addition to these seven funds for expenditures, the budget includes a Capital Improvements Program (CIP) for large construction projects such as the development of park land, the construction of an overpass, the acquisition of land, or the construction or remodeling of City buildings. Funds for these projects are derived from the issuance of bonds, water and sewer fees, a one-half cent local sales tax for transportation improvements (*TransNet*), state and federal grants, and development impact fees. CIP spending represents 6%, or $179 million, of total FY 2014 expenditures.

10.3 IDENTIFYING FUNDING MECHANISMS

Potential funding sources for the City's VPHCP were gathered from various sources, including research compiled for SANDAG's Quality of Life Funding Strategy, SANDAG's Transit Impediments Study, and materials prepared for Senator Kehoe's Transit Financing Subcommittee. Advice was also gathered from an informal group of regional professionals with municipal finance expertise. This group reviewed and amended the initial list of mechanisms that could be considered, and then recommended a set of funding options given the total amount of estimated need.

The initial criteria for inclusion in the list of potential funding mechanisms are:

- Mechanism can be implemented locally (i.e., no reliance on state funding).
- Funds can be used locally.
- Mechanism provides multi-year, long-term funding.
- Funds can be used for vernal pool management activities.
- There is a logical connection between revenue source and use ("nexus").

Mechanisms meeting these initial criteria are listed below:

- Benefit Assessment District
- City of San Diego Environmental Growth Fund
- Community Facilities District
- Entitlement Exactions
- General Fund
- Enterprise Funds
- Special Funds including Vernal Pool Preservation Program Funds, Otay Mesa/East Elliott Property Maintenance Fund, and the Environmental Trust Bankruptcy Fund
- Habitat Maintenance Assessment District

- Parcel Tax
- Property Tax
- Real Estate Transfer Tax

10.4 TOTAL AMOUNT REQUIRED

A detailed programmatic cost analysis for implementing monitoring and management of vernal pools conserved under this VPHCP over the life of the Implementing Agreement (assumed 31 years) has been prepared, and is included in Appendix F. The cost analysis is intended to estimate a total program cost for implementation of the monitoring and management associated with the VPMMP, including one-time and ongoing annual costs (based on 2014 dollars, not including inflation).

Monitoring and management costs are estimated based on the activities outlined in the City's framework VPMMP, which was developed using the Adaptive Management and Monitoring Strategy discussed in Chapter 7. The VPMMP is a framework plan that provides management and monitoring strategies, directives, and recommendations for lands containing vernal pools in the Preserve to manage and/or restore their biological functions, with particular attention on the seven focal species. Currently, the City is responsible for implementing the VPMMP on lands subject to City jurisdiction under City ownership. As additional vernal pool preserve areas on private lands are added to the MHPA through the development process, the City would require the funding necessary to maintain conserved pools to the level identified in the VPMMP. As such, privately owned pools would not require public funding under the VPHCP.

Cost estimates for implementation of the VPMMP are based on the assigned management and monitoring level for each site (Table D-1 of Appendix D). Refer to Appendix F for more details on the costs associated with each management and monitoring level (Level 1, 2 or 3). Table 10-1 summarizes the one-time costs for implementation of the VPMMP-required monitoring and management level for complexes with Level 2 or 3 status. One-time costs are for an initial 3-year period of monitoring and management for Level 2 complexes and a 5-year period for Level 3 complexes, as well as one-time hydrological surveys (for all complexes managed in the VPMMP) and fence and sign installation (for certain complexes, refer to Table F-12 in Appendix F). The North Planning Unit does not have any one-time costs because all complexes are at Management Level 1.

Table 10-1
One-Time Cost ($2014) to Restore and Stabilize Vernal Pools within the VPHCP

Planning Unit*	City Cost	Non-City Costs	Total Cost
North	0	0	0
Central	31,347	47,455	78,802
South	296,289	1,040,791	1,337,080
Subtotal	**327,635**	**1,088,246**	**1,415,881**
Fence/Sign Installation	180,681	450,892	631,573
Baseline Hydrological Surveys	77,482	71,694	149,176
TOTAL ONE-TIME	**585,798**	**1,610,832**	**2,196,630**

*VPHCP Planning Units (See Figure 2-1):
North – North of SR 52, east of I-5, and some areas along I-15 and SR 78
Central – South of SR 52, north of SR 94, and west of I-5
South – East of I-805, south of SR 94, and north of the international border between the U.S. and Mexico

Table 10-2 summarizes the annual ongoing costs to maintain existing habitat conditions and existing covered species population status (Level 1) for each complex managed under the VPMMP.

Table 10-2
Annual Ongoing VPMMP Level 1 Monitoring and Management Costs ($2014)

Planning Unit*	City Cost	Non-City Costs	Total Cost
North	93,411	148,016	241,427
Central	65,636	30,489	96,125
South	134,639	168,126	302,765
Subtotal of Planning Units	**293,686**	**346,631**	**640,317**
Reporting/Data Tracking and Analysis	35,360	0	35,360
Changed Circumstances	56,844	0	56,844
Annual Contingency	29,937	0	29,937
TOTAL ANNUAL ONGOING	**415,827**	**346,631**	**762,458**

*VPHCP Planning Units (See Figure 2-1):
North – North of SR 52, east of I-5, and some areas along I-15 and SR 78
Central – South of SR 52, north of SR 94, and west of I-5
South – East of I-805, south of SR 94, and north of the international border between the U.S. and Mexico

Table 10-3 includes the total cost for VPMMP implementation over the 31-year life of the Permit (in 2014 dollars). The total cost for VPMMP implementation was estimated based on the total of the one-time costs for the required monitoring and management level (for applicable complexes) plus the annual ongoing Level 1 costs for all complexes managed under the VPMMP.

Table 10-3
VPMMP Implementation Costs ($2014) for Life of the Project (31 Years)
Total One-Time Costs and Annual Ongoing Costs

Planning Unit*	City Cost	Non-City Costs	Total Cost
North	2,895,739	2,898,462	5,794,201
Central	1,820,944	1,015,437	2,836,380
South	4,391,825	5,121,983	9,513,809
Subtotal	**9,108,508**	**9,035,882**	**18,144,390**
Baseline Hydrological Surveys	77,482	71,694	149,176
Fence/Sign Installation	180,681	450,892	631,573
Reporting/Data Tracking and Analysis	1,096,160	0	1,096,160
Changed Circumstances	1,762,158	0	1,762,158
Total Contingency	928,058	0	928,058
TOTAL	**13,153,048**	**9,558,467**	**22,711,515**

*VPHCP Planning Units (See Figure 2-1):
North – North of SR 52, east of I-5, and some areas along I-15 and SR 78
Central – South of SR 52, north of SR 94, and west of I-5
South – East of I-805, south of SR 94, and north of the international border between the U.S. and Mexico

Annual ongoing costs assume that all complexes will be maintained at Level 1 monitoring and management. However, over time, it is realistic to anticipate that some complexes may decline to Level 2 or Level 3. Therefore, an annual contingency is assumed to account for potential additional monitoring and management costs associated with a decline in a complex's management level (e.g., Changed Circumstances such as weed invasion or vandalism, as described in Chapter 9). An annual contingency of $29,937 (in 2014 dollars) is appropriate to account for additional costs associated with complexes declining from Level 1 (refer to Appendix F for further assumptions related to the contingency amount). In addition, costs are estimated at a programmatic level and based on average costs across all complexes managed under the VPMMP. It is expected that costs may fluctuate between complexes and between years of implementation. The City will establish a funding mechanism that allows for unexpended project funds, including any contingency funds, to be use in future years.

It should be noted that the costs shown in Tables 10-1, 10-2 and 10-3 are in 2014 dollars, as indicated. When determining final funding amounts, the City should assume an average annual inflation rate of 3% over time. It is assumed that, over time, revenues from the funding sources would also increase by at least the same rate on average.

10.5 EXISTING POTENTIAL FUNDING SOURCES

There are several existing funding sources that could be applied, in part or entirely, toward vernal pool HCP funding. These include monies appropriated within the City's budget, and special funds within the Open Space Division designated for vernal pools management. These potential funding sources are identified in Section 10.3.

Park and Recreation Department Open Space funding originates from the General Fund and, as such, the dollar amount appropriated annually; how it is to be used is ultimately directed by the City Council. Although it is funded by franchise fees, use of the Environmental Growth Fund also is at the City's discretion, as long as funds are directed to preserving and enhancing the City's environment. Most of the Open Space Special Funds may be used only in specific vernal pool complexes (i.e., Carroll Canyon) while others, such as the Vernal Pool Preservation Program, may be used City-wide for research and maintenance of vernal pools and habitat.

The Marron Valley Cornerstone Lands Conservation Bank is owned by the City of San Diego Public Utilities Department. Funds generated from this bank may be used to maintain and manage the Cornerstone Lands including Proctor Valley, Marron Valley, and Otay Lakes, which contain vernal pools. The endowment subaccount is funded by the endowment fee of $3,500 (Fiscal Year 2014) collected for every mitigation credit sold and may only be used for management at Marron Valley.

10.6 SHORT-TERM FUNDING MECHANISMS

The mechanisms identified as options remaining for further consideration for VPHCP funding were reviewed after the one-time costs (Table 10-1) and annual costs (Table 10-2) were estimated based on the detailed cost analysis included in Appendix F. The informal group of regional professionals with municipal financial expertise recommended a set of funding options given the total amount of estimated need.

10.6.1 One-Time Costs

Short-term funding mechanisms are for one-time costs, which are those that would be incurred to restore and stabilize the vernal pools to Level 1 condition, as detailed in Chapter 7. Potential funding sources for one-time costs are listed below:

- State/Federal/Other: Lands managed by state and federal agencies, and other entities (such as school districts), would be responsible for all costs associated with VPMMP-required monitoring and management to achieve a Level 1 condition.
- Private Exactions: As additional vernal pool preserve areas on private lands are added to the MHPA through the development process, the City would require the funding necessary to maintain conserved pools to the level identified in the VPMMP. All impacts to vernal pool resources would be require mitigation as described in Chapter 5 and funding for long-term management in accordance with ESL and the City's Biology Guidelines. As such, privately owned pools would not require public funding under the

VPHCP. Vernal pool preserve areas would either be transferred to the City of San Diego in Fee Title or conserved via a covenant of easement.

- General Fund: No monies would be required from the City's General Fund.
- Enterprise Fund Lands: Divisions operating using Enterprise Funds (such as Public Utilities Department and Environment Services) would continue to fund the management of vernal pools on lands within their control as a cost of normal operations.
- Vernal Pool Preservation Program Funds: The balance of the Vernal Pool Preservation Program Fund (a Park and Recreation Department Special Fund) would be applied to the one-time cost to restore and stabilize the City's vernal pools (Levels 2 and 3) to achieve a Level 1 condition.
- Special Funds: Monies from Park and Recreation Department, Open Space Special Funds such as the Otay Mesa/East Elliott Property Maintenance Fund and the Environmental Trust Bankruptcy Fund.
- Environmental Growth Fund: Would provide the remainder needed for the City's vernal pool one-time costs.

Chapter 4 of this VPHCP describes development projects that are designated as covered projects pursuant to this VPHCP. These projects have delineated "hard lines" for development areas and for on-site conservation. Coverage for these projects is based upon the ensured dedication of the open space related to each project and through implementation of project-specific mitigation programs.

Funding the management tasks that are required as conditions for coverage for the covered projects is the responsibility of each individual project developer or property owner. These tasks may include restoration of habitat and/or requirements to ensure retention of habitat values on land that will be dedicated into the MHPA as a condition of City approval and the development entitlement process. Compliance with all requirements found in the City's VPMMP will be ensured prior to issuance of any project grading/construction permits. Compliance is ensured by the City through permit conditions, ESL, and the City's Biology Guidelines.

10.7 LONG-TERM FUNDING MECHANISMS

10.7.1 Reoccurring Annual Costs

Reoccurring annual costs are those that would be incurred to maintain vernal pools at Level 1 conditions. However, over time, it is realistic to anticipate that some complexes may decline to

Level 2 or Level 3. Therefore, the City's financial plan to fund the VPHCP should also include an annual contingency amount (as discussed in Section 10.4) to account for potential additional long-term monitoring and management costs associated with a decline in a complex's management level.

Potential funding sources for reoccurring annual costs are listed below:

- State/Federal/Other: Lands managed by state and federal agencies, and other entities (such as school districts), are responsible for all reoccurring costs associated with VPMMP-required monitoring and management.
- General Fund: No new funding would be required from the City's General Fund. General Funds are currently used to fund Park and Recreation/Open Space staff including Park Rangers and Biologists who manage and monitor the City's open space preserve areas where the vernal pool resources are located. Current activities include tasks that benefit the vernal pool areas such as signage, fencing, maintenance of trails, enforcement, coordination with volunteers on projects to protect biological resources (i.e., placement of rocks to delineate vernal pool boundaries), and grant coordination with non-profit groups (i.e., restoration/enhancement of vernal pools in Carmel Mountain). General Funds would continue to be used to fund these Park and Recreation/Open Space positions and activities.
- Enterprise Fund Lands: Divisions operating using Enterprise Funds (such as Public Utilities and Environmental Services Departments) would continue to pay for managing vernal pools on lands within their control as cost of normal operations.
- Environmental Growth Fund: Annual allocations from the Environmental Growth Fund for reoccurring costs associated with VPMMP-required Level 1 management and monitoring for existing City vernal pools and any new vernal pool lands acquired by the City.
- Special Funds: Park and Recreation Department's Open Space Special Funds would be applied toward reoccurring costs for City's vernal pools. Vernal pool lands acquired through the extraction process as discussed in Section 10.6.1 above and transferred to the City in Fee Title would include funding for monitoring and management in accordance with the VPMMP, ESL, and the City's Biology Guidelines. These funds would be placed in a site-specific Open Space Special Fund.

10.7.2 Options for Reoccurring Annual Costs

Options identified to finance the reoccurring costs associated with VPMMP-required Level 1 monitoring and management include the City's Environmental Growth Fund and establishment of Community Facilities District(s).

The Environmental Growth Fund could be used to finance all of the City's reoccurring costs, either through annual appropriations from the fund for vernal pool monitoring and management or by the creation of a nonwasting endowment. Such an endowment could be funded by a one-time allocation to cover the City's cost for estimated reoccurring monitoring and management. Alternatively, funds could be set aside each year for 5 years to create an endowment.

Another option identified for meeting annual reoccurring costs associated with VPMMP-required monitoring and management is the establishment of Community Facilities District(s), with annual tax revenues directed toward monitoring and management. Due to the limitations associated with Proposition 218, this mechanism would likely be most applicable to undeveloped lands with fewer than 12 owners.

The use of both short-term and long-term financing tools together will, when established, provide the financial resources to accomplish the following:

1. Accomplishment of conservation goal and objectives of the VPHCP (see Chapter 6).
2. Funding to respond to *Changed* and *Unforeseen Circumstances* within the VPHCP (see Chapter 9).

10.8 FUNDING MECHANISMS FOR CHANGED AND UNFORESEEN CIRCUMSTANCES

Chapter 9 defines the potential for *Changed* and *Unforeseen Circumstances* within the VPHCP Preserve and presents a series of planned responses that will be undertaken if and/or when a *Changed* and *Unforeseen Circumstance* event should occur. Planned responses for Changed Circumstances will be funded through the financing mechanisms established by this VPHCP and described Appendix F. Unforeseen Circumstances will be funded through the contingency mechanism described in Appendix F.

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CHAPTER 11
ALTERNATES TO TAKE

FESA requires that applicants for incidental take permits specify in an HCP what alternative actions to the take were considered and the reasons why those alternatives were not selected. The *Endangered Species Consultation Handbook* (USFWS and National Marine Fisheries Service 1998) identifies two alternatives commonly used in HCPs: (1) an alternative that would reduce take below levels anticipated for the proposed project and (2) an alternative that would avoid take and hence not require a permit from USFWS. The NCCP Act requires that project alternatives be considered in the EIR prepared for the NCCP (Section 2820[e]) but not in the NCCP itself.

This chapter identifies alternative measures considered that would avoid or minimize the potential for take of the two wildlife species covered in this VPHCP: Riverside fairy shrimp and San Diego fairy shrimp. The following discussion is limited to wildlife species because FESA requires alternatives to *Take*. Take of listed plants is not prohibited by FESA, and projects subject to Section 7 consultations will evaluate listed plants in the Biological Assessment and Biological Opinion associated with that consultation. As of the effective date of the Federal Permit, Take of covered species that are currently federally listed will be authorized as described in the VPHCP (see Chapters 5 and 6). Project alternatives are considered in more detail in the draft EIR/EIS that accompanies this draft VPHCP. This chapter evaluates alternatives to take of the two fairy shrimp covered by the VPHCP:

11.1 ALTERNATIVES TO TAKE OF RIVERSIDE FAIRY SHRIMP

11.1.1 Reduced Take Alternative

Under the VPHCP all 131 vernal pools occupied by Riverside fairy shrimp would be conserved. However, a small amount of Take is possible as a result of management and monitoring activities prescribed in the VPMMP. The Reduced Take Alternative would not include any management or monitoring of vernal pools occupied by Riverside fairy shrimp to avoid any potential Take associated with management or monitoring activities.

The Reduced Take Alternative is effectively equivalent to the No Take Alternative (see Section 11.1.2). This alternative is rejected as it would not allow management and monitoring of vernal pools occupied with Riverside fairy shrimp.

11.1.2 No Take Alternative

Under the No Take Alternative, no impacts to the 131 vernal pools occupied by Riverside fairy shrimp within the VPHCP Plan Area would occur because Take would not be authorized. This alternative would provide the same level of conservation for Riverside fairy shrimp as the VPHCP (i.e., all occupied pools would be conserved). However, under the No Take Alternative, the vernal pool complexes occupied by Riverside fairy shrimp would not be managed to avoid potential Take associated with management and monitoring activities.

The No Take alternative is rejected as it would not allow for management and monitoring of vernal pools occupied with Riverside fairy shrimp.

11.2 ALTERNATIVES TO TAKE OF SAN DIEGO FAIRY SHRIMP

11.2.1 Reduced Take Alternative

To meet the first type of alternative required by FESA (i.e., an alternative that would reduce take below levels anticipated for the proposed project), the City and Wildlife Agencies developed the Expanded Conservation Alternative to reduce take of San Diego fairy shrimp from the VPHCP (Table C-3 of Appendix C). The Expanded Conservation Alternative adds additional lands to the MHPA, beyond those added under the Project, that include vernal pools occupied by San Diego fairy shrimp. These additional lands are located in four vernal complexes:

- I12 (Pueblo Lands)
- J13 S (South Otay J13 S)
- J13 N (South Otay 1 Acre Private)
- J34 (Bachman)

Table 11-1 includes a comparison of conservation and take of San Diego fairy shrimp under the VPHCP (i.e., the Project) and the Expanded Conservation Alternative. As shown, the Expanded Conservation Alternative would conserve 5 more pools occupied by San Diego fairy shrimp than the Project (or 1% more of total occupied pools within the VPHCP Plan Area).

Table 11-1
Comparison of Conservation San Diego Fairy Shrimp
VPHCP vs. Expanded Conservation Alternative

Alternative	Total Occupied Pools in VPHCP Plan Area	Occupied Pools Conserved*	% Occupied Pools Conserved
VPHCP (Project) Total	488	449	92%
Expanded Conservation Alternative Total	488	454	93%
Take Reduced by Expanded Conservation Alternative	-	5	1%

*Based on 0% or 75% conservation level of complexes with vernal pools occupied by San Diego fairy shrimp

11.2.2 No Take Alternative

Under the No Take Alternative, no impacts to the 487 vernal pools occupied by San Diego fairy shrimp within the VPHCP Plan Area would occur. The No Take Alternative would, therefore, prevent take of San Diego fairy shrimp. However, under the No Take Alternative, the vernal pool complexes occupied by San Diego fairy shrimp would not be managed to avoid potential Take associated with management and monitoring activities.

In addition, pools would be subject to increased indirect effects due to fragmentation. Individual pools could be surrounded by development similar to the avoided areas on Shaw Lorenz, Rhodes Crossing, and Mira Mesa Market Center. Without the ability to develop a biologically superior alternative that may allow some impacts in exchange for a more ecologically functional Preserve design, extant vernal pools could be completely surrounded by development (e.g., residential buildings, roads, and commercial development) with little to no habitat buffers between the vernal pools and development.

The continued existence of vernal pool species, including San Diego fairy shrimp, is dependent upon the long-term viability of a functioning vernal pool ecosystem. Although ecological processes in vernal pools may be viewed at relatively small temporal (e.g., weeks to months during wetting and drying cycle) and spatial (e.g., tens of square feet) scales, these processes are greatly influenced by large-scale landscape processes (e.g., hydrology, plant and animal dispersal) (Leidy and White 1998). Fragmentation and isolation of vernal pools can threaten the important ecological and mutualistic processes that link vernal pools to each other and the surrounding uplands (USFWS 1998). Such ecological and mutualistic processes involve insects that pollinate the vernal pool plants, mammals and birds that disperse flora and fauna between vernal pools, and amphibians that reproduce in vernal pools.

Watershed contiguity augments gene flow in populations already naturally low in variability (Davies 1996) by allowing flooding between pools. Vernal pool organisms are typically defined by the complex in which they occur, in part because gene flow between complexes appears to be extremely low (Fugate 1993; Davies 1996). Isolation of pools, or modification of the natural watershed, potentially compromises gene flow, resulting in a loss of genetic variability and an increased susceptibility to extinction and reduced fitness (Bohonak 2005; Soule 1986).

Preserving small, isolated, fragmented preserves may not sustain the multi-scale ecological processes associated with vernal pools (Leidy and White 1998). As such, the scientific community repeatedly recommends that conservation of vernal pools include the surrounding upland habitats (Bauder 1987; Thorp and Leong 1995, 1998; Hanes and Stromberg 1998; Leidy and White 1998; USFWS 1998). These surrounding upland habitats influence vernal pool hydrology, species composition, and essential interactions between the species that inhabit them. Fragmenting vernal pools from each other can disrupt dispersal and gene flow between populations of vernal pool flora and fauna, increase their vulnerability to stochastic events, and hinder their ability to reestablish after local extinctions. Therefore, this alternative has been rejected.

CHAPTER 12
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CHAPTER 13
LIST OF PREPARERS

The VPHCP has been prepared by the City of San Diego. The following Agency staff and consultants participated in the VPHCP preparation.

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APPENDIX A

U.S. ARMY CORPS OF ENGINEERS
VERNAL POOL INDICATION SPECIES LIST

INDICATOR SPECIES FOR VERNAL POOLS
U.S. Army Corps of Engineer, Los Angeles District, Regulatory Branch
November 1997

FLORAL LIST

Apiaceae
- *Eryngium aristulatum* var. *parishii*
- *Eryngium armatum*
- *Eryngium vaseyi*
- *Eryngium* sp. *nova* (*Pendleton*)
- *Eryngium* sp. *nova* (*San Quintin*)

Asteraceae
- *Belnnospermum nanum*
- *Hemizonia perennis*
- *Lasthenia glabrata* ssp. *Coulteri*
- *Psilocarphus brevissiums*
- *Psilocarphus oregonus*

Boraginaceae
- *Plagiobothrys acanthocarpus*
- *Plagiobothrys bracteatus*
- *Plagiobothrys stipitatus*
- *Plagiobothrys undulates*
- *Plagiobothrys leptocladus*

Brassicaceae
- *Sibara virginica*

Callitrichaceae
- *Callitriche heterophylla*
- *Callitriche longipedunculata*
- *Callitriche verna*

Campanulaceae
- *Downingia bella*
- *Downingia cuspidate*
- *Downingia concolor* var. *brevior*

Crassulaceae
- *Crassula aquatic*

Elatinaceae
- *Bergia texana*
- *Elatine californica*
- *Elatine chilensis*

Hydrophyllaceae
- *Nama stenocarpum*

Isoetaceae
- *Isoetes howellii*
- *Isoetes orcullii*

Juncaginaceae
- *Lilaea scilloides*

Lamiaceae
- *Pogogyne abramsii*
- *Pogogyne nudiuscula*
- *Pogogyne douglasii*
- *Pogogyne serpylloides*

Limnanthaceae

Limnanthes gracilis ssp. *Parishii*

Malvaceae

Malvella leprosa

Marsileaceae

Marsilea vestita

Pilularia Americana

Onagraceae

Epilobium pygmaeum

Plantaginaceae

Plantago bigelovii

Poaceae

Alopecurus saccatus

Deschampsia danthonioides

Orcuttia californica

Phalaris caroliniana

Phalaris lemmonii

Phalaris paradoxa

Hordeum intercedens

Polemoniaceae

Navarretia fossalis

Navarretia prostrate

Primulaceae

Centunculus minimus

Ranunculaceae

Myosurus minimus

Myosurus minimus var. *apus*

Myosurus minimus var. *filiformis*

Scrophulariaceae

Mimulus latidens

Solanaceae

Petunia parviflora

Verbenaceae

Verbena bracteata

FAUNAL LIST

Anostraca

- *Branchinecta sandiegonensis*
- *Branchinecta lindahli*
- *Branchinecta lynchii*
- *Linderiella* sp.
- *Streptocephalus woottoni*

Cladocera

- *Alona* cf. *diaphana*
- *Ceriodaphnia dubia*
- *Daphnia magna*
- *Daphnia rosea*
- *Macrothrix hirsuticornis*
- *Moina micrura*
- *Scapholebris cf.rammneri*
- *Simocephalus* sp.

Copepoda

- *Acanthocyclops robustus*
- *Acanthocyclops vernalis*

Ostracoda

- *Bradleycypris* sp.
- *Cypria pustulosa*
- *Cypriconcha* sp.
- *Cypridopsis vidua*
- *Cypris pubera*
- *Cypris virens*
- *Eucypris* sp.
- *Herpetocypris* sp.
- *Heterocypris* sp.
- *Lymnocythere* sp.
- *Potamocypris* sp.
- *Prionocypris* sp.
- *Pseudoilcypris* sp.

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APPENDIX B

VERNAL POOL COMPLEX DATA

Appendix B
Vernal Pool Complex Data for the City of San Diego Vernal Pool Habitat Conservation Plan

Complex ID	Complex Name	Planning Unit	Inside or Outside VPHCP Plan Area	Number of Pools per Complex by Ownership			Total Surface Area of Pools	Soils within Complex	Inside or Outside Existing MHPA	Focal Species Critical Habitat Present*	Number of Pools Occupied by Focal Species						
				Total	City , CDFW, or USFWS Controlled	Other Ownership					PONU	POAB	NAFO	EMAR	ORCA	RFS	SDFS
B 11	Mesa Norte	North	Inside	44	0	44	0.60	RdC, TeF	Outside	None	0	12	0	10	0	0	24
B 5	Tierra Alta	North	Inside	1	0	1	0.01	RdC, TeF	Within	None	0	0	0	0	0	0	0
B 6	***Lopez Ridge (CDFG)*****	***North***	***Inside***	***1***	***1***	***0***	***0.22***	***RdC, TeF***	***Within***	***SDFS***	***0***	***1***	***0***	***0***	***0***	***0***	***0***
B 7-8	Crescent Heights	North	Inside	7	7	0	0.04	RdC, TeF	Within	SDFS	0	0	0	0	0	0	1
	Lopez Ridge (City)	North	Inside	10	10	0	0.38	RdC, TeF	Within	SDFS	0	10	0	1	0	0	2
C 10-16	***Winterwood***	***North***	***Outside***	***61***	***0***	***61***	***0.81***	***RdC, TeF***	***Within***	***SDFS***	***0***	***27***	***0***	***7***	***0***	***0***	***2***
C 17-18	Fieldstone	North	Inside	9	0	9	0.32	RdC	Within	None	0	8	0	0	0	0	0
C 27	Mira Mesa Market Center	North	Inside	1	0	1	0.06	RdC	Outside	None	0	1	0	0	0	0	1
D 5-8	Carroll Canyon	North	Inside	119	119	0	1.19	RdC, ReE, TeF	Within	SDFS, NAFO	0	42	1	65	0	0	5
	Parkdale Carroll Canyon	North	Inside	4	4	0	0.02	RdC, ReE, TeF	Within	SDFS, NAFO	0	0	0	0	0	0	0
F 16-17	***MCAS Miramar***	***Central***	***Outside***	***34***	***0***	***34***	***0.74***	***RdC, ReE***	***Outside***	***None***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
	Menlo KM Parcel	Central	Inside	14	0	14	0.19	RdC, ReE	Outside	None	0	0	0	0	0	0	1
H 1-10, 13-15,18-23, 24-26	Del Mar Mesa (City)	North	Inside	92	92	0	0.54	OhF, RdC, RfF, TeF	Within	SDFS	0	3	0	49	0	0	8
	Del Mar Mesa (County)	***North***	***Outisde***	***17***	***0***	***17***	***0.27***	***OhF, RdC, RfF, TeF***	***Within***	***SDFS***	***0***	***2***	***0***	***12***	***0***	***0***	***0***
	Del Mar Mesa (Private)	North	Inside	5	0	5	0.26	OhF, RdC, RfF, TeF	Within	SDFS	*0*	*0*	*0*	*2*	*0*	*0*	*1*
	Del Mar Mesa (State/Federal)**	***North***	***Inside***	***246***	***246***	***0***	***4.68***	***OhF, RdC, RfF, TeF***	***Within***	***SDFS***	***0***	***58***	***1***	***124***	***0***	***0***	***16***
	Rhodes	North	Inside	140	0	140	0.64	OhF, RdC, RfF, TeF	Within	SDFS	0	7	0	6	0	0	8
H 17	Shaw Lorenz	North	Inside	28	0	28	0.24	RdC, RfF, TeF	Within	None	0	0	0	0	0	0	8
H 33	East Ocean Air Drive	North	Inside	2	0	2	0.03	GaF, RdC	Outside	None	0	0	0	2	0	0	0
	SDG&E Substation	***North***	***Outside***	***12***	***0***	***12***	***0.35***	***GaF, RdC***	***Outside***	***None***	***0***	***0***	***0***	***4***	***0***	***0***	***0***
H 38	Carmel Mountain	North	Inside	64	64	0	0.61	CvC, LvF3, RdC	Within	SDFS	0	0	0	0	0	0	2
H 39	Greystone Torrey Highlands	North	Inside	19	19	0	0.68	OhC, OhE	Outside	None	0	5	0	3	0	0	0
I 1	Arjons	North	Inside	34	0	34	0.73	RdC, TeF	Outside	None	0	22	0	15	0	0	1
I 12	Pueblo Lands	North	Inside	7	7	0	0.09	RdC, TeF	Within	None	0	0	0	0	0	0	6
I 6 B	Ford Leasing (Bob Baker)	North	Inside	8	0	8	0.08	RdC, TeF	Outside	None	0	7	0	0	0	0	3
I 6 C	Facilities Development (Eastgate Miramar Associates)	North	Inside	15	0	15	0.24	OhE, OhF	Outside	None	0	11	0	2	0	0	6
J 11 E	Slump Block Pools	South	Inside	2	0	2	0.63	OhE	Within	RFS	0	0	0	0	0	0	0
J 11 W	J 11 West	South	Inside	5	0	5	0.49	OhE, OhF	Within	RFS	0	0	0	0	0	1	1
J 12	J 12	South	Inside	5	0	5	0.28	OhE, OhF	Within	SDFS, RFS	0	0	0	0	0	0	0
J 13 E	South Otay J 13 East	South	Inside	8	0	8	0.06	HrC, OhF	Within	SDFS, RFS	0	0	0	1	0	0	0
J 13 N	NDU 1 & 2	South	Inside	13	0	13	0.07	HrC	Outside	None	0	0	1	2	0	0	13
	South Otay 1 acre (City)	South	Inside	17	17	0	0.22	HrC	Outside	None	0	0	1	1	1	0	0
	South Otay 1 acre (Private)	South	Inside	7	0	7	0.02	HrC	Outside	None	0	0	0	0	0	0	0
J 13 S	Bachman	South	Inside	2	0	2	0.01	HrC	Outside	SDFS, NAFO	0	0	0	0	0	0	0
	NDU 1 & 2	South	Inside	4	0	4	0.21	HrC	Outside	None	0	0	0	0	0	0	2
	South Otay J 13 South	South	Inside	39	0	39	0.58	HrC	Outside	SDFS, NAFO	0	0	0	7	0	0	0
J 14	***Anderprises (Caltrans)***	***South***	***Outside***	***30***	***0***	***30***	***0.50***	***GP, OhF, SuB***	***Within***	***None***	***1***	***0***	***1***	***0***	***0***	***3***	***4***
	Anderprises (City)	South	Inside	2	2	0	0.01	GP, OhF, SuB	Within	None	0	0	0	0	0	0	0
	Bachman	South	Inside	2	0	2	0.02	GP, OhF, SuB	Within	RSF, SDFS	0	0	0	0	0	0	0
	Brown Field Basins	South	Inside	4	4	0	0.83	GP, OhF, SuB	Within	RSF, SDFS	0	0	0	0	0	0	0
	Cal Terraces (South)	South	Inside	73	73	0	1.45	GP, OhF, SuB	Within	RSF, SDFS, NAFO	63	0	6	55	5	26	32
	Handler	South	Inside	24	0	24	0.07	GP, OhF, SuB	Within	RSF, SDFS	0	0	0	0	0	0	0
J 15	***Arnie's Point***	***South***	***Outside***	***69***	***0***	***69***	***2.79***	***DaF, OhF, SuA, SuB***	***Within***	***RFS***	***15***	***0***	***10***	***61***	***3***	***30***	***56***
J 16-18	Goat Mesa (City)	South	Inside	15	15	0	0.34	DaF, LsF, OhF, SuA, SuB	Within	RFS, SDFS	0	0	0	4	0	1	0
	Goat Mesa (Federal)	***South***	***Outside***	***2***	***0***	***2***	***0.15***	***DaF, LsF, OhF, SuA, SuB***	***Within***	***RFS, SDFS***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
	Goat Mesa (Private)	South	Inside	2	0	2	0.01	DaF, LsF, OhF, SuA, SuB	Within	RFS, SDFS	0	0	0	0	0	0	0
	Wruck Canyon	South	Inside	6	6	0	0.02	DaF, LsF, OhF, SuA, SuB	Within	RFS, SDFS	0	0	0	0	0	0	0
J 2	Cal Terraces (North), Otay Mesa Road Parcels	South	Inside	304	304	0	3.53	OhF, SuB	Within	RFS, SDFS, NAFO	286	0	79	275	52	93	209
	Clayton Parcel	South	Inside	35	35	0	0.27	OhC, OhF, SuB	Within	RFS, SDFS, NAFO	0	0	0	1	0	0	2
	St. Jerome's	South	Inside	24	0	24	0.41	OhC, OhF, SuB	Within	RFS, SDFS, NAFO	0	0	0	0	0	3	1
J 20-21	La Media ITS	South	Inside	33	0	33	1.43	SuA, SuB	Outside	None	0	0	0	0	0	0	6
J 21	La Media Swale South	South	Inside	7	0	7	0.21	HrC	Outside	None	0	0	0	0	0	0	0
J 27	Empire Center	South	Inside	10	0	10	0.23	HrC, SuB	Outside	None	0	0	0	9	0	0	0
J 28 E	La Media Swale North	South	Inside	5	0	5	0.16	HrC, SuB	Within	None	0	0	0	0	0	0	0
J 29	***Lonestar W (Caltrans)***	***South***	***Outside***	***10***	***0***	***10***	***0.15***	***OhF, SuA***	***Within***	***RFS, SDFS, NAFO***	**0**	**0**	**0**	**7**	**0**	**1**	**4**
J3	***J3***	***South***	***Outside***	***1***	***0***	***1***	***0.01***	***OhC, OhE***	***Outside***	***RFS, SDFS, NAFO***	**0**	**0**	**0**	**0**	**0**	**0**	**0**
J 30	***Lonestar E (Caltrans)***	***South***	***Outside***	***103***	***0***	***103***	***4.81***	***LsE, SuA***	***Within***	***RFS, SDFS, NAFO***	**0**	**0**	**0**	**0**	**0**	**35**	**50**
	Lonestar E (Private)	***South***	***Outside***	***62***	***0***	***62***	***0.80***	***LsE, SuA***	***Within***	***RFS, SDFS, NAFO***	***1***	***0***	***0***	***32***	***0***	***0***	***0***
J 31	***Dennery West***	***South***	***Outside***	***47***	***0***	***47***	***0.97***	***OhC, OhF, SuB***	***Within***	***RSF, SDFS***	**0**	**0**	**0**	**0**	**0**	**10**	**38**
	Hidden Trails	South	Inside	66	66	0	0.66	OhC, OhF, SuB	Within	RFS, SDFS	0	0	0	0	0	0	1
J 32	***West Otay A (State)***	***South***	***Outside***	***19***	***0***	***19***	***0.23***	***HrC***	***Within***	***NAFO***	***7***	***0***	***3***	***1***	***0***	***1***	***8***
	West Otay A (Private)	South	Inside	3	0	3	0.01	HrC	Within	NAFO	1	0	0	2	0	0	0
	West Otay B	South	Inside	15	15	0	0.06	HrC	Within	NAFO	0	0	0	0	0	0	0
	West Otay C	South	Inside	7	7	0	0.04	HrC	Within	NAFO	0	0	0	1	0	0	0
J 33	***Sweetwater High School***	***South***	***Outside***	***8***	***0***	***8***	***0.07***	***OhC, OhF***	***Outside***	***RFS, NAFO***	***5***	***0***	***3***	***2***	***0***	***3***	***8***
J 34	Bachman	South	Inside	15	0	15	0.09	HrC, OhC, OhF, SuB	Within	RFS, SDFS	0	0	0	0	0	0	1
	Candlelight	South	Inside	10	0	10	0.08	HrC, OhC, OhF, SuB	Within	RFS, SDFS	0	0	0	0	0	1	1
J 35	Brown Field	South	Inside	3	3	0	0.02	DaF, GP, OhF, SuA, SuB	Within	None	0	0	0	0	0	0	0
J 36	Southview	South	Inside	17	0	17	0.11	OhC, OhF, SuB	Within	RFS, SDFS	0	0	0	0	0	0	12
J 4-5	California Crossing	South	Inside	11	0	11	0.09	OhF, SuB	Within	RFS, SDFS	0	0	0	0	0	0	5
	Robinhood Ridge	South	Inside	83	83	0	0.56	OhF, SuB	Within	RFS, SDFS, NAFO	19	0	4	46	0	6	41
K 5	Otay Lakes	Central	Inside	85	85	0	3.20	OhE, OhF, ReE, SmE, SnG, TuB	Within	SDFS, NAFO	0	0	2	46	0	0	6
KK1	Lake Murray	Central	Inside	1	1	0	0.02	TuB	Within	None	0	0	0	0	0	0	0
KK 2	Pasatiempo	Central	Inside	10	10	0	0.04	BsC, DcD	Outside	None	0	0	0	0	0	0	0
MM 1	Marron Valley	South	Inside	18	18	0	0.18	HrC, HrC2, Rm, SvE, VbB	Within	SDFS	0	0	0	0	0	0	5
N 1-4	Teledyne Ryan	Central	Inside	43	0	43	0.59	RdC	Outside	None	0	1	0	0	0	0	11
N 5-6	Montgomery Field	Central	Inside	249	249	0	8.35	CfB, CgC, OhE, RdC	Within	SDFS, NAFO	0	129	0	0	0	0	10
N 7	Serra Mesa Library	Central	Inside	26	26	0	0.41	RdC, RhC	Within	None	0	0	0	0	0	0	0
N 8	General Dynamics	Central	Inside	22	22	0	0.40	RdC	Within	None	0	20	0	2	0	0	6
NC	Li Collins	North	Inside	2	0	2	0.04	HrE2, LeE, OhC	Within	None	0	0	0	0	0	0	0
	Kelton	South	Inside	3	3	0	0.02	HrE2, LeE, OhC	Within	None	0	0	0	0	0	0	0
OO	Salk Institute	North	Inside	15	0	15	0.09	CbB, CfB	Within	None	0	0	0	0	0	0	0
Q2	Mission Trails Regional Park	Central	Inside	17	17	0	0.25	OhF, RdC, ReE, VbB	Within	None	0	0	0	0	0	0	6
	Mission Trails Regional Park School District	***Central***	***Outside***	***2***	***0***	***2***	***0.02***	***OhF, RdC, ReE, VbB***	***Within***	***None***	***0***	***0***	***0***	***0***	***0***	***0***	***0***

Appendix B
Vernal Pool Complex Data for the City of San Diego Vernal Pool Habitat Conservation Plan

Complex ID	Complex Name	Planning Unit	Inside or Outside VPHCP Plan Area	Number of Pools per Complex by Ownership			Total Surface Area of Pools	Soils within Complex	Inside or Outside Existing MHPA	Focal Species Critical Habitat Present*	Number of Pools Occupied by Focal Species						
				Total	City , CDFW, or USFWS Controlled	Other Ownership					PONU	POAB	NAFO	ERAR	ORCA	RFS	SDFS
Q 3	Castlerock	North	Inside	9	0	9	0.05	DoE	Outside	None	0	0	0	0	0	0	4
QQ	Tecolote Canyon	Central	Inside	9	9	0	0.09	CgC, GaF, HrC, TaF	Within	None	0	0	0	0	0	0	0
R 1	Proctor Valley	South	Inside	124	124	0	1.40	DoE, FxE, OhC, OhE, PfC, Rm, SnG, VbB	Within	NAFO	0	0	0	0	0	0	3
U 15	SANDER	Central	Inside	39	39	0	0.83	RdC, ReE	Outside	SDFS	0	1	0	0	0	0	2
U 19	Cubic	Central	Inside	29	0	29	0.45	RdC	Outside	SDFS	0	1	0	2	0	0	7
X 5	Nobel Drive	North	Inside	11	11	0	0.10	HrE2, RdC	Within	NAFO	0	0	1	0	0	0	6
X 7	Nobel Research	North	Inside	28	28	0	0.10	RdC	Within	None	0	0	0	0	0	0	1
N/A	***MCAS Miramar***	***Central***	***Outside***	***7,531***	***0***	***7,531***	***ND***	***ND***	***Outside***	***ND***	***0***	***1,112***	***6***	***1,795***	***2***	***0***	***4,051***
Total				**10,496**	**1,790**	**8,706**					**398**	**1,480**	**119**	**2,654**	**63**	**214**	**4,708**
Total Inside VPHPC Plan Area				**2,488**	**1,841**	**647**					**369**	**339**	**96**	**733**	**58**	**131**	**487**

PONU = Otay Mesa mint; POAB = San Diego Mesa mint; NAFO = Spreading navarretia; ERAR = San Diego button-celery; ORCA = California Orcutt grass; RFS = Riverside fairy shrimp; SDFS = San Diego fairy shrimp

ND= No Data

*= Critical habitat is designated by USFWS for spreading navarretia (NAFO), Riverside fairy shrimp (RFS), and San Diego fairy shrimp (SDFS) only.

**= Sites owned by the Wildlife Agencies are included in the VPHCP Plan Area because the Wildlife Agencies are signatory parties.

= Land not owned by City of San Diego.

Bold = Land not owned by City of San Diego or under the City of San Diego's land use authority.

Soil Types Legend

MUSYM	Description	Category
BsC	Bosanko clay, 2 to 9% slopes	Bosanko clay
CbB	Carlsbad gravelly loamy sand, 2 to 5% slopes	Carlsbad gravelly loamy sand
CbC	Carlsbad gravelly loamy sand, 5 to 9% slopes	Carlsbad gravelly loamy sand
CfB	Chesterton fine sandy loam, 2 to 5% slopes	Chestern fine sandy loam
CgC	Chesterton-Urban land complex, 2 to 9% slopes	Chestern-Urban land complex
DaF	Diablo clay, 30 to 50% slopes	Diablo clay
DcD	Diablo-Urban land complex, 5 to 15% slopes	Diablo-Urban land complex
DoE	Diablo-Olivenhain complex, 9 to 30% slopes	Diablo-Olivenhain complex
FxE	Friant rocky fine sandy loam, 9 to 30% slopes	Friant rocky fine sandy loam
GaF	Gaviota fine sandy loam, 30 to 50% slopes	Gaviota fine sandy loam
GP	Gravel pits	Gravel pits
HrC	Huerhuero loam, 2 to 9% slopes	Huerhuero loam
HrC2	Huerhuero loam, 5 to 9% slopes, eroded	Huerhuero loam
HrE2	Huerhuero loam, 15 to 30% slopes, eroded	Huerhuero loam
LeE	Las Flores loamy fine sand, 15 to 30% slopes	Las Flores loamy fine sand
LsE	Linne clay loam, 9 to 30% slopes	Linne clay loam
LsF	Linne clay loam, 30 to 50% slopes	Linne clay loam
LvF3	Loamy alluvial land-Huerhuero complex, 9 to 50% slopes, severely	Loamy alluvial land-Huerhuero complex
MlC	Marina loamy coarse sand, 2 to 9% slopes	Marina loamy coarse sand
OhC	Olivenhain cobbly loam, 2 to 9% slopes	Olivenhain cobbly loam
OhE	Olivenhain cobbly loam, 9 to 30% slopes	Olivenhain cobbly loam
OhF	Olivenhain cobbly loam, 30 to 50% slopes	Olivenhain cobbly loam
PfC	Placentia sandy loam, thick surface, 2 to 9% slopes	Placentia sandy loam
RdC	Redding gravelly loam, 2 to 9% slopes	Redding gravelly loam
ReE	Redding cobbly loam, 9 to 30% slopes	Redding cobbly loam
RfF	Redding cobbly loam, dissected, 15 to 50% slopes	Redding cobbly loam
RhC	Redding-Urban land complex, 2 to 9% slopes	Redding-Urban land complex
RhE	Redding-Urban land complex, 9 to 30% slopes	Redding-Urban land complex
Rm	Riverwash	Riverwash
SmE	San Miguel rocky silt loam, 9 to 30% slopes	San Miguel rocky silt loam
SnG	San Miguel-Exchequer rocky silt loams, 9 to 70% slopes	San Miguel-Exchequer rocky silt loams
SuA	Stockpen gravelly clay loam, 0 to 2% slopes	Stockpen gravelly clay loam
SuB	Stockpen gravelly clay loam, 2 to 5% slopes	Stockpen gravelly clay loam
SvE	Stony land	Stony land
TeF	Terrace escarpments	Terrace escarpments
TuB	Tujunga sand, 0 to 5% slopes	Tujunga sand
VbB	Visalia gravelly sandy loam, 2 to 5% slopes	Visalia gravelly sandy loam
W	Water	Water

APPENDIX C

CONSERVATION ANALYSIS TABLES

Table C-1: Baseline Conservation of Vernal Pools and Focal Species

Complex ID	Name	Planning Unit	INSIDE or OUTSIDE Baseline (Subject to City Jurisdiction)	Conservation Level (75% or 100% Conserved)	Total Pools[1]			Total Pools Conserved Inside Baseline *	Pools Conserved on City, USFWS, or CDFW Controlled Land *	Pools Conserved on Other Ownership Land*	Total Surface Area of Pools (Acres)	Surface Area Conserved (Acres)*	Surface Area Conserved on City, USFWS, or CDFW Controlled Land	Surface Area Conserved on Other Ownership Land (Acres)*	Focal Species Critical Habitat Present**	Occupied Focal Species Pools: Total (Inside and Outside Baseline)[1] and Total Conserved in the Baseline*														Complex Identified as Necessary to Stabilize the Following Focal Species Populations[2]	Complex Identified as Necessary to Reclassify the Following Focal Species Populations[2]
					Total	City, USFWS, or CDFW Controlled	Other Ownership									PONU total	PONU Cons	POAB total	POAB Cons	NAFO total	NAFO Cons	ERAR total	ERAR Cons	ORCA total	ORCA Cons	RFS total	RFS Cons	SDFS total	SDFS Cons	UNKN FS total		
B 11	Mesa Norte	North	Inside	100	44	0	44	44	0	44	0.60	0.60	0.00	0.60	None	0	0	12	12	0	0	10	10	0	0	0	0	24	24	19	None identified	None identified
B 5	Tierra Alta	North	Outside	0	1	0	1	0	0	0	0.01	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	None identified	None identified
B 6	Lopez Ridge (CDFG)	North	Inside	100	1	1	0	1	1	0	0.22	0.22	0.22	0.00	SDFS	0	0	1	1	0	0	0	0	0	0	0	0	0	0		None identified	None identified
B 7-8	Crescent Heights	North	Inside	100	7	7	0	7	7	0	0.04	0.04	0.04	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	None identified	None identified
	Lopez Ridge (City)	North	Inside	100	10	10	0	10	10	0	0.38	0.38	0.38	0.00	SDFS	0	0	10	10	0	0	1	1	0	0	0	0	2	2	2	None identified	None identified
C 17-18	Fieldstone	North	Inside	100	9	0	9	9	0	9	0.32	0.32	0.00	0.32	None	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
C 27	Mira Mesa Market Center	North	Inside	100	1	0	1	1	0	1	0.06	0.06	0.00	0.06	None	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	None identified	None identified
D 5-8	Carroll Canyon	North	Inside	75	4	4	0	3	3	0	0.01	0.01	0.01	0.00	SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	ERAR, POAB	None identified
			Inside	100	115	115	0	115	115	0	1.17	1.17	1.17	0.00	SDFS, NAFO	0	0	42	42	1	1	65	65	0	0	0	0	5	5		ERAR, POAB	None identified
	Parkdale Carroll Canyon	North	Inside	100	4	4	0	4	4	0	0.02	0.02	0.02	0.00	SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, POAB	None identified
F 16-17	Menlo KM Parcel	Central	Outside	0	14	0	14	0	0	0	0.19	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	ERAR, POAB, SDFS	None identified
H 1-10, 13-15, 18-26	Del Mar Mesa (City)	North	Inside	100	92	92	0	92	92	0	0.54	0.54	0.54	0.00	SDFS	0	0	3	3	0	0	49	49	0	0	0	0	8	8	0	ERAR, POAB, SDFS	ERAR, POAB
	Del Mar Mesa (Private)	North	Inside	100	5	0	5	5	0	5	0.26	0.26	0.00	0.26	SDFS	0	0	0	0	0	0	2	2	0	0	0	0	1	1		ERAR, POAB, SDFS	ERAR, POAB
	Del Mar Mesa (State/Federal)	North	Inside	100	246	246	0	246	246	0	4.68	4.68	4.68	0.00	SDFS	0	0	58	58	1	1	124	124	0	0	0	0	16	16		ERAR, POAB, SDFS	ERAR, POAB
	Rhodes	North	Inside	100	134	0	134	134	0	134	0.62	0.62	0.00	0.62	SDFS	0	0	7	7	0	0	6	6	0	0	0	0	2	2	65	ERAR, POAB, SDFS	ERAR, POAB
			Outside	0	6	0	6	0	0	0	0.02	0.00	0.00	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	6	0		ERAR, POAB, SDFS	ERAR, POAB
H 17	Shaw Lorenz	North	Inside	100	28	0	28	28	0	28	0.24	0.24	0.00	0.24	None	0	0	0	0	0	0	0	0	0	0	0	0	8	8	10	None identified	None identified
H 33	East Ocean Air Drive	North	Inside	100	2	0	2	2	0	2	0.03	0.03	0.00	0.03	None	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	ERAR, POAB, SDFS	None identified
H 38	Carmel Mountain	North	Inside	100	64	64	0	64	64	0	0.61	0.61	0.61	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	2	2	9	None identified	None identified
H 39	Greystone Torrey Highlands	North	Inside	100	19	19	0	19	19	0	0.68	0.68	0.68	0.00	None	0	0	5	5	0	0	3	3	0	0	0	0	0	0	0	None identified	None identified
I 1	Arjons	North	Inside	100	34	0	34	34	0	34	0.73	0.73	0.00	0.73	None	0	0	22	22	0	0	15	15	0	0	0	0	1	1	9	None identified	ERAR, POAB
I 12	Pueblo Lands	North	Inside	75	2	2	0	2	2	0	0.04	0.03	0.03	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	None identified	None identified
		North	Outside	0	5	5	0	0	0	0	0.05	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	4	0		None identified	None identified
I 6 B	Ford Leasing (Bob Baker)	North	Inside	100	8	0	8	8	0	8	0.08	0.08	0.00	0.08	None	0	0	7	7	0	0	0	0	0	0	0	0	3	3	3	None identified	ERAR, POAB
I 6 C	Facilities Development (Eastgate Miramar Associates)	North	Inside	100	15	0	15	15	0	15	0.24	0.24	0.00	0.24	None	0	0	11	11	0	0	2	2	0	0	0	0	6	6	6	None identified	ERAR, POAB
J 11 E	Slump Block Pools	South	Inside	75	2	0	2	2	0	2	0.63	0.47	0.00	0.47	RFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 11 W	J 11 West	South	Inside	75	5	0	5	4	0	4	0.49	0.37	0.00	0.37	RFS	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 12	J 12	South	Inside	75	5	0	5	4	0	4	0.28	0.21	0.00	0.21	SDFS, RFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified

Table C-1: Baseline Conservation of Vernal Pools and Focal Species

Complex ID	Name	Planning Unit	INSIDE or OUTSIDE Baseline (Subject to City Jurisdiction)	Conservation Level (75% or 100% Conserved)	Total Pools[1]			Total Pools Conserved Inside Baseline *	Pools Conserved on City, USFWS, or CDFW Controlled Land *	Pools Conserved on Other Ownership Land*	Total Surface Area of Pools (Acres)	Surface Area Conserved (Acres)*	Surface Area Conserved on City, USFWS, or CDFW Controlled Land	Surface Area Conserved on Other Ownership Land (Acres)*	Focal Species Critical Habitat Present**	Occupied Focal Species Pools: Total (Inside and Outside Baseline)[1] and Total Conserved in the Baseline*														Complex Identified as Necessary to Stabilize the Following Focal Species Populations[2]	Complex Identified as Necessary to Reclassify the Following Focal Species Populations[2]
					Total	City, USFWS, or CDFW Controlled	Other Ownership									PONU total	PONU Cons	POAB total	POAB Cons	NAFO total	NAFO Cons	ERAR total	ERAR Cons	ORCA total	ORCA Cons	RFS total	RFS Cons	SDFS total	SDFS Cons	UNKN FS total		
J 13 E	South Otay J 13 East	South	Inside	75	2	0	2	2	0	2	0.01	0.01	0.00	0.01	SDFS, RFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
		South	Outside	0	6	0	6	0	0	0	0.05	0.00	0.00	0.00	SDFS, RFS	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 13 N	NDU 1 & 2	South	Outside	0	13	0	13	0	0	0	0.07	0.00	0.00	0.00	None	0	0	0	0	1	0	2	0	0	0	0	0	13	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	South Otay 1 acre (City)	South	Inside	100	17	17	0	17	17	0	0.22	0.22	0.22	0.00	None	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	South Otay 1 acre (Private)	South	Outside	0	7	0	7	0	0	0	0.02	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 13 S	Bachman	South	Outside	0	2	0	2	0	0	0	0.01	0.00	0.00	0.00	SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	NDU 1 & 2	South	Outside	0	4	0	4	0	0	0	0.21	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	2	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	South Otay J 13 South	South	Outside	0	39	0	39	0	0	0	0.58	0.00	0.00	0.00	None	0	0	0	0	0	0	7	0	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 14	Anderprises (City)	South	Inside	100	2	2	0	2	2	0	0.01	0.01	0.01	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Bachman	South	Inside	75	2	0	2	2	0	2	0.02	0.02	0.00	0.02	RSF, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Brown Field Basins	South	Inside	100	4	4	0	4	4	0	0.83	0.83	0.83	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Cal Terraces (South)	South	Inside	100	73	73	0	73	73	0	1.45	1.45	1.45	0.00	RSF, SDFS, NAFO	63	63	0	0	6	6	55	55	5	5	26	26	32	32	30	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Handler	South	Outside	0	24	0	24	0	0	0	0.07	0.00	0.00	0.00	RSF, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 16-18	Goat Mesa (City)	South	Inside	100	15	15	0	15	15	0	0.34	0.34	0.34	0.00	RFS, SDFS	0	0	0	0	0	0	4	4	0	0	1	1	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Goat Mesa (Private)	South	Inside	75	2	0	2	2	0	2	0.01	0.01	0.00	0.01	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Wruck Canyon	South	Inside	100	6	6	0	6	6	0	0.02	0.02	0.02	0.00	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 2	Cal Terraces (North), Otay Mesa Road Parcels	South	Inside	100	304	304	0	304	304	0	3.53	3.53	3.53	0.00	RFS, SDFS, NAFO	286	286	0	0	79	79	275	275	52	52	93	93	209	209	211	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Clayton Parcel	South	Inside	100	35	35	0	35	35	0	0.27	0.27	0.27	0.00	RFS, SDFS, NAFO	0	0	0	0	0	0	1	1	0	0	0	0	2	2	11	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	St. Jerome's	South	Outside	0	24	0	24	0	0	0	0.41	0.00	0.00	0.00	RFS, SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 20-21	La Media ITS	South	Outside	0	33	0	33	0	0	0	1.43	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 21	La Media Swale South	South	Outside	0	7	0	7	0	0	0	0.21	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified

Table C-1: Baseline Conservation of Vernal Pools and Focal Species

Complex ID	Name	Planning Unit	INSIDE or OUTSIDE Baseline (Subject to City Jurisdiction)	Conservation Level (75% or 100% Conserved)	Total Pools[1]			Total Pools Conserved Inside Baseline *	Pools Conserved on City, USFWS, or CDFW Controlled Land *	Pools Conserved on Other Ownership Land*	Total Surface Area of Pools (Acres)	Surface Area Conserved (Acres)*	Surface Area Conserved on City, USFWS, or CDFW Controlled Land	Surface Area Conserved on Other Ownership Land (Acres)*	Focal Species Critical Habitat Present**	Occupied Focal Species Pools: Total (Inside and Outside Baseline)[1] and Total Conserved in the Baseline*																Complex Identified as Necessary to Stabilize the Following Focal Species Populations[2]	Complex Identified as Necessary to Reclassify the Following Focal Species Populations[2]
					Total	City, USFWS, or CDFW Controlled	Other Ownership									PONU total	PONU Cons	POAB total	POAB Cons	NAFO total	NAFO Cons	ERAR total	ERAR Cons	ORCA total	ORCA Cons	RFS total	RFS Cons	SDFS total	SDFS Cons	UNKN FS total		
J 27	Empire Center	South	Inside	100	10	0	10	10	0	10	0.23	0.23	0.00	0.23	None	0	0	0	0	0	0	9	9	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 28 E	La Media Swale North	South	Inside	75	5	0	5	4	0	4	0.16	0.12	0.00	0.12	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 31	Hidden Trails	South	Inside	100	66	66	0	66	0	66	0.66	0.66	0.66	0.00	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	None identified	None identified
J 32	West Otay A	South	Inside	100	3	0	3	3	0	3	0.01	0.01	0.00	0.01	NAFO	1	1	0	0	0	0	2	2	0	0	0	0	0	0		None identified	None identified
	West Otay B	South	Inside	100	15	15	0	15	15	0	0.06	0.06	0.06	0.00	NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
	West Otay C	South	Inside	100	7	7	0	7	7	0	0.04	0.04	0.04	0.00	NAFO	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	None identified	None identified
J 34	Bachman	South	Inside	75	2	0	2	2	0	2	0.02	0.01	0.00	0.01	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0		None identified	None identified
		South	Outside	0	13	0	13	0	0	0	0.07	0.00	0.00	0.00	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	None identified	None identified
	Candlelight	South	Inside	100	10	0	10	10	0	10	0.08	0.08	0.00	0.08	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	None identified	None identified
J 35	Brown Field	South	Inside	100	3	3	0	3	3	0	0.02	0.02	0.02	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
J 36	Southview	South	Inside	75	7	0	7	5	0	5	0.04	0.03	0.00	0.03	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	None identified	None identified
		South	Outside	0	10	0	10	0	0	0	0.07	0.00	0.00	0.00	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	7	0		None identified	None identified
J 4-5	California Crossing	South	Inside	100	11	0	11	11	0	11	0.09	0.09	0.00	0.09	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	None identified	None identified
	Robinhood Ridge	South	Inside	100	83	83	0	83	83	0	0.56	0.56	0.56	0.00	RFS, SDFS, NAFO	19	19	0	0	4	4	46	46	0	0	6	6	41	41	41	None identified	None identified
K 5	Otay Lakes	Central	Inside	100	85	85	0	85	85	0	3.20	3.20	3.20	0.00	SDFS, NAFO	0	0	0	0	2	2	46	46	0	0	0	0	6	6	6	ERAR, NAFO	None identified
KK 1	Lake Murray	Central	Outside	0	1	1	0	0	0	0	0.02	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
KK 2	Pasatiempo	Central	Outside	0	10	10	0	0	0	0	0.04	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
MM 1	Marron Valley	South	Inside	100	18	18	0	18	18	0	0.18	0.18	0.18	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	5	5	3	None identified	None identified
N 1-4	Teledyne Ryan	Central	Outside	0	43	0	43	0	0	0	0.59	0.00	0.00	0.00	None	0	0	1	0	0	0	0	0	0	0	0	0	11	0	0	POAB, NAFO, SDFS	None identified
N 5-6	Montgomery Field[3]	Central	Inside	100	226	226	0	226	226	0	5.46	5.46	5.46	0.00	SDFS, NAFO	0	0	129	129	0	0	0	0	0	0	0	0	10	10	18	POAB, NAFO, SDFS	None identified
		Central	Inside	100	23	23	0	23	23	0	0.98	0.98	0.98	0.00	SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0		POAB, NAFO, SDFS	None identified
N 7	Serra Mesa Library	Central	Inside	100	26	26	0	26	26	0	0.41	0.41	0.41	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
N 8	General Dynamics	Central	Inside	100	22	22	0	22	0	22	0.40	0.40	0.40	0.00	None	0	0	20	20	0	0	2	2	0	0	0	0	6	6	6	None identified	None identified
NC	Li Collins	South	Inside	100	2	0	2	2	2	0	0.04	0.04	0.00	0.04	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
	Kelton	North	Inside	100	3	3	0	3	0	3	0.02	0.02	0.02	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
OO	Salk Institute	North	Inside	100	15	0	15	15	0	15	0.09	0.09	0.00	0.09	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
Q2	Mission Trails Regional Park	Central	Inside	100	17	17	0	17	17	0	0.25	0.25	0.25	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	6	6	6	None identified	None identified
Q 3	Castlerock	North	Inside	100	5	0	5	5	0	5	0.02	0.02	0.00	0.02	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
		North	Outside	0	4	0	4	0	0	0	0.02	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	4	0		None identified	None identified
QQ	Tecolote Canyon	Central	Inside	100	9	9	0	9	9	0	0.09	0.09	0.09	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
R 1	Proctor Valley	South	Inside	100	124	124	0	124	124	0	1.40	1.40	1.40	0.00	NAFO	0	0	0	0	0	0	0	0	0	0	0	0	3	3	10	ERAR, NAFO	None identified

Table C-1: Baseline Conservation of Vernal Pools and Focal Species

Complex ID	Name	Planning Unit	INSIDE or OUTSIDE Baseline (Subject to City Jurisdiction)	Conservation Level (75% or 100% Conserved)	Total Pools[1]			Total Pools Conserved Inside Baseline *	Pools Conserved on City, USFWS, or CDFW Controlled Land *	Pools Conserved on Other Ownership Land*	Total Surface Area of Pools (Acres)	Surface Area Conserved (Acres)*	Surface Area Conserved on City, USFWS, or CDFW Controlled Land	Surface Area Conserved on Other Ownership Land (Acres)*	Focal Species Critical Habitat Present**	Occupied Focal Species Pools: Total (Inside and Outside Baseline)[1] and Total Conserved in the Baseline*															Complex Identified as Necessary to Stabilize the Following Focal Species Populations[2]	Complex Identified as Necessary to Reclassify the Following Focal Species Populations[2]
					Total	City, USFWS, or CDFW Controlled	Other Ownership									PONU total	PONU Cons	POAB total	POAB Cons	NAFO total	NAFO Cons	ERAR total	ERAR Cons	ORCA total	ORCA Cons	RFS total	RFS Cons	SDFS total	SDFS Cons	UNKN FS total		
U 15	SANDER	Central	Outside	0	39	39	0	0	0	0	0.83	0.00	0.00	0.00	SDFS	0	0	1	0	0	0	0	0	0	0	0	0	2	0		None identified	ERAR, POAB, ORCA, SDFS
U 19	Cubic	Central	Outside	0	29	0	29	0	0	0	0.45	0.00	0.00	0.00	SDFS	0	0	1	0	0	0	2	0	0	0	0	0	7	0	6	None identified	ERAR, POAB, ORCA, SDFS
X 5	Nobel Drive	North	Inside	100	11	11	0	11	11	0	0.10	0.10	0.10	0.00	NAFO	0	0	0	0	1	1	0	0	0	0	0	0	6	6	6	SDFS	None identified
X 7	Nobel Research	North	Inside	100	28	28	0	28	0	28	0.10	0.10	0.10	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	1	1	9	None identified	None identified
		Total Inside and Outsite Baseline[1]			**2,488**	**1,841**	**647**				**39.8**				**Total[1]**	**369**	-	**339**	-	**96**	-	**733**	-	**58**	-	**131**	-	**488**	-			
		Total Inside Baseline[1]			**2,154**	**1,786**	**368**	**2,148**	**1,668**	**480**	**34.4**	**34.0**	**29.0**	**5.0**	**Total Inside Preserve[1]**	**369**		**336**		**95**		**721**		**58**		**128**		**421**	**500**			
															% Occupied Pools Conserved[1]	**100%**		**99%**		**99%**		**98%**		**100%**		**98%**		**86%**				

= Land not owned by City of San Diego.

*= Based on Conservation Level, conservation of vernal pools rounded up to the nearest whole number

**= Critical habitat is designated by USFWS for San Diego fairy shrimp (SDFS) and spreading navarretia (NAFO), and proposed for Riverside fairy shrimp (RFS).

[1]On Land Subject to City Jurisdiction

[2]Based on Recovery Plan (USFWS 1998)

[2]Montgomery Field will be subject a management and monitoring plan per the USFWS BO No.1-6-94-F-32

Note: The Baseline includes sites that are within the City's Muli-Habitat Planning Area, are conserved lands, have an approved USFWS Biological Opinion, and/or are "pipeline projects" (i.e., in a stages of the City project approval process where conservation and loss of lands has been determined)

PONU = Otay Mesa mint; POAB = San Diego Mesa mint; NAFO = Spreading navarretia; ERAR = San Diego button-celery; ORCA = California Orcutt grass; RFS = Riverside fairy shrimp; SDFS = San Diego fairy shrimp

Table C-2: VPHCP Conservation of Vernal Pools and Focal Species

Complex ID	Name	Planning Unit	INSIDE or OUTSIDE MHPA	Conservation Level (75% or 100% Conserved)	Total Pools[1]			Total Pools Conserved Inside MHPA *	Pools Conserved on City, USFWS, or CDFW Controlled Land *	Pools Conserved on Other Ownership Land*	Total Surface Area of Pools (Acres)	Surface Area Conserved (Acres)*	Surface Area Conserved on City, USFWS, or CDFW	Surface Area Conserved on Other Ownership Land	Focal Species Critical Habitat Present**	Occupied Focal Species Pools: Total (Inside and Outside MHPA)[1] and Total Conserved in														Complex Identified as Necessary to Stabilize the Following Focal Species	Complex Identified as Necessary to Reclassify the Following Focal Species
					Total	City, USFWS, or CDFW Controlled	Other Ownership									PONU total	PONU Cons	POAB total	POAB Cons	NAFO total	NAFO Cons	ERAR total	ERAR Cons	ORCA total	ORCA Cons	RFS total	RFS Cons	SDFS total	SDFS Cons	UNKN FS total		
B 11	Mesa Norte	North	Inside	100	44	0	44	44	0	44	0.60	0.60	0.00	0.60	None	0	0	12	12	0	0	10	10	0	0	0	0	24	24	19	None identified	None identified
B 5	Tierra Alta	North	Inside	100	1	0	1	1	0	1	0.01	0.01	0.00	0.01	None	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	None identified	None identified
B 6	Lopez Ridge (CDFG)	North	Inside	100	1	1	0	1	1	0	0.22	0.22	0.22	0.00	SDFS	0	0	1	1	0	0	0	0	0	0	0	0	0	0		None identified	None identified
B 7-8	Crescent Heights	North	Inside	100	7	7	0	7	7	0	0.04	0.04	0.04	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	None identified	None identified
	Lopez Ridge (City)	North	Inside	100	10	10	0	10	10	0	0.38	0.38	0.38	0.00	SDFS	0	0	10	10	0	0	1	1	0	0	0	0	2	2	2	None identified	None identified
C 17-18	Fieldstone	North	Inside	100	9	0	9	9	0	9	0.32	0.32	0.00	0.32	None	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
C 27	Mira Mesa Market Center	North	Inside	100	1	0	1	1	0	1	0.06	0.06	0.00	0.06	None	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	None identified	None identified
D 5-8	Carroll Canyon	North	Inside	75	4	4	0	3	3	0	0.01	0.01	0.01	0.00	SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	ERAR, POAB	None identified
			Inside	100	115	115	0	115	115	0	1.17	1.17	1.17	0.00	SDFS, NAFO	0	0	42	42	1	1	65	65	0	0	0	0	5	5		ERAR, POAB	None identified
	Parkdale Carroll Canyon	North	Inside	100	4	4	0	4	4	0	0.02	0.02	0.02	0.00	SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, POAB	None identified
F 16-17	Menlo KM Parcel	Central	Inside	75	14	0	14	11	0	11	0.19	0.14	0.00	0.14	None	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	ERAR, POAB, SDFS	None identified
H 1-10, 13-15, 18-26	Del Mar Mesa (City)	North	Inside	100	92	92	0	92	92	0	0.54	0.54	0.54	0.00	SDFS	0	0	3	3	0	0	49	49	0	0	0	0	8	8	0	ERAR, POAB, SDFS	ERAR, POAB
	Del Mar Mesa (Private)	North	Inside	100	5	0	5	5	0	5	0.26	0.26	0.00	0.26	SDFS	0	0	0	0	0	0	2	2	0	0	0	0	1	1		ERAR, POAB, SDFS	ERAR, POAB
	Del Mar Mesa (State/Federal)	North	Inside	100	246	246	0	246	246	0	4.68	4.68	4.68	0.00	SDFS	0	0	58	58	1	1	124	124	0	0	0	0	16	16		ERAR, POAB, SDFS	ERAR, POAB
	Rhodes	North	Outside	0	6	0	6	0	0	0	0.02	0.00	0.00	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	6	0		ERAR, POAB, SDFS	ERAR, POAB
			Inside	100	134	0	134	134	0	134	0.62	0.62	0.00	0.62	SDFS	0	0	7	7	0	0	6	6	0	0	0	0	2	2	65	ERAR, POAB, SDFS	ERAR, POAB
H 17	Shaw Lorenz	North	Inside	100	28	0	28	28	0	28	0.24	0.24	0.00	0.24	None	0	0	0	0	0	0	0	0	0	0	0	0	8	8	10	None identified	None identified
H 33	East Ocean Air Drive	North	Inside	100	2	0	2	2	0	2	0.03	0.03	0.00	0.03	None	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	ERAR, POAB, SDFS	None identified
H 38	Carmel Mountain	North	Inside	100	64	64	0	64	64	0	0.61	0.61	0.61	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	2	2	9	None identified	None identified
H 39	Greystone Torrey Highlands	North	Inside	100	19	19	0	19	19	0	0.68	0.68	0.68	0.00	None	0	0	5	5	0	0	3	3	0	0	0	0	0	0	0	None identified	None identified
I 1	Arjons	North	Inside	100	34	0	34	34	0	34	0.73	0.73	0.00	0.73	None	0	0	22	22	0	0	15	15	0	0	0	0	1	1	9	None identified	ERAR, POAB
I 12	Pueblo Lands	North	Inside	75	2	2	0	2	2	0	0.04	0.03	0.03	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	None identified	None identified
		North	Outside	0	5	5	0	0	0	0	0.05	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	4	0		None identified	None identified
I 6 B	Ford Leasing (Bob Baker)	North	Inside	100	8	0	8	8	0	8	0.08	0.08	0.00	0.08	None	0	0	7	7	0	0	0	0	0	0	0	0	3	3	3	None identified	ERAR, POAB
I 6 C	Facilities Development (Eastgate Miramar Associates)	North	Inside	100	15	0	15	15	0	15	0.24	0.24	0.00	0.24	None	0	0	11	11	0	0	2	2	0	0	0	0	6	6	6	None identified	ERAR, POAB
J 11 E	Slump Block Pools	South	Inside	75	2	0	2	2	0	2	0.63	0.47	0.00	0.47	RFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified

Table C-2: VPHCP Conservation of Vernal Pools and Focal Species

Complex ID	Name	Planning Unit	INSIDE or OUTSIDE MHPA	Conservation Level (75% or 100% Conserved)	Total Pools[1]			Total Pools Conserved Inside MHPA *	Pools Conserved on City, USFWS, or CDFW Controlled Land *	Pools Conserved on Other Ownership Land*	Total Surface Area of Pools (Acres)	Surface Area Conserved (Acres)*	Surface Area Conserved on City, USFWS, or CDFW	Surface Area Conserved on Other Ownership Land	Focal Species Critical Habitat Present**	Occupied Focal Species Pools: Total (Inside and Outside MHPA)[1] and Total Conserved in												Complex Identified as Necessary to Stabilize the Following Focal Species	Complex Identified as Necessary to Reclassify the Following Focal Species
					Total	City, USFWS, or CDFW Controlled	Other Ownership									PONU total	PONU Cons	POAB total	POAB Cons	NAFO total	NAFO Cons	ERAR total	ERAR Cons	ORCA total	ORCA Cons	RFS total	RFS Cons	SDFS total	SDFS Cons	UNKN FS total		
J 11 W	J 11 West	South	Inside	75	5	0	5	4	0	4	0.49	0.37	0.00	0.37	RFS	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 12	J 12	South	Inside	75	5	0	5	4	0	4	0.28	0.21	0.00	0.21	SDFS, RFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 13 E		South	Inside	75	2	0	2	2	0	2	0.01	0.01	0.00	0.01	SDFS, RFS	0	0	0	0	0	0	1	1	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	South Otay J 13 East	South	Inside	100	6	0	6	6	0	6	0.05	0.05	0.00	0.05	SDFS, RFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 13 N	NDU 1 & 2	South	Outside	0	13	0	13	0	0	0	0.07	0.00	0.00	0.00	None	0	0	0	0	1	0	2	0	0	0	0	0	13	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	South Otay 1 acre (City)	South	Inside	100	17	17	0	17	17	0	0.22	0.22	0.22	0.00	None	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	South Otay 1 acre (Private)	South	Outside	0	7	0	7	0	0	0	0.02	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 13 S	Bachman	South	Inside	100	2	0	2	2	0	2	0.01	0.01	0.00	0.01	SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	NDU 1 & 2	South	Outside	0	4	0	4	0	0	0	0.21	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	2	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	South Otay J 13 South	South	Outside	0	37	0	37	0	0	0	0.58	0.00	0.00	0.00	None	0	0	0	0	0	0	7	0	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
		South	Inside	100	2	0	2	2	0	2	0.00	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 14	Anderprises (City)	South	Inside	100	2	2	0	2	2	0	0.01	0.01	0.01	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Bachman	South	Inside	75	2	0	2	2	0	2	0.02	0.02	0.00	0.02	RSF, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Brown Field Basins	South	Inside	100	4	4	0	4	4	0	0.83	0.83	0.83	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Cal Terraces (South)	South	Inside	100	73	73	0	73	73	0	1.45	1.45	1.45	0.00	RSF, SDFS, NAFO	63	63	0	0	6	6	55	55	5	5	26	26	32	32	30	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Handler	South	Inside	100	24	0	24	24	0	24	0.07	0.07	0.00	0.07	RSF, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 16-18	Goat Mesa (City)	South	Inside	100	15	15	0	15	15	0	0.34	0.34	0.34	0.00	RFS, SDFS	0	0	0	0	0	0	4	4	0	0	1	1	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Goat Mesa (Private)	South	Inside	75	2	0	2	2	0	2	0.01	0.01	0.00	0.01	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Wruck Canyon	South	Inside	100	6	6	0	6	6	0	0.02	0.02	0.02	0.00	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Cal Terraces (North), Otay Mesa Road Parcels	South	Inside	100	304	304	0	304	304	0	3.53	3.53	3.53	0.00	RFS, SDFS, NAFO	286	286	0	0	79	79	275	275	52	52	93	93	209	209	211	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified

Table C-2: VPHCP Conservation of Vernal Pools and Focal Species

Complex ID	Name	Planning Unit	INSIDE or OUTSIDE MHPA	Conservation Level (75% or 100% Conserved)	Total Pools[1]			Total Pools Conserved Inside MHPA *	Pools Conserved on City, USFWS, or CDFW Controlled Land *	Pools Conserved on Other Ownership Land*	Total Surface Area of Pools (Acres)	Surface Area Conserved (Acres)*	Surface Area Conserved on City, USFWS, or CDFW	Surface Area Conserved on Other Ownership Land	Focal Species Critical Habitat Present**	Occupied Focal Species Pools: Total (Inside and Outside MHPA)[1] and Total Conserved in													Complex Identified as Necessary to Stabilize the Following Focal Species	Complex Identified as Necessary to Reclassify the Following Focal Species
					Total	City, USFWS, or CDFW Controlled	Other Ownership									PONU total	PONU Cons	POAB total	POAB Cons	NAFO total	NAFO Cons	ERAR total	ERAR Cons	ORCA total	ORCA Cons	RFS total	RFS Cons	SDFS total	SDFS Cons	UNKN FS total		
J 2	Clayton Parcel	South	Inside	100	35	35	0	35	35	0	0.27	0.27	0.27	0.00	RFS, SDFS, NAFO	0	0	0	0	0	0	1	1	0	0	0	0	2	2	11	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	St. Jerome's	South	Outside	0	6	0	6	0	0	0	0.23	0.00	0.00	0.00	RFS, SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
		South	Inside	100	18	0	18	18	0	18	0.18	0.18	0.00	0.18	RFS, SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	3	3	1	1	5	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 20-21	La Media ITS	South	Inside	75	33	0	33	25	0	25	1.43	1.07	0.00	1.07	None	0	0	0	0	0	0	0	0	0	0	0	0	6	5	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 21	La Media Swale South	South	Inside	100	7	0	7	7	0	7	0.21	0.21	0.00	0.21	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 27	Empire Center	South	Inside	100	10	0	10	10	0	10	0.23	0.23	0.00	0.23	None	0	0	0	0	0	0	9	9	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 28 E	La Media Swale North	South	Inside	75	5	0	5	4	0	4	0.16	0.12	0.00	0.12	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 31	Hidden Trails	South	Inside	100	66	66	0	66	0	66	0.66	0.66	0.66	0.00	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	None identified	None identified
J 32	West Otay A	South	Inside	100	3	0	3	3	0	3	0.01	0.01	0.00	0.01	NAFO	1	1	0	0	0	0	2	2	0	0	0	0	0	0		None identified	None identified
	West Otay B	South	Inside	100	15	15	0	15	15	0	0.06	0.06	0.06	0.00	NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
	West Otay C	South	Inside	100	7	7	0	7	7	0	0.04	0.04	0.04	0.00	NAFO	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	None identified	None identified
J 34	Bachman	South	Inside	75	2	0	2	2	0	2	0.02	0.01	0.00	0.01	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0		None identified	None identified
		South	Outside	0	10	0	10	0	0	0	0.06	0.00	0.00	0.00	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	None identified	None identified
		South	Inside	100	3	0	3	3	0	3	0.01	0.01	0.00	0.01	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0		None identified	None identified
	Candlelight	South	Inside	100	10	0	10	10	0	10	0.08	0.08	0.00	0.08	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	None identified	None identified
J 35	Brown Field	South	Inside	100	3	3	0	3	3	0	0.02	0.02	0.02	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
J 36	Southview	South	Inside	75	17	0	17	13	0	13	0.11	0.08	0.00	0.08	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	12	9	0	None identified	None identified
J 4-5	California Crossing	South	Inside	100	11	0	11	11	0	11	0.09	0.09	0.00	0.09	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	None identified	None identified
	Robinhood Ridge	South	Inside	100	83	83	0	83	83	0	0.56	0.56	0.56	0.00	RFS, SDFS, NAFO	19	19	0	0	4	4	46	46	0	0	6	6	41	41	41	None identified	None identified
K 5	Otay Lakes	Central	Inside	100	85	85	0	85	85	0	3.20	3.20	3.20	0.00	SDFS, NAFO	0	0	0	0	2	2	46	46	0	0	0	0	6	6	6	ERAR, NAFO	None identified
KK 1	Lake Murray	Central	Outside	0	1	1	0	0	0	0	0.02	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
KK 2	Pasatiempo	Central	Inside	100	10	10	0	10	10	0	0.04	0.04	0.04	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
MM 1	Marron Valley	South	Inside	100	18	18	0	18	18	0	0.18	0.18	0.18	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	5	5	3	None identified	None identified
N 1-4	Teledyne Ryan	Central	Inside	75	43	0	43	32	0	32	0.59	0.44	0.00	0.44	None	0	0	1	1	0	0	0	0	0	0	0	0	11	8	0	POAB, NAFO, SDFS	None identified
N 5-6	Montgomery Field[3]	Central	Inside	100	226	226	0	226	226	0	5.46	5.46	5.46	0.00	SDFS, NAFO	0	0	129	129	0	0	0	0	0	0	0	0	10	10	18	POAB, NAFO, SDFS	None identified
		Central	Inside	100	23	23	0	23	23	0	0.98	0.98	0.98	0.00	SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0		POAB, NAFO, SDFS	None identified
N 7	Serra Mesa Library	Central	Inside	100	26	26	0	26	26	0	0.41	0.41	0.41	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
N 8	General Dynamics	Central	Inside	100	22	22	0	22	0	22	0.40	0.40	0.40	0.00	None	0	0	20	20	0	0	2	2	0	0	0	0	6	6	6	None identified	None identified

Table C-2: VPHCP Conservation of Vernal Pools and Focal Species

Complex ID	Name	Planning Unit	INSIDE or OUTSIDE MHPA	Conservation Level (75% or 100% Conserved)	Total Pools[1]			Total Pools Conserved Inside MHPA *	Pools Conserved on City, USFWS, or CDFW Controlled Land *	Pools Conserved on Other Ownership Land*	Total Surface Area of Pools (Acres)	Surface Area Conserved (Acres)*	Surface Area Conserved on City, USFWS, or CDFW	Surface Area Conserved on Other Ownership Land	Focal Species Critical Habitat Present**	Occupied Focal Species Pools: Total (Inside and Outside MHPA)[1] and Total Conserved in														Complex Identified as Necessary to Stabilize the Following Focal Species	Complex Identified as Necessary to Reclassify the Following Focal Species
					Total	City, USFWS, or CDFW Controlled	Other Ownership									PONU total	PONU Cons	POAB total	POAB Cons	NAFO total	NAFO Cons	ERAR total	ERAR Cons	ORCA total	ORCA Cons	RFS total	RFS Cons	SDFS total	SDFS Cons	UNKN FS total		
NC	Li Collins	South	Inside	100	2	0	2	2	2	0	0.04	0.04	0.00	0.04	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
	Kelton	North	Inside	100	3	3	0	3	0	3	0.02	0.02	0.02	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
OO	Salk Institute	North	Inside	100	15	0	15	15	0	15	0.09	0.09	0.00	0.09	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
Q2	Mission Trails Regional Park	Central	Inside	100	17	17	0	17	17	0	0.25	0.25	0.25	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	6	6	6	None identified	None identified
Q 3	Castlerock	North	Inside	100	5	0	5	5	0	5	0.02	0.02	0.00	0.02	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
		North	Outside	0	4	0	4	0	0	0	0.02	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	4	0		None identified	None identified
QQ	Tecolote Canyon	Central	Inside	100	9	9	0	9	9	0	0.09	0.09	0.09	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
R 1	Proctor Valley	South	Inside	100	124	124	0	124	124	0	1.40	1.40	1.40	0.00	NAFO	0	0	0	0	0	0	0	0	0	0	0	0	3	3	10	ERAR, NAFO	None identified
U 15	SANDER	Central	Outside	0	1	1	0	0	0	0	0.34	0.00	0.00	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0		None identified	ERAR, POAB, ORCA, SDFS
		Central	Inside	75	38	38	0	29	29	0	0.49	0.37	0.37	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	None identified	ERAR, POAB, ORCA, SDFS
U 19	Cubic	Central	Outside	0	6	0	6	0	0	0	0.08	0.00	0.00	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	1	0	6	None identified	ERAR, POAB, ORCA, SDFS
		Central	Inside	75	23	0	23	17	0	17	0.37	0.28	0.00	0.28	SDFS	0	0	1	1	0	0	2	2	0	0	0	0	6	5		None identified	ERAR, POAB, ORCA, SDFS
X 5	Nobel Drive	North	Inside	100	11	11	0	11	11	0	0.10	0.10	0.10	0.00	NAFO	0	0	1	1	1	1	0	0	0	0	0	0	6	6	6	SDFS	None identified
X 7	Nobel Research	North	Inside	100	28	28	0	28	0	28	0.10	0.10	0.10	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	1	1	9	None identified	None identified
	Total Inside and Outsite Preserve[1]				**2,488**	**1,841**	**647**				**39.8**				**Total[1]**	**369**	-	**339**	-	**96**	-	**733**	-	**58**	-	**131**	-	**488**	-			
	Total Inside Preserve[1]				**2,388**	**1,834**	**554**	**2,343**	**1,707**	**636**	**38.1**	**36.9**	**29.4**	**7.5**	**Total Inside Preserve[1]**	**369**		**339**		**95**		**724**		**58**		**131**		**449**	**507**			
															% Occupied Pools Conserved[1]	**100%**		**100%**		**99%**		**99%**		**100%**		**100%**		**92%**				

= Land not owned by City of San Diego.

*= Based on Conservation Level, conservation of vernal pools rounded up to the nearest whole number

**= Critical habitat is designated by USFWS for San Diego fairy shrimp (SDFS) and spreading navarretia (NAFO), and proposed for Riverside fairy shrimp (RFS).

[1]On Land Subject to City Jurisdiction

[2]Based on Recovery Plan (USFWS 1998)

[2]Montgomery Field will be subject a management and monitoring plan per the USFWS BO No.1-6-94-F-32

PONU = Otay Mesa mint; POAB = San Diego Mesa mint; NAFO = Spreading navarretia; ERAR = San Diego button-celery; ORCA = California Orcutt grass; RFS = Riverside fairy shrimp; SDFS = San Diego fairy shrimp

Table C-3: VPHCP Expanded Conservation Alternative - Conservation of Vernal Pools and Focal Species

Complex ID	Name	Planning Unit	INSIDE or OUTSIDE MHPA	Conservation Level (75% or 100% Conserved)	Total Pools[1]			Total Pools Conserved Inside MHPA *	Pools Conserved on City, USFWS, or CDFW Controlled	Pools Conserved on Other Ownership Land*	Total Surface Area of Pools (Acres)	Surface Area Conserved (Acres)*	Surface Area Conserved on City, USFWS, or CDFW	Surface Area Conserved on Other Ownership Land	Focal Species Critical Habitat Present**	Occupied Focal Species Pools: Total (Inside and Outside MHPA)[1] and Total Conserved in														Complex Identified as Necessary to Stabilize the Following Focal Species	Complex Identified as Necessary to Reclassify the Following Focal Species
					Total	City, USFWS, or CDFW Controlled	Other Ownership									PONU total	PONU Cons	POAB total	POAB Cons	NAFO total	NAFO Cons	ERAR total	ERAR Cons	ORCA total	ORCA Cons	RFS total	RFS Cons	SDFS total	SDFS Cons	UNKN FS total		
B 11	Mesa Norte	North	Inside	100	44	0	44	44	0	44	0.60	0.60	0.00	0.60	None	0	0	12	12	0	0	10	10	0	0	0	0	24	24	19	None identified	None identified
B 5	Tierra Alta	North	Inside	100	1	0	1	1	0	1	0.01	0.01	0.00	0.01	None	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	None identified	None identified
B 6	Lopez Ridge (CDFG)	North	Inside	100	1	1	0	1	1	0	0.22	0.22	0.22	0.00	SDFS	0	0	1	1	0	0	0	0	0	0	0	0	0	0		None identified	None identified
B 7-8	Crescent Heights	North	Inside	100	7	7	0	7	7	0	0.04	0.04	0.04	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	None identified	None identified
	Lopez Ridge (City)	North	Inside	100	10	10	0	10	10	0	0.38	0.38	0.38	0.00	SDFS	0	0	10	10	0	0	1	1	0	0	0	0	2	2	2	None identified	None identified
C 17-18	Fieldstone	North	Inside	100	9	0	9	9	0	9	0.32	0.32	0.00	0.32	None	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
C 27	Mira Mesa Market Center	North	Inside	100	1	0	1	1	0	1	0.06	0.06	0.00	0.06	None	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	None identified	None identified
D 5-8	Carroll Canyon	North	Inside	75	4	4	0	3	3	0	0.01	0.01	0.01	0.00	SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	ERAR, POAB	None identified
			Inside	100	115	115	0	115	115	0	1.17	1.17	1.17	0.00	SDFS, NAFO	0	0	42	42	1	1	65	65	0	0	0	0	5	5		ERAR, POAB	None identified
	Parkdale Carroll Canyon	North	Inside	100	4	4	0	4	4	0	0.02	0.02	0.02	0.00	SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, POAB	None identified
F 16-17	Menlo KM Parcel	Central	Inside	75	14	0	14	11	0	11	0.19	0.14	0.00	0.14	None	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	ERAR, POAB, SDFS	None identified
H 1-10, 13-15, 18-26	Del Mar Mesa (City)	North	Inside	100	92	92	0	92	92	0	0.54	0.54	0.54	0.00	SDFS	0	0	3	3	0	0	49	49	0	0	0	0	8	8	0	ERAR, POAB, SDFS	ERAR, POAB
	Del Mar Mesa (Private)	North	Inside	100	5	0	5	5	0	5	0.26	0.26	0.00	0.26	SDFS	0	0	0	0	0	0	2	2	0	0	0	0	1	1		ERAR, POAB, SDFS	ERAR, POAB
	Del Mar Mesa (State/Federal)	North	Inside	100	246	246	0	246	246	0	4.68	4.68	4.68	0.00	SDFS	0	0	58	58	1	1	124	124	0	0	0	0	16	16		ERAR, POAB, SDFS	ERAR, POAB
	Rhodes	North	Outside	0	6	0	6	0	0	0	0.02	0.00	0.00	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	6	0		ERAR, POAB, SDFS	ERAR, POAB
			Inside	100	134	0	134	134	0	134	0.62	0.62	0.00	0.62	SDFS	0	0	7	7	0	0	6	6	0	0	0	0	2	2	65	ERAR, POAB, SDFS	ERAR, POAB
H 17	Shaw Lorenz	North	Inside	100	28	0	28	28	0	28	0.24	0.24	0.00	0.24	None	0	0	0	0	0	0	0	0	0	0	0	0	8	8	10	None identified	None identified
H 33	East Ocean Air Drive	North	Inside	100	2	0	2	2	0	2	0.03	0.03	0.00	0.03	None	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	ERAR, POAB, SDFS	None identified
H 38	Carmel Mountain	North	Inside	100	64	64	0	64	64	0	0.61	0.61	0.61	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	2	2	9	None identified	None identified
H 39	Greystone Torrey Highlands	North	Inside	100	19	19	0	19	19	0	0.68	0.68	0.68	0.00	None	0	0	5	5	0	0	3	3	0	0	0	0	0	0	0	None identified	None identified
I 1	Arjons	North	Inside	100	34	0	34	34	0	34	0.73	0.73	0.00	0.73	None	0	0	22	22	0	0	15	15	0	0	0	0	1	1	9	None identified	ERAR, POAB
I 12	Pueblo Lands	North	Inside	75	2	2	0	5	2	3	0.05	0.04	0.04	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	None identified	None identified
			Outside	0	5	5	0	0	0	0	0.03	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	1	0		None identified	None identified
I 6 B	Ford Leasing (Bob Baker)	North	Inside	100	8	0	8	8	0	8	0.08	0.08	0.00	0.08	None	0	0	7	7	0	0	0	0	0	0	0	0	3	3	3	None identified	ERAR, POAB
I 6 C	Facilities Development (Eastgate Miramar Associates)	North	Inside	100	15	0	15	15	0	15	0.24	0.24	0.00	0.24	None	0	0	11	11	0	0	2	2	0	0	0	0	6	6	6	None identified	ERAR, POAB
J 11 E	Slump Block Pools	South	Inside	75	2	0	2	2	0	2	0.63	0.47	0.00	0.47	RFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 11 W	J 11 West	South	Inside	75	5	0	5	4	0	4	0.49	0.37	0.00	0.37	RFS	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 12	J 12	South	Inside	75	5	0	5	4	0	4	0.28	0.21	0.00	0.21	SDFS, RFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 13 E		South	Inside	75	2	0	2	2	0	2	0.01	0.01	0.00	0.01	SDFS, RFS	0	0	0	0	0	0	1	1	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified

Table C-3: VPHCP Expanded Conservation Alternative - Conservation of Vernal Pools and Focal Species

Complex ID	Name	Planning Unit	INSIDE or OUTSIDE MHPA	Conservation Level (75% or 100% Conserved)	Total Pools[1]			Total Pools Conserved Inside MHPA *	Pools Conserved on City, USFWS, or CDFW Controlled	Pools Conserved on Other Ownership Land*	Total Surface Area of Pools (Acres)	Surface Area Conserved (Acres)*	Surface Area Conserved on City, USFWS, or CDFW	Surface Area Conserved on Other Ownership Land	Focal Species Critical Habitat Present**	Occupied Focal Species Pools: Total (Inside and Outside MHPA)[1] and Total Conserved in												Complex Identified as Necessary to Stabilize the Following Focal Species	Complex Identified as Necessary to Reclassify the Following Focal Species
					Total	City, USFWS, or CDFW Controlled	Other Ownership									PONU total	PONU Cons	POAB total	POAB Cons	NAFO total	NAFO Cons	ERAR total	ERAR Cons	ORCA total	ORCA Cons	RFS total	RFS Cons	SDFS total	SDFS Cons	UNKN F5 total		
J 13 E	South Otay J 13 East	South	Inside	100	6	0	6	6	0	6	0.05	0.05	0.00	0.05	SDFS, RFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 13 N	NDU 1 & 2	South	Outside	0	13	0	13	0	0	0	0.07	0.00	0.00	0.00	None	0	0	0	0	1	0	2	0	0	0	0	0	13	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	South Otay 1 acre (City)	South	Inside	100	17	17	0	17	17	0	0.22	0.22	0.22	0.00	None	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	South Otay 1 acre (Private)	South	Inside	75	7	0	7	5	5	0	0.02	0.02	0.00	0.02	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 13 S	Bachman	South	Inside	100	2	0	2	2	0	2	0.01	0.01	0.00	0.01	SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	NDU 1 & 2	South	Outside	0	4	0	4	0	0	0	0.21	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	2	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	South Otay J 13 South	South	Inside	75	35	0	35	26	0	26	0.57	0.42	0.00	0.42	None	0	0	0	0	0	0	7	5	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
		South	Outside	0	2	0	2	0	0	0	0.01	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
		South	Inside	100	2	0	2	2	0	2	0.00	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 14	Anderprises (City)	South	Inside	100	2	2	0	2	2	0	0.01	0.01	0.01	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Bachman	South	Inside	75	2	0	2	2	0	2	0.02	0.02	0.00	0.02	RSF, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Brown Field Basins	South	Inside	100	4	4	0	4	4	0	0.83	0.83	0.83	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Cal Terraces (South)	South	Inside	100	73	73	0	73	73	0	1.45	1.45	1.45	0.00	RSF, SDFS, NAFO	63	63	0	0	6	6	55	55	5	5	26	26	32	32	30	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Handler	South	Inside	100	24	0	24	24	0	24	0.07	0.07	0.00	0.07	RSF, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 16-18	Goat Mesa (City)	South	Inside	100	15	15	0	15	15	0	0.34	0.34	0.34	0.00	RFS, SDFS	0	0	0	0	0	0	4	4	0	0	1	1	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Goat Mesa (Private)	South	Inside	75	2	0	2	2	0	2	0.01	0.01	0.00	0.01	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Wruck Canyon	South	Inside	100	6	6	0	6	6	0	0.02	0.02	0.02	0.00	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 2	Cal Terraces (North), Otay Mesa Road Parcels	South	Inside	100	304	304	0	304	304	0	3.53	3.53	3.53	0.00	RFS, SDFS, NAFO	286	286	0	0	79	79	275	275	52	52	93	93	209	209	211	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	Clayton Parcel	South	Inside	100	35	35	0	35	35	0	0.27	0.27	0.27	0.00	RFS, SDFS, NAFO	0	0	0	0	0	0	1	1	0	0	0	0	2	2	11	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
	St. Jerome's	South	Outside	0	6	0	6	0	0	0	0.23	0.00	0.00	0.00	RFS, SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
		South	Inside	100	18	0	18	18	0	18	0.18	0.18	0.00	0.18	RFS, SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	3	3	1	1	5	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified

Table C-3: VPHCP Expanded Conservation Alternative - Conservation of Vernal Pools and Focal Species

Complex ID	Name	Planning Unit	INSIDE or OUTSIDE MHPA	Conservation Level (75% or 100% Conserved)	Total Pools[1]			Total Pools Conserved Inside MHPA *	Pools Conserved on City, USFWS, or CDFW Controlled	Pools Conserved on Other Ownership Land*	Total Surface Area of Pools (Acres)	Surface Area Conserved (Acres)*	Surface Area Conserved on City, USFWS, or CDFW	Surface Area Conserved on Other Ownership Land	Focal Species Critical Habitat Present**	Occupied Focal Species Pools: Total (Inside and Outside MHPA)[1] and Total Conserved in														Complex Identified as Necessary to Stabilize the Following Focal Species	Complex Identified as Necessary to Reclassify the Following Focal Species
					Total	City, USFWS, or CDFW Controlled	Other Ownership									PONU total	PONU Cons	POAB total	POAB Cons	NAFO total	NAFO Cons	ERAR total	ERAR Cons	ORCA total	ORCA Cons	RFS total	RFS Cons	SDFS total	SDFS Cons	UNKN FS total		
J 20-21	La Media ITS	South	Inside	75	33	0	33	25	0	25	1.43	1.07	0.00	1.07	None	0	0	0	0	0	0	0	0	0	0	0	0	6	5	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 21	La Media Swale South	South	Inside	100	7	0	7	7	0	7	0.21	0.21	0.00	0.21	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 27	Empire Center	South	Inside	100	10	0	10	10	0	10	0.23	0.23	0.00	0.23	None	0	0	0	0	0	0	9	9	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 28 E	La Media Swale North	South	Inside	75	5	0	5	4	0	4	0.16	0.12	0.00	0.12	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ERAR, PONU ORCA, NAFO, RFS, SDFS	None identified
J 31	Hidden Trails	South	Inside	100	66	66	0	66	0	66	0.66	0.66	0.66	0.00	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	None identified	None identified
J 32	West Otay A	South	Inside	100	3	0	3	3	0	3	0.01	0.01	0.00	0.01	NAFO	1	1	0	0	0	0	2	2	0	0	0	0	0	0		None identified	None identified
	West Otay B	South	Inside	100	15	15	0	15	15	0	0.06	0.06	0.06	0.00	NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
	West Otay C	South	Inside	100	7	7	0	7	7	0	0.04	0.04	0.04	0.00	NAFO	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	None identified	None identified
J 34	Bachman	South	Inside	75	2	0	2	2	0	2	0.02	0.01	0.00	0.01	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0		None identified	None identified
		South	Inside	75	10	0	10	8	0	8	0.06	0.05	0.00	0.05	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	None identified	None identified
		South	Inside	100	3	0	3	3	0	3	0.01	0.01	0.00	0.01	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0		None identified	None identified
	Candlelight	South	Inside	100	10	0	10	10	0	10	0.08	0.08	0.00	0.08	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	None identified	None identified
J 35	Brown Field	South	Inside	100	3	3	0	3	3	0	0.02	0.02	0.02	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
J 36	Southview	South	Inside	75	7	0	7	5	0	5	0.04	0.03	0.00	0.03	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	None identified	None identified
		South	Inside	100	10	0	10	10	0	10	0.07	0.07	0.00	0.07	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	7	7		None identified	None identified
J 4-5	California Crossing	South	Inside	100	11	0	11	11	0	11	0.09	0.09	0.00	0.09	RFS, SDFS	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	None identified	None identified
	Robinhood Ridge	South	Inside	100	83	83	0	83	83	0	0.56	0.56	0.56	0.00	RFS, SDFS, NAFO	19	19	0	0	4	4	46	46	0	0	6	6	41	41	41	None identified	None identified
K 5	Otay Lakes	Central	Inside	100	85	85	0	85	85	0	3.20	3.20	3.20	0.00	SDFS, NAFO	0	0	0	0	2	2	46	46	0	0	0	0	6	6	6	ERAR, NAFO	None identified
KK 1	Lake Murray	Central	Outside	0	1	1	0	0	0	0	0.02	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
KK 2	Pasatiempo	Central	Inside	100	10	10	0	10	10	0	0.04	0.04	0.04	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
MM 1	Marron Valley	South	Inside	100	18	18	0	18	18	0	0.18	0.18	0.18	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	5	5	3	None identified	None identified
N 1-4	Teledyne Ryan	Central	Inside	75	43	0	43	32	0	32	0.59	0.44	0.00	0.44	None	0	0	1	1	0	0	0	0	0	0	0	0	11	8	0	POAB, NAFO, SDFS	None identified
N 5-6	Montgomery Field[3]	Central	Inside	100	226	226	0	226	226	0	5.46	5.46	5.46	0.00	SDFS, NAFO	0	0	129	129	0	0	0	0	0	0	0	0	10	10	18	POAB, NAFO, SDFS	None identified
		Central	Inside	100	23	23	0	23	23	0	0.98	0.98	0.98	0.00	SDFS, NAFO	0	0	0	0	0	0	0	0	0	0	0	0	0	0		POAB, NAFO, SDFS	None identified
N 7	Serra Mesa Library	Central	Inside	100	26	26	0	26	26	0	0.41	0.41	0.41	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
N 8	General Dynamics	Central	Inside	100	22	22	0	22	0	22	0.40	0.40	0.40	0.00	None	0	0	20	20	0	0	2	2	0	0	0	0	6	6	6	None identified	None identified
NC	Li Collins	South	Inside	100	2	0	2	2	2	0	0.04	0.04	0.00	0.04	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
	Kelton	North	Inside	100	3	3	0	3	0	3	0.02	0.02	0.02	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
OO	Salk Institute	North	Inside	100	15	0	15	15	0	15	0.09	0.09	0.00	0.09	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
Q2	Mission Trails Regional Park	Central	Inside	100	17	17	0	17	17	0	0.25	0.25	0.25	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	6	6	6	None identified	None identified

Table C-3: VPHCP Expanded Conservation Alternative - Conservation of Vernal Pools and Focal Species

Complex ID	Name	Planning Unit	INSIDE or OUTSIDE MHPA	Conservation Level (75% or 100% Conserved)	Total Pools[1]			Total Pools Conserved Inside MHPA *	Pools Conserved on City, USFWS, or CDFW Controlled	Pools Conserved on Other Ownership Land*	Total Surface Area of Pools (Acres)	Surface Area Conserved (Acres)*	Surface Area Conserved on City, USFWS, or CDFW	Surface Area Conserved on Other Ownership Land	Focal Species Critical Habitat Present**	Occupied Focal Species Pools: Total (Inside and Outside MHPA)[1] and Total Conserved in												Complex Identified as Necessary to Stabilize the Following Focal Species	Complex Identified as Necessary to Reclassify the Following Focal Species
					Total	City, USFWS, or CDFW Controlled	Other Ownership									PONU total	PONU Cons	POAB total	POAB Cons	NAFO total	NAFO Cons	ERAR total	ERAR Cons	ORCA total	ORCA Cons	RFS total	RFS Cons	SDFS total	SDFS Cons	UNKN FS total		
Q 3	Castlerock	North	Inside	100	5	0	5	5	0	5	0.02	0.02	0.00	0.02	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
		North	Outside	0	4	0	4	0	0	0	0.02	0.00	0.00	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	4	0		None identified	None identified
QQ	Tecolote Canyon	Central	Inside	100	9	9	0	9	9	0	0.09	0.09	0.09	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	None identified	None identified
R 1	Proctor Valley	South	Inside	100	124	124	0	124	124	0	1.40	1.40	1.40	0.00	NAFO	0	0	0	0	0	0	0	0	0	0	0	0	3	3	10	ERAR, NAFO	None identified
U 15	SANDER	Central	Outside	0	1	1	0	0	0	0	0.34	0.00	0.00	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0		None identified	ERAR, POAB, ORCA, SDFS
		Central	Inside	75	38	38	0	29	29	0	0.49	0.37	0.37	0.00	SDFS	0	0	1	1	0	0	0	0	0	0	0	0	2	2	2	None identified	ERAR, POAB, ORCA, SDFS
U 19	Cubic	Central	Outside	0	6	0	6	0	0	0	0.08	0.00	0.00	0.00	SDFS	0	0	0	0	0	0	0	0	0	0	0	0	1	0	6	None identified	ERAR, POAB, ORCA, SDFS
		Central	Inside	75	23	0	23	17	0	17	0.37	0.28	0.00	0.28	SDFS	0	0	1	1	0	0	2	2	0	0	0	0	6	5		None identified	ERAR, POAB, ORCA, SDFS
X 5	Nobel Drive	North	Inside	100	11	11	0	11	11	0	0.10	0.10	0.10	0.00	NAFO	0	0	0	0	1	1	0	0	0	0	0	0	6	6	6	SDFS	None identified
X 7	Nobel Research	North	Inside	100	28	28	0	28	0	28	0.10	0.10	0.10	0.00	None	0	0	0	0	0	0	0	0	0	0	0	0	1	1	9	None identified	None identified
		Total Inside and Outsite Preserve[1]			**2,488**	**1,841**	**647**				**39.8**				**Total[1]**	**369**	-	**339**	-	**96**	-	**733**	-	**58**	-	**131**	-	**488**	-			
		Total Inside Preserve[1]			**2,440**	**1,834**	**606**	**2,387**	**1,712**	**675**	**38.8**	**37.4**	**29.4**	**8.0**	**Total Inside Preserve[1]**	**369**		**339**		**95**		**729**		**58**		**131**		**454**	**507**			
															% Occupied Pools Conserved[1]	**100%**		**100%**		**99%**		**99%**		**100%**		**100%**		**93%**				

= Land not owned by City of San Diego.

*= Based on Conservation Level, conservation of vernal pools rounded up to the nearest whole number

**= Critical habitat is designated by USFWS for San Diego fairy shrimp (SDFS) and spreading navarretia (NAFO), and proposed for Riverside fairy shrimp (RFS).

[1]On Land Subject to City Jurisdiction

[2]Based on Recovery Plan (USFWS 1998)

[2]Montgomery Field will be subject a management and monitoring plan per the USFWS BO No.1-6-94-F-32

PONU = Otay Mesa mint; POAB = San Diego Mesa mint; NAFO = Spreading navarretia; ERAR = San Diego button-celery; ORCA = California Orcutt grass; RFS = Riverside fairy shrimp; SDFS = San Diego fairy shrimp

APPENDIX D

VERNAL POOL COMPLEX MANAGEMENT LEVELS *(TABLE D-1)*

AND

VERNAL POOL MANAGEMENT AND MONITORING PLAN *(TO BE PROVIDED)*

Appendix D-1 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 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	Level 1
B 5	Tierra Alta	North	Inside	0	0	0	0	0	0	1	Private	Level 1	Level 1
B 6	***Lopez Ridge (CDFG)***	***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	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	Inside	0	0	0	0	0	0	0	Private	None	$Level\ 1_1$
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
	Del Mar Mesa (State/Federal)	***North***	***Outside***	***0***	***58***	***1***	***124***	***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	Level 1
H 33	East Ocean Air Drive	North	Inside	0	0	0	2	0	0	0	Private	None	$Level\ 1_2$
	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	Level 1
I 1	Arjons	North	Inside	0	22	0	15	0	0	1	Private	None	$None_2$
I 12	Pueblo Lands	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
I 6 C	Facilities Development (Eastgate Miramar Associates)	North	Inside	0	11	0	2	0	0	6	Private	None	None
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	$None_1$	$Level\ 3_1$
J 14	***Anderprises (Caltrans)***	***South***	***Outside***	***1***	***0***	***1***	***0***	***0***	***3***	***4***	***State***	***SSRP***	***N/A***
	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	$None_4$
	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	$Level\ 3_1$
J 15	***Arnie's Point***	***South***	***Outside***	***15***	***0***	***10***	***61***	***3***	***30***	***56***	***Federal***	***SSMP***	***N/A***
J 16-18	Goat Mesa (City)	South	Inside	0	0	0	4	0	1	0	City	Level 1	Level 1
	Goat Mesa (Federal)	***South***	***Outside***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***Federal***	***None***	***None***
	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	$Level\ 3_2$
J 28 E	La Media Swale North	South	Inside	0	0	0	0	0	0	0	Private	None	$Level\ 3_1$
J 29	***Lonestar W (Caltrans)***	***South***	***Outside***	***0***	***0***	***0***	***7***	***0***	***1***	***4***	***State***	***SSMP***	***N/A***
J3	***J3***	***South***	***Outside***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***State***	***None***	***N/A***
J 30	***Lonestar E (Caltrans)***	***South***	***Outside***	***0***	***0***	***0***	***0***	***0***	***35***	***50***	***State***	***SSMP***	***N/A***
	Lonestar E (Private)	**South**	Outside	**1**	**0**	**0**	**32**	**0**	**0**	**0**	**Private**	**SSMP**	**N/A**
J 31	***Dennery West***	***South***	***Outside***	***0***	***0***	***0***	***0***	***0***	***10***	***38***	***State***	***SSMP***	***N/A***
	Hidden Trails	South	Inside	0	0	0	0	0	0	1	City	Level 1	Level 1
J 32	***West Otay A (State)***	***South***	***Outside***	***7***	***0***	***3***	***1***	***0***	***1***	***8***	***State***	***SSRP***	***N/A***
	West Otay A (Private)	***South***	***Inside***	***1***	***0***	***0***	***2***	***0***	***0***	***0***	***Private***	***None***	***Level 1 $_2$***
	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	***Sweetwater High School***	***South***	***Outside***	***5***	***0***	***3***	***2***	***0***	***3***	***8***	***School District***	***SSRP***	***N/A***
J 34	Bachman	South	Inside	0	0	0	0	0	0	1	Private	$None_1$	$Level\ 3_1$
	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	$None_4$
J 36	Southview	South	Inside	0	0	0	0	0	0	12	Private	None	$Level\ 3_1$
J 4-5	California Crossing	South	Inside	0	0	0	0	0	0	5	Private	None (reporting)	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
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	10	City	Level 1	$Level\ 1_4$

Appendix D-1 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 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			
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	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	SSRP	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	4	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	7	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	Level 1

SSRP= Site-specific restoration plan

1= These sites may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the 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.

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

4= Brown Field and Montgomery Field are conserved under separate permits. Refer to VPHCP Chapter 4 for more information.

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 withdevelopment under VPHCP.
Green	Private, conserved pre-MSCP, so no management required.
Blue	Public and conserved. No management requiredand none recommended.
Gray	Private and conserved. No management requiredand none recommended.
Red	Outside VCHCP (Not a Part)

APPENDIX E

CITY OF SAN DIEGO LAND DEVELOPMENT CODE BIOLOGY GUIDELINES FOR ENVIRONMENTALLY SENSITIVE LANDS

(TO BE PROVIDED)

APPENDIX F

COST ANALYSIS

APPENDIX F
CITY OF SAN DIEGO VPHCP COST ANALYSIS

COST ANALYSIS OVERVIEW

The VPMMP is the management framework for the VPHCP. The VPMMP identifies three levels of monitoring and management, with the level of effort (and therefore cost) required to conserve and protect populations of the seven focal species under the VPHCP increasing from Level 1 (Stewardship) to Level 3 (Restoration). General annual costs are estimated for the required monitoring and management actions at each VPMMP level. Those general costs for each level are then used to determine various categories of VPMMP implementation costs under the VPHCP. Other costs for VPMMP implementation (including as initial baseline hydrological surveys, data tracking/reporting, and costs for changed circumstances) and an annual contingency are also estimated. The various VPMMP implementation costs for are then compared to the costs for management under the Baseline.

Other potential "as-needed" costs associated with implementation of certain activities identified in the VPMMP, which may not be necessary for all complexes, are also provided for consideration by the City.

The following tables are included at the end of the cost evaluation:

- Table F-1: Level 1 Monitoring and Management Costs
- Table F-2: Level 2 Monitoring and Management Costs
- Table F-3: Level 3 Monitoring and Management Costs
- Table F-4: Other One-Time (Mandatory) and Potential As-Needed (Optional) Costs for VPHCP Monitoring and Management
- Table F-5: City of San Diego VPHCP Monitoring and Management Comprehensive Cost Estimate by Complex
- Table F-6: Summary of One-Time Costs for VPHCP Monitoring and Management by Complex (2014 Dollars)
- Table F-7: Summary of Annual Ongoing Costs for VPHCP Monitoring and Management by Complex (2014 Dollars)
- Table F-7: Summary of Total Costs for VPHCP Monitoring and Management by Complex (2014 Dollars)
- Table F-9: Weed Control Cost Estimate Detail

- Table F-10: City and Consultant Staff 2014 Rates
- Table F-11: Cost Estimate for Changed Circumstances
- Table F-12: Fence and Sign Installation Cost Assumptions
- Table F-13: Baseline Monitoring and Management Comprehensive Cost Estimate by Complex

The cost analysis is directly linked to the monitoring and management activities detailed in Chapter 7 of the VPHCP, as well as the complex-specific management framework in the VPMMP. If any changes are made to the monitoring and/or management methods outlined in the VPHCP and/or VPMMP, then the costs analysis may need to be revised accordingly.

While implementation costs have been generated for each vernal pool complex managed under the VPHCP, the costs have been generated based on broad, program-level assumptions. For example, some estimated costs were developed using Preserve-wide assumptions based on average complex size, average occurrence of vernal pool focal species, average number of vernal pools within a complex, etc. These assumptions are summarized in the following sections and described in further detail in the attached tables. The purpose of this cost analysis is to identify a program-level cost for implementation of the overall VPHCP management and monitoring program so that the City can target appropriate funding sources. At a site-specific level, some sites may require more funding and some may require less. Site-specific costs should be reevaluated if and when management and monitoring is implemented at a specific site. Costs can and should be tailored to reflect specific management and monitoring needs identified for a complex beyond what is assumed in this program-level cost analysis.

COST ASSUMPTIONS BY MANAGEMENT LEVEL

Tables F-1 through F-3 provides a cost estimate for the required activities associated with each monitoring and management level, as defined in the VPMMP (Table F-1 for Level 1, Table F-2 for Level 2, and Table F-3 for Level 3). Detailed assumptions for each activity associated with a level are provided in Tables F-1 through F-3. Overall assumptions for developing costs for each level are provided below:

- Estimated costs are in 2014 dollars. Escalation is not factored into the cost estimate, but will be factored in by the City when determining funding needs and sources for the VPHCP program.
- Cost estimates are generalized based on AECOM's previous experience and agency input (City, SANDAG Service Bureau, the U.S. Fish and Wildlife Service [USFWS], and the

California Department of Fish and Wildlife [CDFW]) on overseeing and implementing monitoring and management of vernal pools in the San Diego region over the past 15 years.

- Adequate access protection (e.g., fencing, signage) is in place or will be installed at each complex prior to implementation of other management activities. One-time costs for fence and sign installation (where needed, based on City input), as well as repair and replacement costs (assumed under each management level), are included. Site patrol/enforcement is assumed under Level 1 as part of annual ongoing Stewardship costs.

- Management and monitoring activities will be performed by either City staff or Consultants depending on the level and type of activity. In general, Level 1 activities will be performed by City staff. Note that Level 1 management activities (trash removal, access control maintenance, edge effect repair) are also performed under Levels 2 and 3 by City staff. It is assumed that Level 2 monitoring activities will be performed by City staff, while Level 2 management will be performed by Consultant staff. It is assumed that Level 3 monitoring and maintenance activities will be performed by Consultant staff.

- City and Consultant biologists performing monitoring and management activities will have the appropriate permits to work with the focal species and have a minimum of 3 years of local field experience with vernal pool vegetation, fauna, hydrology, and soils.

- Weed control costs for focal species vernal pools were extrapolated based on the average size of vernal pools with focal species within the MHPA (0.018 acre). The area of weed control per pool was derived using a basin-to-watershed ratio of approximately 1:5 for Level 2 Weed Control (20-foot buffer treated around each pool) and approximately 1:10 for Level 3 Weed Control (35-foot buffer treated around each pool). Weed control costs for focal species vernal pool include labor plus other direct costs such as field vehicle rental, fuel, herbicide, and equipment. A separate line item is included in each management level for general weed control of the upland watershed and non-focal-species vernal pools. Table F-6 provides more detail on weed control cost estimates.

- For cost estimating purposes, Consultant rates are based on typical contracted audited rates for SANDAG Service Bureau Consultant staff. City staff costs are based on 2014 rates provided by the City. Other direct costs (fringe, overhead) and travel (vehicle use and fuel) are assumed in the fully loaded staff rates. Details on City and Consultant rates are provided in Table F-7.

OTHER ONE-TIME AND POTENTIAL AS-NEEDED COSTS

Table F-4 includes other on-time costs that are mandatory for VPMMP implementation, as well as potential as-needed costs that are optional.

One-time mandatory costs involve a baseline hydrological survey to measure maximum basin depth and watershed connectivity (based on assessment methods identified under the Hydrogeomorphic [HGM] Approach [Bauder et al. 2009]) for every vernal pool within the MHPA that will be managed under the VPHCP (regardless of management and monitoring level), including lands under City control and lands under other ownership. The baseline hydrological data will be used during VPMMP Level 2 and 3 monitoring to evaluate changes in vernal pool water storage and hydrological connectivity. All complexes need baseline hydrological data collected, in the event that a Level 1 complex declines to Level 2 or 3, at which point comparisons to baseline hydrological data would be required. The cost for this one-time survey is detailed in Table F-4 (broken down between City-controlled and other lands), and is incorporated into the cost of VPMMP implementation (Tables A-5 through A-7). It is assumed that this baseline hydrological survey will be performed during the first 5 years of VPMMP implementation. It is assumed that baseline hydrological data collection for Level 2 and 3 complexes is required to be funded under the VPHCP. It is recommended that baseline hydrological data collection for Level 1 complexes be funded via an outside funding source (e.g., a grant).

Optional costs for Levels 1, 2, and 3, such as site-specific restoration plans and topographic restoration, are not included as part of the total implementation cost for the VPMMP levels because not all complexes, if any, will require the as-needed activities. These costs are provided in Table F-4 for reference if and when VPMMP monitoring indicates the need for these activities (as determined by the City). If a complex changes management level, the City can choose to add these activities, as needed. It is assumed that funding for as-needed activities would come from the annual contingency fund, at the discretion of the City.

VPMMP IMPLEMENTATION COSTS

Cost Analysis Methodology

The estimated cost for the three monitoring and management levels was used to determine a total cost of implementation of the VPMMP at each complex in the MHPA that will be managed under the VPHCP over the life of the Permit (31 years). Costs differ at each complex based on the number of vernal pools with focal species, level of effort associated with assigned monitoring

and management level (Levels 1, 2, and 3), and type of staff performing the monitoring and management (City or Consultant). Table F-5 provides various types (based on land ownership) and phases (one-time versus ongoing) of VPMMP implementation costs by complex, as follows:

- The total one-time cost to implement enhancement (Level 2) and restoration (Level 3 or Site-Specific Management Plan) for each complex within the MHPA that will be managed under the VPHCP, regardless of land ownership and management responsibility. The following assumptions were made about the time-frame for one-time monitoring and maintenance costs for these specific VPMMP levels:
    - Level 3 (Restoration) maintenance and monitoring would last 5 years. Each complex at Level 3 is assumed to be stabilized following the 5-year period and will be elevated to Level 1 (Stewardship) status.
    - Level 2 (Enhancement) maintenance and monitoring would last 3 years. Each complex at Level 2 is assumed to be stabilized following 3 years, and will then be elevated to Level 1 (Stewardship) status.
- The City's one-time cost to implement enhancement (Level 2) and restoration (Level 3 or Site-Specific Management Plan) for each complex within the MHPA that will be managed under the VPHCP.
- The total annual ongoing cost for Level 1 (Stewardship) monitoring and management at each complex within the MHPA that will be managed under the VPHCP, regardless of land ownership and management responsibility.
- The total annual ongoing cost for Level 1 (Stewardship) monitoring and management at each complex (or portion of a complex) on City-controlled land within the MHPA.
- The total cost for the VPMMP recommended (based on input from the City and resource agencies) monitoring and management level for each complex within the MHPA that will be managed under the VPHCP (ranges from Level 1 to Level 3, or may include Site-Specific Actions), regardless of land ownership and management responsibility. The recommended level is not required to be implemented under the VPHCP, but is provided for consideration should additional funding become available in the future. Not all complexes have a recommended monitoring and management level.
- The City's potential cost for the VPMMP recommended monitoring and management level at each complex (or portion of a complex) on City-controlled land within the MHPA, should additional funding become available.

- The total cost for VPMMP implementation over the 31-year life of the Project (in 2014 dollars, not adjusted for inflation), regardless of land ownership and management responsibility, including the one-time required costs, annual ongoing costs, reporting, changed circumstances, and contingency.
- The City's total cost for VPMMP implementation for complexes on City-controlled land within the MHPA over the 31-year life of the Project, including the one-time required costs, annual ongoing costs, reporting, changed circumstances, and contingency.

Note that certain complexes do not have a required monitoring and management level in the VPMMP (noted as "None" in Table F-5). Some complexes do not have focal species and do not warrant monitoring and management, as agreed upon by the City, SANDAG Service Bureau, USFWS, and CDFW. Some complexes are privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure that the property owner implements the Recommended Management activities as appropriate for the level of mitigation outlined in the VPMMP. Other complexes that are not under City control have been developed pursuant to prior approval by the City of San Diego. 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 Additional Recommended Management activities.

Certain complexes may also have Site-Specific Management Plans (SSMP), instead of a required monitoring and management level. SSMPs are existing or future resource agency-approved plans that guide monitoring and management activities for the complex. For cost estimating purposes, it is assumed that costs for implementation of an SSMP are comparable to a Level 3 monitoring and management level. No additional requirements on the landowner will added to complexes with an approved SSMP with adoption of the VPHCP if the land is retained by the landowner. In some cases, privately owned complexes with an SSMP have a recommended monitoring and management level in the event that the City gains control of the land. If lands are deeded to the City, appropriate funding will be provided to the City by the landowner and will be placed in a site-special special account. For resource agency-approved mitigation projects, it is assumed that, after 5 years of Level 3 maintenance and monitoring, the site will be elevated to Level 1 (at which point the monitoring and management costs would be reduced accordingly), and maintained at that level in perpetuity.

In addition to management and monitoring activities, it is assumed that City staff time will be required for data tracking, analysis, and reporting. City staff will also need to coordinate with private landowners and managers regarding VPMMP required activities, including obtaining

required data and reporting information for focal species vernal pools on private land. The cost estimate assumes an average time commitment of one day a week for a City biologist (Biologist III) for this effort, which is included as an individual line item in Table F-5. This task may also be performed by a Senior Planner which has a similar pay rate so the cost estimate would be the essentially the same.

The program-level cost calculation methodology allows the City the flexibility to adjust complex-specific costs as adaptive management and monitoring decisions are made in the future. If, through management and monitoring (as detailed in the VPMMP), it is determined that the management level for a complex must be elevated or lowered, the City can adjust the cost estimate for that particular complex using the management and monitoring level-specific costs in Tables A-1 through A-3. Costs can and should be tailored to reflect specific management and monitoring needs identified for a complex.

The cost analysis summarizes the one-time and annual ongoing Project costs, as well as the total costs for the 31-year life of the Project. After the initial 3-year period for Level 2 complexes and 5-year period for Level 3 or SSMP complexes, all complexes are assumed to be maintained at Level 1.

The total cost for VPMMP implementation was generated based on the total of the one-time costs for the VPMMP-required monitoring and management level (Level 2, Level 3, or SSMP complexes) plus annual ongoing Level 1 costs for all complexes.

Cost assumptions for contingency and changed circumstances are described below.

Annual Contingency Fund

Annual ongoing costs assume that all complexes will be maintained at Level 1 monitoring and maintenance (after initial Level 2 and 3 complexes are elevated to Level 1 status). However, over time it is realistic to anticipate that some complexes may decline to Level 2 or Level 3. In addition, it is possible that unanticipated costs may result from unexpected activities, such as illegal grading. Therefore, it is prudent for the City to include an annual contingency amount to account for potential additional monitoring and maintenance costs associated with a decline in a complex's management level (i.e., the difference between Level 1 and Level 2 or Level 3 costs).

To determine an appropriate annual contingency, it is assumed that, on average each year during the 31-year life of the VPHCP permit, either two average-sized complexes will be at Level 2 *or* one average-sized complex will be at Level 3. To estimate the contingency amount, the average

Level 2 and Level 3 costs were determined using the average number of vernal pools with focal plant species (13 pools) and shrimp species (three pools) for each complex within the MHPA that will be managed under the VPHCP. The average annual cost associated with this assumption is approximately $44,148. The average annual cost associated with Level l is $14,211. Therefore, an annual contingency of $29,937 ($44,148 minus $14,211 for the ongoing Level 1 costs) is appropriate to account for additional costs associated with complexes declining from Level 1.

Site conditions and monitoring and management requirements will vary among sites and between years depending on a variety of factors, such as rainfall patterns, changes to the surrounding environment, and success of management techniques. Estimated costs are averages and may fluctuate between years of Project implementation. Unexpended Project funds (including the contingency) would be available for use in future years. For example, unexpended funds could be used to address Planned Responses to Changed Circumstances (refer to VPHCP Chapter 9) that result in a change in management level, such as weed invasion or vandalism.

Changed Circumstances

Separate from the contingency, additional costs may be associated with Changed Circumstances that necessitate Planned Responses (i.e., additional mitigation, management, maintenance, and/or monitoring beyond what is identified in the VPMMP; see VPHCP Chapter 9). Based on guidance from USFWS, two specific categories of changed circumstances are included in this cost analysis: post-fire management and enhancement fairy shrimp management to address a decline in fairy shrimp density. Cost assumptions are summarized, including average annual cost and total cost for the 31-year life of the Project. More detail is provided in Table F-11. Costs associated with other Changed Circumstances, including weed invasion, vandalism, and climate change, are assumed to be covered by the annual contingency fund (discussed above) because the Planned Responses relate more specifically to a change in management level.

While the likelihood of occurrence and magnitude of subsequent effects of these circumstances are highly unknown, an estimated level of effort (and associated costs) is provided for consideration. Activities and assumptions associated with the changed circumstances categories are discussed below.

Post-Fire Management

For this cost analysis, it is assumed that a catastrophic fire will burn two average-size complexes (50 vernal pools) once every 10 years. Burned complexes will require limited Level 3 management and monitoring to recover (5 years). Management activities to restore burned

complexes will involve general maintenance (trash removal, access control, etc.); weed control in vernal pools and the upland watershed; and seed collection, bulking, and dispersal. Monitoring will involve quantitative observations and Level 3 quantitative monitoring for focal plant species to monitor re-seeding success for all vernal pools in a complex and focal shrimp species pools (based on pre-fire conditions). It is assumed that, following 5 years of post-fire restoration, a burned complex will be elevated to Level 1 monitoring and management. Costs associated with post-fire management are the difference between Level 1 and Level 3 for the 5-year post-fire restoration period.

Enhanced Fairy Shrimp Management

Fairy shrimp (San Diego or Riverside) population decline is another unforeseen circumstance that may arise due to possible hybridization with versatile fairy shrimp or other yet-to-be determined causes. It is possible that, based on direction from USFWS, the City may be required to implement an enhanced level of effort for management of San Diego and/or Riverside fairy shrimp should a population decline occur. In a good-faith effort to address potential enhanced fairy shrimp management, a cost estimate was developed based on a possible fairy shrimp cyst bulking program. A cyst bank bulking inoculation program could potentially be implemented to address fairy shrimp population issues. Fairy shrimp cyst bank bulking is experimental in design and implementation, and should only be conducted upon approval by USFWS and under the direct supervision of a qualified biologist with permits for handling endangered fairy shrimp species. The guidelines discussed below should be considered.

To implement a cyst banking/inoculation program, cyst-rich soil could be collected from pools known to be occupied by San Diego or Riverside fairy shrimp (and ideally free of versatile fairy shrimp). Soil would be taken to a lab, placed in artificial basins (plastic pools or tubes), and inundated for at least 4 weeks to hatch the fairy shrimp and other crustacean species. A reverse osmosis system would be used to remove minerals and chemicals (chlorine) from the water.

Mature fairy shrimp and other crustacean species would be identified and placed in smaller containers for egg and cyst collection. It is difficult to identify the species of adult male fairy shrimp without the use of magnification, which usually requires the shrimp to be euthanized before identification. However, females can be identified accurately without magnification. To ensure that San Diego and Riverside fairy shrimp are the only shrimp species being collected, only adult females that have bred and developed cyst sacs would be placed in the collection containers.

Fairy shrimp and other crustacean species would drop their eggs and cysts into a sterile medium in the collection containers. Once the adult crustacean species reproduce and completed their life cycle, the collection containers would be dried so that the sand rich with eggs and cysts can be collected and stored.

Soil rich with San Diego and/or Riverside fairy shrimp cysts could be used to inoculate pools and enhance or reestablish populations. Pools could also be saturated with San Diego and/or Riverside fairy shrimp cysts to possibly outcompete versatile fairy shrimp and prevent hybridization. These methods have not been tested, and would only be conducted under the direction and supervision of USFWS.

COST EVALUATION TABLES

Table F-1: Level 1 Monitoring and Management Costs

Task	Assumptions	Staff	Title	Loaded Rate	Hours	Unit	Timing	Annual Cost per Unit
MONITORING LEVEL 1								
Qualitative Visits	2 hour per complex, including travel time	City	Bio III	$88	2	Complex	Annual	$176
Quantitative Floral Focal Species Surveys	0.5 hour per pool; survey 10% of pools with each focal species; if complex has <10 pools for each focal species, survey at least 1 pool for each focal species known to occur	City	Bio III	$88	0.5	Pool (subsample)	Annual	$44
Quantitative Shrimp Focal Shrimp Species Surveys	Dry season shrimp cyst sampling for pools with shrimp, up to 10 pools or 5% of pools, whichever is greater; sampling once every 3 years; includes genetic lab time for analyzing shrimp	Consultant	n/a	$860 per pool	n/a	Pool (subsample)	Once every 3 years	$287
Ponding Verification	4 hours per complex (includes 3 visits during wet season, one assumed to overlap with qualitative visit)	City	Bio I	$61	4	Complex	Annual	$246
MANAGEMENT LEVEL 1								
Patrol/Enforcement	Patrol and enforcement of site access throughout the year as part of stewardship (Average once per month, 4 hrs per visit including travel time. Note some complexes may not be visited every month and others may be visited bi-weekly or weekly)	City	Ranger	$60	4	Complex	Ranges (Average Monthly)	$2,873
Trash and Debris Removal	Performed in conjunction with other visits	City	GMM or Ranger[1]	$67	16	Complex	Annual	$1,074
Access Control Maintenance	Repair and maintenance of previously installed access control (e.g., fencing and signs). Material costs are included in the per unit cost (assume $100 per complex).	City	GMM or Ranger+ Fence/Sign Cost	$67	8	Complex	Annual	$637
Edge Effect Repair	Irrigation control, erosion control, etc.	City	GMM or Ranger[1]	$67	4	Complex	Annual	$269
General Weed Control Level 1	Two visits per spring (2 staff) for general upland watershed area and non-focal species vernal pools	City	PA	$56	32	Complex	Annual	$1,789
Focal Vernal Pool Weed Control Level 1	Two visits per spring (1 staff) of targeted control of invasives in vernal pools with focal species	City	PA + Herbicide	$67	16	Complex	Annual	$1,066
Maintenance Oversight	Average of two 2 hour oversight visits/field coordination efforts per year	City	Snr Plnr	$91	4	Complex	Annual	$366

Notes: Level 1 activities apply to pools with focal species unless otherwise noted. Rates are rounded and detailed in Table A-7.

[1] For cost estimating purposes, the City GMM and Ranger rates are averaged

Summary Costs:	
Annual Cost for Complex-Wide Activities	**$8,495**
Annual Cost for Each Floral Focal Species Pool in Subsample	**$44**
Annual Cost for Each Shrimp Focal Species Pool in Subsample	**$287**

Table F-2: Level 2 Monitoring and Management Costs

Task	Assumptions	Staff	Title	Loaded Rate	Hours	Unit	Timing	Annual Cost per Unit
MONITORING LEVEL 2								
Qualitative Visits	2 hour per complex, including travel time	City	Bio III	$88	1.5	Complex	Annual	$132
Quantitative Floral Focal Species Surveys	0.5 hour per pool. Survey all pools with focal species	City	Bio III	$88	0.5	Pool	Annual	$44
Quantitative Shrimp Focal Shrimp Species Surveys	Dry season shrimp cyst sampling for pools with shrimp, up to 10 pools or 10% of pools, whichever is greater; sampling once every 3 years; includes genetic lab time for analyzing shrimp	Consultant	n/a	$860 per pool	n/a	Pool (subsample)	Once every 3 years	$287
Ponding Verification	4 hours per complex (includes 3 visits during wet season, one assumed to overlap with qualitative visit)	City	Bio I	$61	4	Complex	Annual	$246
MANAGEMENT LEVEL 2								
Trash and Debris Removal	Performed in conjunction with other visits	City	GMM or Ranger[1]	$67	16	Complex	Annual	$1,074
Access Control Maintenance	Repair and maintenance of previously installed access control (e.g., fencing and signs). Material costs are included in the per unit cost (assume $200 per complex).	City	GMM or Ranger + Fence/Sign	$67	8	Complex	Annual	$737
Edge Effect Repair	Irrigation control, erosion control, etc.	City	GMM or Ranger[1]	$67	4	Complex	Annual	$269
Maintenance Oversight	Assume average of 16 hours per complex annually (4 visits)	Consultant	Snr Bio	$179	16	Complex	Annual	$2,868
Dethatching	One time in pools with focal species and 20-foot buffer	Consultant	Crew	n/a	n/a	Pool	Annual	$277
General Weed Control Level 2	Three visits per spring (2 staff) for general upland watershed area and non-focal species vernal pools	Consultant	Crew + Herbicide	$71	48	Complex	Annual	$3,399
Focal Vernal Pool Weed Control Level 2	Two visits per spring (4 staff) and 20-foot buffer around focal species pools only	Consultant	Crew	n/a	n/a	Pool	Annual	$231
Seed Collection	Hand collection from pools with focal species	Consultant	Bio I	$104	0.5	Pool	Annual	$52
Seed Bulking	One greenhouse generation; 50 plants per pool with focal species	Consultant	n/a	$7.50 per plant	n/a	Pool	Annual	$375
Seed Dispersal	Hand broadcast in pools with focal species	Consultant	Crew	$65	0.25	Pool	Annual	$16
Shrimp Cyst Soil Collection	Performed by permitted biologist	Consultant	Bio I	$104	0.5	Pool	Annual	$52
Shrimp Cyst Soil Dispersal	Performed by permitted biologist	Consultant	Bio I	$104	0.25	Pool	Annual	$26
Topographic Repair	10 pools per day, including 8 hrs operator plus 8 hrs senior biologist, including maximum depth survey.	Consultant	Crew	$65	8	Pool	Annual	$102
			Snr Bio	$179	8	Pool	Annual	$143

Notes: Level 2 activities apply to pools with focal species unless otherwise noted. Rates are rounded and detailed in Table A-7.

Summary Costs:	
Annual Cost for Complex-Wide Activities	**$8,724**
Annual Cost for Each Floral Focal Species Pool in Subsample	**$995**
Annual Cost for Each Shrimp Focal Species Pool in Subsample	**$365**
Topographic Repair	**$245**

Note: Annual costs for Level 2 are assumed over a 3 year period

Table F-3: Level 3 Monitoring and Management Costs

Task	Assumptions	Staff	Title	Loaded Rate	Hours	Unit	Timing	Annual Cost per Unit
MONITORING LEVEL 3								
Qualitative Visits	2 hour per complex, including travel time	Consultant	Bio I	$104	1.5	Complex	Annual	$156
Quantitative Floral Focal Species Surveys	0.5 hour per pool; survey all pools with focal species	Consultant	Bio I	$104	0.5	Pool	Annual	$52
Quantitative Shrimp Focal Shrimp Species Surveys	Dry season shrimp cyst sampling for pools with shrimp, up to 10 pools or 20% of pools, whichever is greater; sampling once every 3 years; includes genetic lab time for analyzing shrimp	Consultant	n/a	$860 per pool	n/a	Pool (subsample)	Once every 3 years	$172
Ponding Verification	4 hours per complex (includes 3 visits during wet season, one assumed to overlap with qualitative visit)	Consultant	Bio I	$104	4	Complex	Annual	$417
MANAGEMENT LEVEL 3								
Trash and Debris Removal	Performed in conjunction with other visits	City	GMM or Ranger[1]	$67	16	Complex	Annual	$1,074
Access Control Maintenance	Repair and maintenance of previously installed access control (e.g., fencing and signs). Material costs are included in the per unit cost (assume $200 per complex).	City	GMM or Ranger + Fence/Sign Cost	$67	8	Complex	Annual	$737
Edge Effect Repair	Irrigation control, erosion control, etc.	City	GMM or Ranger[1]	$67	4	Complex	Annual	$269
Maintenance Oversight	Assume 32 hours per complex annually (8 visits)	Consultant	Snr Bio	$179	32	Complex	Annual	$5,736
Dethatching	One time in pools with focal species and 35-foot buffer	Consultant	Crew	$65	n/a	Pool	Annual	$558
General Weed Control	Four visits per spring (2 staff) in general upland watershed and non-focal species vernal pools	Consultant	Crew + Herbicide	$71	64	Complex	Annual	$4,532
Focal Vernal Pool Weed Control Level 3	Four visits per spring (4 staff) and 35-foot buffer around pools with focal species only	Consultant	Crew	$65	n/a	Pool	Annual	$744
Seed Collection	Hand collection from pools with focal species	Consultant	Bio I	$104	1	Pool	Annual	$104
Seed Bulking	One greenhouse generation; 50 plants per pool with focal species	Consultant	n/a	$7.50 per plant	n/a	Pool	Annual	$375
Seed Dispersal	Hand broadcast in pools with focal species	Consultant	Crew	$65	0.5	Pool	Annual	$32
Container Plant Installation	Plants are directly planted into the site	Consultant	Crew	$65	4	Pool	Annual	$258
Container Plant Care	Includes 3 visits for watering (0.5 hour each), does not include water cost	Consultant	Crew	$65	1.5	Pool	Annual	$97
Shrimp Cyst Soil Collection	Performed by permitted biologist	Consultant	Bio I	$104	1	Pool	Annual	$104
Shrimp Cyst Soil Dispersal	Performed by permitted biologist	Consultant	Bio I	$104	0.5	Pool	Annual	$52
Topographic Repair	8 pools per day, including 8 hrs operator plus 8 hrs senior biologist, including maximum depth survey	Consultant	Crew	$65	8	Pool	Annual	$127
			Snr Bio	$179	8	Pool	Annual	$179

Notes: Level 3 activities apply to pools with focal species unless otherwise noted. Rates are rounded and detailed in Table A-7.

Summary Costs:	
Annual Cost for Complex-Wide Activities	**$12,921**
Annual Cost for Each Floral Focal Species Pool in Subsample	**$2,221**
Annual Cost for Each Shrimp Focal Species Pool in Subsample	**$328**
Topographic Repair	**$306**

Note: Annual costs for Level 3 are assumed over a 5 year period

Table F-4: Other One-Time (Mandatory) and Potential As-Needed (Optional) Costs for VPHCP Monitoring and Management Plan

Task	Assumptions	Staff	Title	Loaded Rate	Hrs	Unit	Timing	Estimated Cost or Range of Costs
ONE-TIME MANDATORY COSTS (INCLUDED IN TABLE F-5)								
HGM Baseline Survey (City Lands)	Assume all pools in the VPHCP Preserve on City controlled lands (1,486 pools) will be surveyed within a 5 year timeframe. Data collection for Level 2 and 3 pools will be funded via the VPHCP, Level 1 pools will be funded via outside funding (e.g., a grant).	Consultant	Bio I	$104	0.5	Per Pool	One-Time	$77,482
HGM Baseline Survey (Other Ownership)	Assume all pools in the VPHCP Preserve on privately owned/controlled lands (1,375 pools) will be surveyed within a 5 year timeframe	Consultant	Bio I	$104	0.5	Per Pool	One-Time	$71,694
Installing Fencing/Signage	Fencing and signage will be installed at certain complexes that do not have existing access control and require fencing/signs based on City direction (as detailed in Table F-12). Costs include materials plus City staff labor for installation.	City	GMM	$74	N/A	Average Fence/Sign Installation Cost plus Labor per Linear Foot	One-Time	$10.29
POTENTIAL AS-NEEDED OPTIONAL COSTS TO CONSIDER (NOT INCLUDED IN TABLE A-5)								
Management Level 1								
Topographic Repair Level 1	Minor as-needed repairs with hand tools	City	GMM	$74	16	Complex	Annual	$1,191
Management Level 2								
Detailed Restoration Plan	For internal use by City and Consultant staff to guide specific restoration activities; prepared at the discretion of the City	Consultant	Various	N/A	N/A	Per Plan	One-time	$15,000 (1-20 pools)/ $20,000 (21-50 pools)/ $25,000 (51-100 pools)
Detailed Topographic Plan	Includes a detailed micro-topographic map to direct vernal pool restoration; prepared at the discretion of the City	Consultant	Various	N/A	N/A	Per Plan	One-time	$3,500 (1-20 pools)/ $7,500 (21-50 pools)/ $10,000 (50+ pools)
Management Level 3								
Detailed Restoration Plan	For internal use by City and Consultant staff to guide specific restoration activities; prepared at the discretion of the City	Consultant	Various	N/A	N/A	Per Plan	One-time	$5000 (1-20 pools)/ $7500 (21-50 pools)/ $10,000 (51-100 pools)
Detailed Topographic Plan	For internal use by City and Consultant staff, includes a detailed micro-topographic map to direct vernal pool restoration; prepared at the discretion of the City	Consultant	Various	N/A	N/A	Per Plan	One-time	$3,500 (1-20 pools)/ $7,500 (21-50 pools)/ $10,000 (50+ pools)

Notes: Rates are detailed in Table F-7.

Table F-5 City of San Diego VPHCP Monitoring and Management Comprehensive Cost Estimate by Complex (2014 Dollars)

Complex ID	Name	Planning Unit	Inside or Outside VPHCP Plan Area	Management Funding Responsibility	Total Pools with Plant Focal Species	Plant Focal Species Pools Subsample (Level 1)	Pools with Plant Focal Species (Level 2)	Pools with Plant Focal Species (Level 3)	Total Pools with Shrimp Focal Species	Shrimp Focal Species Pool Subsample (Level 1)	Shrimp Focal Species Pool Subsample (Level 2)	Shrimp Focal Species Pool Subsample (Level 3)	Total One-Time Fence/Sign Installation Cost	City One-Time Fence/Sign Installation Cost	Total Annual Ongoing Cost for Level 1 Mngmt & Monitoring ($)	City Annual Ongoing Cost for Level 1 Mngmt & Monitoring ($)	Required VPMMP Mngmt & Monitoring Level	Total One-Time* Cost for Required VPMMP Mngmt & Monitoring Level 2 or 3 or SSMP ($)	City One-Time* Cost for Required VPMMP Mngmt & Monitoring Level 2 or 3 or SSMP ($)	City Cost for Required VPMMP Implementation (31 Years)
B 11	Mesa Norte	North	Inside	Private	16	2	16	16	24	10	10	10	0	0	11,449	0	Level 1	0	0	0
B 5	Tierra Alta	North	Inside	Private	0	0	0	0	0	0	0	0	1,911	0	8,495	0	Level 1	0	0	0
B 6	***Lopez Ridge (CDFG)***	***North***	***Inside***	***State***	***1***	***1***	***1***	***1***	***0***	***0***	***0***	***0***	***0***	***0***	***8,539***	***0***	***Level 1***	***0***	***0***	***0***
B 7-8	Crescent Heights	North	Inside	City	1	1	1	1	0	0	0	0	0	0	8,539	8,539	Level 1	0	0	264,699
	Lopez Ridge (City)	North	Inside	City Enterprise	10	2	10	10	2	2	2	2	0	0	9,156	9,156	Level 1	0	0	283,834
C 17-18	Fieldstone	North	Inside	Private	8	1	8	8	0	0	0	0	0	0	8,539	0	None$_2$	0	0	0
C 27	Mira Mesa Market Center	North	Inside	Private	1	1	1	1	1	1	1	1	0	0	8,825	0	None	0	0	0
D 5-8	Parkdale Carroll Canyon	North	Inside	City	0	0	0	0	0	0	0	0	0	0	8,495	8,495	Level 1	0	0	263,338
	Carroll Canyon	North	Inside	City	76	11	76	76	5	5	5	5	0	0	10,411	10,411	Level 1	0	0	322,743
F 16-17	Menlo KM Parcel	Central	Inside	Private	0	0	0	0	1	1	1	1	0	0	8,781	0	Level 1$_1$	0	0	0
H 1-10, 13-15,18-23, 24-26	***Del Mar Mesa (State/Federal)***	***North***	***Outside***	***State/Federal***	***154***	***18***	***154***	***154***	***10***	***10***	***10***	***10***	***0***	***0***	***12,152***	***0***	***Level 1***	***0***	***0***	***0***
	Del Mar Mesa (Private)	North	Inside	Private	2	1	2	2	1	1	1	1	13,729	0	8,825	0	Level 1	0	0	0
	Del Mar Mesa (City)	North	Inside	City	54	6	54	54	8	8	8	8	31,333	31,333	11,052	11,052	Level 1	0	0	342,598
	Rhodes	North	Inside	Private	12	2	12	12	4	4	4	4	0	0	9,729	0	Level 1	0	0	0
H 17	Shaw Lorenz	North	Inside	Private	0	0	0	0	1	1	1	1	4,696	0	8,781	0	Level 1	0	0	0
H 33	East Ocean Air Drive	North	Inside	Private	2	1	2	2	0	0	0	0	0	0	8,539	0	Level 1	0	0	0
H 38	Carmel Mountain	North	Inside	City	0	0	0	0	2	2	2	2	0	0	9,068	9,068	Level 1	0	0	281,112
H 39	Greystone Torrey Highlands	North	Inside	City	6	2	6	6	0	0	0	0	0	0	8,583	8,583	Level 1	0	0	266,060
I 1	Arjons	North	Inside	Private	25	4	25	25	1	1	1	1	12,178	0	8,957	0	None$_2$	0	0	0
I12	Pueblo Lands	North	Inside	City Enterprise	0	0	0	0	2	2	2	2	0	0	9,068	9,068	Level 1	0	0	281,112
I 6 B	Ford Leasing (Bob Baker)	North	Inside	Private	1	1	1	1	3	3	3	3	0	0	9,399	0	None	0	0	0
I 6 C	Facilities Development (Eastgate Miramar Associates)	North	Inside	Private	11	2	11	11	6	6	6	6	12,126	0	10,303	0	None	0	0	0
J 11 E	Slump Block Pools	South	Inside	Private	0	0	0	0	0	0	0	0	21,714	0	8,495	0	Level 2$_1$	26,171	0	0
J 11 W	J 11 West	South	Inside	Private	0	0	0	0	1	1	1	1	14,552	0	8,781	0	Level 3$_1$	67,778	0	0
J 12	J 12	South	Inside	Private	0	0	0	0	0	0	0	0	16,936	0	8,495	0	Level 3$_1$	64,604	0	0
J 13 E	South Otay J 13 East	South	Inside	Private	0	0	0	0	0	0	0	0	0	0	8,495	0	Level 3$_1$	64,604	0	0
J 13 N	South Otay 1 acre (City)	South	Inside	City	3	3	3	3	0	0	0	0	25,835	25,835	8,626	8,626	Level 3	102,514	102,514	326,803
J 13 S	South Otay J 13 South	South	Inside	Private	0	0	0	0	0	0	0	0	58,771	0	8,495	0	Level 3	44,276	0	0
	Bachman	South	Inside	Private	0	0	0	0	0	0	0	0	2,086	0	8,495	0	Level 3	64,604	0	0
J 14	Anderprises (City)	South	Inside	City	0	0	0	0	0	0	0	0	2,322	2,322	8,495	8,495	Level 1$_2$	0	0	263,338
	Cal Terraces (South)	South	Inside	City	63	14	63	63	36	10	10	10	0	0	11,976	11,976	Level 1	0	0	371,260
	Handler	South	Inside	Private	0	0	0	0	0	0	0	0	23,112	0	8,495	0	Level 3	64,604	0	0
	Bachman	South	Inside	Private	0	0	0	0	0	0	0	0	0	0	8,495	0	Level 3$_1$	64,604	0	0
J 16-18	Goat Mesa (Private)	South	Inside	Private	0	0	0	0	0	0	0	0	2,261	0	8,495	0	Level 1$_1$	0	0	263,338
	Goat Mesa (City)	South	Inside	City Enterprise	4	1	4	4	0	0	0	0	0	0	8,539	8,539	Level 1	0	0	264,699
	Wruck Canyon	South	Inside	City	0	0	0	0	0	0	0	0	10,102	10,102	8,495	8,495	Level 1	0	0	263,338
J 2	Cal Terraces (North), Otay Mesa Road Parcels	South	Inside	City	219	70	219	219	216	11	22	43	0	0	14,664	14,664	Level 1	0	0	454,588
	Clayton Parcel	South	Inside	City	1	1	1	1	0	0	0	0	54,239	54,239	8,539	8,539	Level 1$_1$	0	0	264,699
	St. Jerome's	South	Inside	Private	0	0	0	0	0	0	0	0	14,038	0	8,495	0	Level 3$_1$	64,604	0	0
J 20-21	La Media ITS	South	Inside	Private	0	0	0	0	6	6	6	6	65,297	0	10,215	0	Level 3$_1$	83,646	0	0
J 21	La Media Swale South	South	Inside	Private	0	0	0	0	0	0	0	0	16,751	0	8,495	0	Level 3$_1$	64,604	0	0
J 27	Empire Center	South	Inside	Private	9	1	9	9	0	0	0	0	8,345	0	8,539	0	Level 3$_1$	178,334	0	0
J 28 E	La Media Swale North	South	Inside	Private	0	0	0	0	0	0	0	0	13,935	0	8,495	0	Level 3$_1$	64,604	0	0
J 31	Hidden Trails **	South	Inside	City	0	0	0	0	1	1	1	1	0	0	8,781	8,781	Level 1	0	0	272,225
J 32	West Otay A (Private)	South	Outside	State	2	2	2	2	0	0	0	0	0	0	8,583	0	Level 1$_2$	0	0	0
	West Otay B	South	Inside	City	0	0	0	0	0	0	0	0	11,777	11,777	8,495	8,495	Level 1	0	0	263,338
	West Otay C	South	Inside	City	1	1	1	1	0	0	0	0	9,917	9,917	8,539	8,539	Level 1	0	0	264,699

Table F-5 City of San Diego VPHCP Monitoring and Management Comprehensive Cost Estimate by Complex (2014 Dollars)

Complex ID	Name	Planning Unit	Inside or Outside VPHCP Plan Area	Management Funding Responsibility	Total Pools with Plant Focal Species	Plant Focal Species Pools Subsample (Level 1)	Pools with Plant Focal Species (Level 2)	Pools with Plant Focal Species (Level 3)	Total Pools with Shrimp Focal Species	Shrimp Focal Species Pool Subsample (Level 1)	Shrimp Focal Species Pool Subsample (Level 2)	Shrimp Focal Species Pool Subsample (Level 3)	Total One-Time Fence/Sign Installation Cost	City One-Time Fence/Sign Installation Cost	Total Annual Ongoing Cost for Level 1 Mngmt & Monitoring ($)	City Annual Ongoing Cost for Level 1 Mngmt & Monitoring ($)	Required VPMMP Mngmt & Monitoring Level	Total One-Time* Cost for Required VPMMP Mngmt & Monitoring Level 2 or 3 or SSMP ($)	City One-Time* Cost for Required VPMMP Mngmt & Monitoring Level 2 or 3 or SSMP ($)	City Cost for Required VPMMP Implementation (31 Years)
J 34	Bachman	South	Inside	Private	0	0	0	0	0	0	0	0	21,601	0	8,495	0	Level 3	61,876	0	0
	Candlelight	South	Inside	Private	0	0	0	0	1	1	1	1	45,134	0	8,781	0	Level 1	0	0	0
J 36	Southview	South	Inside	Private	0	0	0	0	12	10	10	10	29,144	0	11,361	0	Level 3_1	61,876	0	0
J 4	Robinhood Ridge	South	Inside	City	50	8	50	50	41	10	10	10	0	0	11,713	11,713	Level 2	193,774	193,774	521,730
	California Crossing	South	Inside	Private	0	0	0	0	5	5	5	5	13,596	0	9,928	0	Level 1	0	0	0
K 5	Otay Lakes	Central	Inside	City Enterprise	46	6	46	46	6	6	6	6	0	0	10,478	10,478	Level 1	0	0	324,825
KK 2	Pasatiempo	Central	Inside	City	0	0	0	0	0	0	0	0	14,212	14,212	8,495	8,495	Level 1	0	0	263,338
MM 1	Marron Valley	South	Inside	City Enterprise	0	0	0	0	5	5	5	5	0	0	9,928	9,928	Level 1	0	0	307,772
N 1-4	Teledyne Ryan	Central	Inside	Private	1	1	1	1	11	10	10	10	0	0	11,405	0	Level 2_1	47,455	0	0
N 7	Serra Mesa Library	Central	Inside	City	0	0	0	0	0	0	0	0	0	0	8,495	8,495	Level 1	0	0	263,338
N 8	General Dynamics **	Central	Inside	City	20	3	20	20	6	6	6	6	0	0	10,346	10,346	Level 1	0	0	320,741
NC	Li Collins	North	Inside	Private	0	0	0	0	0	0	0	0	0	0	8,495	0	None	0	0	0
	Kelton	South	Inside	City	0	0	0	0	0	0	0	0	0	0	8,495	8,495	None	0	0	0
OO	Salk Institute	North	Inside	Private	0	0	0	0	0	0	0	0	0	0	8,495	0	Level 1	0	0	0
Q 2	Mission Trails Regional Park	Central	Inside	City	0	0	0	0	6	6	6	6	3,083	3,083	10,215	10,215	Level 1_1	0	0	316,658
Q 3	Castlerock	North	Inside	Private	0	0	0	0	0	0	0	0	0	0	8,495	0	Level 1	0	0	0
QQ	Tecolote Canyon	Central	Inside	City	0	0	0	0	0	0	0	0	17,861	17,861	8,495	8,495	None	0	0	0
R 1	Proctor Valley	South	Inside	City Enterprise	0	0	0	0	3	3	3	3	0	0	9,355	9,355	Level 1	0	0	289,998
U15	SANDER	Central	Inside	City Enterprise	1	1	1	1	2	2	2	2	0	0	9,112	9,112	Level 2_1	31,347	31,347	332,043
U 19	Cubic	Central	Inside	Private	3	2	3	3	6	6	6	6	38,979	0	10,303	0	Level 1_1	0	0	0
X 5	Nobel Drive	North	Inside	City	1	1	1	1	6	6	6	6	0	0	10,259	10,259	Level 1	0	0	318,019
X 7	Nobel Research **	North	Inside	City	0	0	0	0	1	1	1	1	0	0	8,781	8,781	Level 1	0	0	272,225
												Subtotal VPMMP Monitoring and Management Cost			**640,317**	**293,686**		**1,415,881**	**327,635**	**9,108,508**
												Data Tracking and Reporting (Bio III 1 day per week annually, City responsibility for all sites)			**35,360**	**35,360**				**1,096,160**
												Changed Circumstances (refer to Table A-11 for detail, assumes City is responsible for all costs)			**56,844**	**56,844**				**1,762,158**
												Contingency			**29,937**	**29,937**				**928,058**
												Total One-Time Fence/Sign Installation Cost (only certain complexes, as detailed in Table A-12)								**180,681**
												One-Time Cost for Vernal Pool HGM Baseline Survey (see Table A-4 for detail)								**77,482**
												TOTAL COST	**631,573**	**180,681**	**762,458**	**415,827**		**1,415,881**	**327,635**	**13,153,048**

= Land not owned by City of San Diego.

Bold = Land not owned by City of San Diego or under the City of San Diego's land use authority.

SSRP = Site-specific Restoration Plan, not part of VPHCP. For cost-estimating purposes, Level 3 costs are assumed.

SSMP = Site-specific Management Plan, not part of VPMMP. Assumes SSMP will be updated to be consistent with the VPHCP. For cost-estimating purposes, Level 3 costs are assumed.

$None_1$ = These sites are privately held and may seek development entitlement in the future. During the development entitlement process the City will ensure the property owner implements the Recommended Management.

$None_2$ = These site have been developed pursuant to prior approval by City of San Diego. No management was required at that time, nor is any management being required as part of this HCP. As funding becomes available the City may work with the owner to implement the Additional Recommended Management.

* = One-time costs are assumed for a 3-year period for monitoring and management for VPMMP-required Level 2 and 5-years for Level 3. After the initial 3 or 5-years, all complexes are assumed at the annual ongoing Level 1 cost. Sites at Level 1 are NOT included in this column as they are part of the on-going annual costs.

** = Development projects were approved on these sites after the adoption of the City of San Diego's Multiple Species Conservation Plan (MSCP) Subarea Plan (SAP). The City was granted a Conservation Easement as a condition of the discretionary land use entitlement. While the ownership is private, the City committed to provide the biological management of these sites as a condition easement pursuant to the requirements of the MSCP SAP.

City Enterprise Sites		Department
I12	Pueblo Lands	Public Utilities Waste Water Department
J 16-18	Wruck Canyon	Public Utilities Waste Water Department
J 35	Brown Field	Airports
K 5	Otay Lakes	Public Utilities Water Department
MM 1	Marron Valley	Public Utilities Water Department
N 5-6	Montgomery Field	Airports
R 1	Proctor Valley	Public Utilities
U15	SANDER	Environmental Services

Table F-6: Summary of One-Time Costs for VPHCP Monitoring and Management by Complex (2014 Dollars)

Complex ID	Name	Geographic Area	Management Responsibility	Total Pools with Plant Focal Species	Total Pools with Shrimp Focal Species	% City Controlled Pools	Total One-Time Fence/Sign Installation Cost	City One-Time Fence/Sign Installation Cost	Required VPMMP Mngmt & Monitoring Level	City One-Time* Cost for Required VPMMP Mngmt & Monitoring Level 2 or 3 or SSMP ($)
B 11	Mesa Norte	North	Private	16	24	0	0	0	Level 1	0
B 5	Tierra Alta	North	Private	0	0	0	1,911	0	Level 1	0
B 6	***Lopez Ridge (CDFG)***	***North***	***State***	***1***	***0***	***0***	***0***	***0***	***Level 1***	***0***
B 7-8	Crescent Heights	North	City	1	0	100	0	0	Level 1	0
	Lopez Ridge (City)	North	City Enterprise	10	2	100	0	0	Level 1	0
C 17-18	Fieldstone	North	Private	8	0	0	0	0	None2	0
C 27	Mira Mesa Market Center	North	Private	1	1	0	0	0	None	0
D 5-8	Parkdale Carroll Canyon	North	City	0	0	100	0	0	Level 1	0
	Carroll Canyon	North	City	76	5	100	0	0	Level 1	0
F 16-17	Menlo KM Parcel	Central	Private	0	1	0	0	0	Level 11	0
H 1-10, 13-15,18-23, 24-26	***Del Mar Mesa (State/Federal)***	***North***	***State/Federal***	***154***	***10***	***0***	***0***	***0***	***Level 1***	***0***
	Del Mar Mesa (Private)	North	Private	2	1	0	13,729	0	Level 1	0
	Del Mar Mesa (City)	North	City	54	8	100	31,333	31,333	Level 1	0
	Rhodes	North	Private	12	4	0	0	0	Level 1	0
H 17	Shaw Lorenz	North	Private	0	1	0	4,696	0	Level 1	0
H 33	East Ocean Air Drive	North	Private	2	0	0	0	0	Level 1	0
H 38	Carmel Mountain	North	City	0	2	100	0	0	Level 1	0
H 39	Greystone Torrey Highlands	North	City	6	0	100	0	0	Level 1	0
I 1	Arjons	North	Private	25	1	0	12,178	0	None2	0
I12	Pueblo Lands	North	City Enterprise	0	2	100	0	0	Level 1	0
I 6 B	Ford Leasing (Bob Baker)	North	Private	1	3	0	0	0	None	0
I 6 C	Facilities Development	North	Private	11	6	0	12,126	0	None	0
J 11 E	Slump Block Pools	South	Private	0	0	0	21,714	0	Level 21	0
J 11 W	J 11 West	South	Private	0	1	0	14,552	0	Level 31	0
J 12	J 12	South	Private	0	0	0	16,936	0	Level 31	0
J 13 E	South Otay J 13 East	South	Private	0	0	0	0	0	Level 31	0
J 13 N	South Otay 1 acre (City)	South	City	3	0	100	25,835	25,835	Level 3	102,514
J 13 S	South Otay J 13 South	South	Private	0	0	0	58,771	0	Level 3	0
	Bachman	South	Private	0	0	0	2,086	0	Level 3	0
J 14	Anderprises (City)	South	City	0	0	100	2,322	2,322	Level 12	0
	Cal Terraces (South)	South	City	63	36	100	0	0	Level 1	0
	Brown Field Basins	South	City Enterprise	0	0	0	0	0	None4	0
	Handler	South	Private	0	0	0	23,112	0	Level 3	0
	Bachman	South	Private	0	0	0	0	0	Level 31	0
J 16-18	Goat Mesa (Private)	South	Private	0	0	0	2,261	0	Level 11	0
	Goat Mesa (City)	South	City Enterprise	4	0	100	0	0	Level 1	0
	Wruck Canyon	South	City	0	0	100	10,102	10,102	Level 1	0
J 2	Cal Terraces (North), Otay	South	City	219	216	100	0	0	Level 1	0
	Clayton Parcel	South	City	1	0	100	54,239	54,239	Level 11	0
	St. Jerome's	South	Private	0	0	0	14,038	0	Level 31	0

Table F-6: Summary of One-Time Costs for VPHCP Monitoring and Management by Complex (2014 Dollars)

Complex ID	Name	Geographic Area	Management Responsibility	Total Pools with Plant Focal Species	Total Pools with Shrimp Focal Species	% City Controlled Pools	Total One-Time Fence/Sign Installation Cost	City One-Time Fence/Sign Installation Cost	Required VPMMP Mngmt & Monitoring Level	City One-Time* Cost for Required VPMMP Mngmt & Monitoring Level 2 or 3 or SSMP ($)
J 20-21	La Media ITS	South	Private	0	6	0	65,297	0	Level 31	0
J 21	La Media Swale South	South	Private	0	0	0	16,751	0	Level 31	0
J 27	Empire Center	South	Private	9	0	0	8,345	0	Level 31	0
J 28 E	La Media Swale North	South	Private	0	0	0	13,935	0	Level 31	0
J 31	***Hidden Trails *****	***South***	***City***	***0***	***1***	***100***	***0***	***0***	***Level 1***	***0***
J 32	West Otay A (Private)	South	State	2	0	0	0	0	Level 12	0
	West Otay B	South	City	0	0	100	11,777	11,777	Level 1	0
	West Otay C	South	City	1	0	100	9,917	9,917	Level 1	0
J 34	Bachman	South	Private	0	0	0	21,601	0	Level 3	0
	Candlelight	South	Private	0	1	0	45,134	0	Level 1	0
J 35	Brown Field	South	City Enterprise	0	0	100	0	0	None4	0
J 36	Southview	South	Private	0	12	0	29,144	0	Level 31	0
J 4	Robinhood Ridge	South	City	50	41	100	0	0	Level 2	193,774
	California Crossing	South	Private	0	5	0	13,596	0	Level 1	0
K 5	Otay Lakes	Central	City Enterprise	46	6	100	0	0	Level 1	0
KK 2	Pasatiempo	Central	City	0	0	100	14,212	14,212	Level 1	0
MM 1	Marron Valley	South	City Enterprise	0	5	100	0	0	Level 1	0
N 1-4	Teledyne Ryan	Central	Private	1	11	0	0	0	Level 21	0
N 5-6	Montgomery Field	Central	City Enterprise	129	10	100	0	0	Level 14	0
N 7	Serra Mesa Library	Central	City	0	0	100	0	0	Level 1	0
N 8	General Dynamics **	Central	City	20	6	100	0	0	Level 1	0
NC	Li Collins	North	Private	0	0	0	0	0	None	0
	Kelton	South	City	0	0	100	0	0	None	0
OO	Salk Institute	North	Private	0	0	0	0	0	Level 1	0
Q 2	Mission Trails Regional Park	Central	City	0	6	100	3,083	3,083	Level 11	0
Q 3	Castlerock	North	Private	0	0	0	0	0	Level 1	0
QQ	Tecolote Canyon	Central	City	0	0	100	17,861	17,861	None	0
R 1	Proctor Valley	South	City Enterprise	0	3	100	0	0	Level 1	0
U15	SANDER	Central	City Enterprise	1	2	100	0	0	Level 21	31,347
U 19	Cubic	Central	Private	3	6	0	38,979	0	Level 11	0
X 5	Nobel Drive	North	City	1	6	100	0	0	Level 1	0
X 7	Nobel Research **	North	City	0	1	100	0	0	Level 1	0
									Subtotal VPMMP Required Monitoring and Management Cost	327,635
									Total One-Time Fence/Sign Installation Cost (only certain complexes, as detailed in Table A-12)	180,681
									One-Time Vernal Pool HGM Baseline Survey (see Table A-4 for detail)	77,482
TOTAL ONE-TIME COST										**585,798**

= Land not owned by City of San Diego.

Bold = Land not owned by City of San Diego or under the City of San Diego's land use authority

Table F-7 Summary of Annual Ongoing Costs for VPHCP Monitoring and Management by Complex (2014 Dollars)

Complex ID	Name	Geographic Area	Management Responsibility	Total Pools with Plant Focal Species	Total Pools with Shrimp Focal Species	% City Controlled Pools	City Annual Ongoing Cost for Level 1 Mngmt & Monitoring ($)	Non-City Cost for Required VPMMP Implementation (31 Years)	Total Annual Ongoing Cost for Level 1 Mngmt & Monitoring ($)
B 11	Mesa Norte	North	Private	16	24	0	0	11,449	11,449
B 5	Tierra Alta	North	Private	0	0	0	0	8,495	8,495
B 6	***Lopez Ridge (CDFG)***	***North***	***State***	***1***	***0***	***0***	***0***	***8,539***	***8,539***
B 7-8	Crescent Heights	North	City	1	0	100	8,539	0	8,539
	Lopez Ridge (City)	North	City Enterprise	10	2	100	9,156	0	9,156
C 17-18	Fieldstone	North	Private	8	0	0	0	8,539	8,539
C 27	Mira Mesa Market Center	North	Private	1	1	0	0	8,825	8,825
D 5-8	Parkdale Carroll Canyon	North	City	0	0	100	8,495	0	8,495
	Carroll Canyon	North	City	76	5	100	10,411	0	10,411
F 16-17	Menlo KM Parcel	Central	Private	0	1	0	0	8,781	8,781
H 1-10, 13-15,18-23, 24-26	***Del Mar Mesa (State/Federal)***	***North***	***State/Federal***	***154***	***10***	***0***	***0***	***12,152***	***12,152***
	Del Mar Mesa (Private)	North	Private	2	1	0	0	8,825	8,825
	Del Mar Mesa (City)	North	City	54	8	100	11,052	0	11,052
	Rhodes	North	Private	12	4	0	0	9,729	9,729
H 17	Shaw Lorenz	North	Private	0	1	0	0	8,781	8,781
H 33	East Ocean Air Drive	North	Private	2	0	0	0	8,539	8,539
H 38	Carmel Mountain	North	City	0	2	100	9,068	0	9,068
H 39	Greystone Torrey Highlands	North	City	6	0	100	8,583	0	8,583
I 1	Arjons	North	Private	25	1	0	0	8,957	8,957
I12	Pueblo Lands	North	City Enterprise	0	2	100	9,068	0	9,068
I 6 B	Ford Leasing (Bob Baker)	North	Private	1	3	0	0	9,399	9,399
I 6 C	Facilities Development (Eastgate Miramar Associates)	North	Private	11	6	0	0	10,303	10,303
J 11 E	Slump Block Pools	South	Private	0	0	0	0	8,495	8,495
J 11 W	J 11 West	South	Private	0	1	0	0	8,781	8,781
J 12	J 12	South	Private	0	0	0	0	8,495	8,495
J 13 E	South Otay J 13 East	South	Private	0	0	0	0	8,495	8,495
	South Otay 1 acre (City)	South	City	3	0	100	8,626	0	8,626
J 13 S	South Otay J 13 South	South	Private	0	0	0	0	8,495	8,495
	Bachman	South	Private	0	0	0	0	8,495	8,495
J 14	Anderprises (City)	South	City	0	0	100	8,495	0	8,495
	Cal Terraces (South)	South	City	63	36	100	11,976	0	11,976
	Brown Field Basins	South	City Enterprise	0	0	0	0	0	0
	Handler	South	Private	0	0	0	0	8,495	8,495
	Bachman	South	Private	0	0	0	0	8,495	8,495
J 16-18	Goat Mesa (Private)	South	Private	0	0	0	0	8,495	8,495
	Goat Mesa (City)	South	City Enterprise	4	0	100	8,539	0	8,539
	Wruck Canyon	South	City	0	0	100	8,495	0	8,495
J 2	Cal Terraces (North), Otay Mesa Road Parcels	South	City	219	216	100	14,664	0	14,664
	Clayton Parcel	South	City	1	0	100	8,539	0	8,539
	St. Jerome's	South	Private	0	0	0	0	8,495	8,495
J 20-21	La Media ITS	South	Private	0	6	0	0	10,215	10,215
J 21	La Media Swale South	South	Private	0	0	0	0	8,495	8,495
J 27	Empire Center	South	Private	9	0	0	0	8,539	8,539
J 28 E	La Media Swale North	South	Private	0	0	0	0	8,495	8,495
J 31	Hidden Trails **	South	City	0	1	100	8,781	0	8,781
J 32	West Otay A (Private)	South	State	2	0	0	0	8,583	8,583
	West Otay B	South	City	0	0	100	8,495	0	8,495
	West Otay C	South	City	1	0	100	8,539	0	8,539
J 34	Bachman	South	Private	0	0	0	0	8,495	8,495
	Candlelight	South	Private	0	1	0	0	8,781	8,781
J 35	Brown Field	South	City Enterprise	0	0	100	0	0	0
J 36	Southview	South	Private	0	12	0	0	11,361	11,361
J 4	Robinhood Ridge	South	City	50	41	100	11,713	0	11,713
	California Crossing	South	Private	0	5	0	0	9,928	9,928
K 5	Otay Lakes	Central	City Enterprise	46	6	100	10,478	0	10,478
KK 2	Pasatiempo	Central	City	0	0	100	8,495	0	8,495
MM 1	Marron Valley	South	City Enterprise	0	5	100	9,928	0	9,928
N 1-4	Teledyne Ryan	Central	Private	1	11	0	0	11,405	11,405
N 5-6	Montgomery Field	Central	City Enterprise	129	10	100	0	0	0
N 7	Serra Mesa Library	Central	City	0	0	100	8,495	0	8,495
N 8	General Dynamics **	Central	City	20	6	100	10,346	0	10,346
NC	Li Collins	North	Private	0	0	0	0	8,495	8,495
	Kelton	South	City	0	0	100	8,495	0	8,495
OO	Salk Institute	North	Private	0	0	0	0	8,495	8,495

Table F-7 Summary of Annual Ongoing Costs for VPHCP Monitoring and Management by Complex (2014 Dollars)

Complex ID	Name	Geographic Area	Management Responsibility	Total Pools with Plant Focal Species	Total Pools with Shrimp Focal Species	% City Controlled Pools	City Annual Ongoing Cost for Level 1 Mngmt & Monitoring ($)	Non-City Cost for Required VPMMP Implementation (31 Years)	Total Annual Ongoing Cost for Level 1 Mngmt & Monitoring ($)
Q2	Mission Trails Regional Park	Central	City	0	6	100	10,215	0	10,215
Q 3	Castlerock	North	Private	0	0	0	0	8,495	8,495
QQ	Tecolote Canyon	Central	City	0	0	100	8,495	0	8,495
R 1	Proctor Valley	South	City Enterprise	0	3	100	9,355	0	9,355
U15	SANDER	Central	City Enterprise	1	2	100	9,112	0	9,112
U 19	Cubic	Central	Private	3	6	0	0	10,303	10,303
X 5	Nobel Drive	North	City	1	6	100	10,259	0	10,259
X 7	Nobel Research **	North	City	0	1	100	8,781	0	8,781
						Subtotal Level 1 (Stewardship) Monitoring and Management Cost	**293,686**	**346,631**	**640,317**
						Data Tracking and Reporting (Bio III 1 day per week annually, City responsibility for all sites)	**35,360**	0	**35,360**
						Changed Circumstances (refer to Table A-11 for detail, assumes City is responsible for all costs)	**56,844**	0	**56,844**
						Contingency	**29,937**	0	**29,937**
TOTAL ANNUAL ONGOING COST							**415,827**	**346,631**	**762,458**

= Land not owned by City of San Diego

Bold ego or under the City of San Diego's land use authority

Table F-8 Summary of Total Cost for VPHCP Monitoring and Management by Complex for the 36-Year Life of the Project (2014 Dollars)

Complex ID	Name	Geographic Area	Management Responsibility	% City Controlled Pools	City Cost for Required VPMMP Implementation (31 Years)	Non-City Cost for Required VPMMP Implementation (31 Years)	Total Cost for VPMMP Implementation (31 Years)
B 11	Mesa Norte	North	Private	0	0	354,927	354,927
B 5	Tierra Alta	North	Private	0	0	263,338	263,338
B 6	***Lopez Ridge (CDFG)***	***North***	***State***	***0***	***0***	***264,699***	***264,699***
B 7-8	Crescent Heights	North	City	100	264,699	0	264,699
	Lopez Ridge (City)	North	City Enterprise	100	283,834	0	283,834
C 17-18	Fieldstone	North	Private	0	0	0	0
C 27	Mira Mesa Market Center	North	Private	0	0	0	0
D 5-8	Parkdale Carroll Canyon	North	City	100	263,338	0	263,338
	Carroll Canyon	North	City	100	322,743	0	322,743
F 16-17	Menlo KM Parcel	Central	Private	0	0	272,225	272,225
H 1-10, 13-15,18-23, 24-26	***Del Mar Mesa (State/Federal)***	***North***	***State/Federal***	***0***	***0***	***376,704***	***376,704***
	Del Mar Mesa (Private)	North	Private	0	0	273,586	273,586
	Del Mar Mesa (City)	North	City	100	342,598	0	342,598
	Rhodes	North	Private	0	0	301,607	301,607
H 17	Shaw Lorenz	North	Private	0	0	272,225	272,225
H 33	East Ocean Air Drive	North	Private	0	0	264,699	264,699
H 38	Carmel Mountain	North	City	100	281,112	0	281,112
H 39	Greystone Torrey Highlands	North	City	100	266,060	0	266,060
I 1	Arjons	North	Private	0	0	0	0
I12	Pueblo Lands	North	City Enterprise	100	281,112	0	281,112
I 6 B	Ford Leasing (Bob Baker)	North	Private	0	0	0	0
I 6 C	Facilities Development (Eastgate	North	Private	0	0	0	0
J 11 E	Slump Block Pools	South	Private	0	0	306,499	306,499
J 11 W	J 11 West	South	Private	0	0	296,095	296,095
J 12	J 12	South	Private	0	0	285,469	285,469
J 13 E	South Otay J 13 East	South	Private	0	0	285,469	285,469
	South Otay 1 acre (City)	South	City	100	326,803	0	326,803
J 13 S	South Otay J 13 South	South	Private	0	0	0	0
	Bachman	South	Private	0	0	285,469	285,469
J 14	Anderprises (City)	South	City	100	263,338	0	263,338
	Cal Terraces (South)	South	City	100	371,260	0	371,260
	Brown Field Basins	South	City Enterprise	0	0	0	0
	Handler	South	Private	0	0	285,469	285,469
	Bachman	South	Private	0	0	285,469	285,469
J 16-18	Goat Mesa (Private)	South	Private	0	263,338	0	263,338
	Goat Mesa (City)	South	City Enterprise	100	264,699	0	264,699
	Wruck Canyon	South	City	100	263,338	0	263,338
J 2	Cal Terraces (North), Otay Mesa Road Parcels	South	City	100	454,588	0	454,588
	Clayton Parcel	South	City	100	264,699	0	264,699
	St. Jerome's	South	Private	0	0	285,469	285,469
J 20-21	La Media ITS	South	Private	0	0	349,230	349,230
J 21	La Media Swale South	South	Private	0	0	285,469	285,469
J 27	Empire Center	South	Private	0	0	400,340	400,340

Table F-8 Summary of Total Cost for VPHCP Monitoring and Management by Complex for the 36-Year Life of the Project (2014 Dollars)

Complex ID	Name	Geographic Area	Management Responsibility	% City Controlled Pools	City Cost for Required VPMMP Implementation (31 Years)	Non-City Cost for Required VPMMP Implementation (31 Years)	Total Cost for VPMMP Implementation (31 Years)
J 28 E	La Media Swale North	South	Private	0	0	285,469	285,469
J 31	Hidden Trails **	South	City	100	272,225	0	272,225
J 32	***West Otay A (Private)***	***South***	***State***	***0***	***0***	***266,060***	***266,060***
	West Otay B	South	City	100	263,338	0	263,338
	West Otay C	South	City	100	264,699	0	264,699
J 34	Bachman	South	Private	0	0	282,740	282,740
	Candlelight	South	Private	0	0	272,225	272,225
J 35	Brown Field	South	City Enterprise	100	0	0	0
J 36	Southview	South	Private	0	0	357,274	357,274
J 4	Robinhood Ridge	South	City	100	521,730	0	521,730
	California Crossing	South	Private	0	0	307,772	307,772
K 5	Otay Lakes	Central	City Enterprise	100	324,825	0	324,825
KK 2	Pasatiempo	Central	City	100	263,338	0	263,338
MM 1	Marron Valley	South	City Enterprise	100	307,772	0	307,772
N 1-4	Teledyne Ryan	Central	Private	0	0	423,832	423,832
N 5-6	Montgomery Field	Central	City Enterprise	100	0	0	0
N 7	Serra Mesa Library	Central	City	100	263,338	0	263,338
N 8	General Dynamics **	Central	City	100	320,741	0	320,741
NC	Li Collins	North	Private	0	0	0	0
	Kelton	South	City	100	0	0	0
OO	Salk Institute	North	Private	0	0	263,338	263,338
Q2	Mission Trails Regional Park	Central	City	100	316,658	0	316,658
Q 3	Castlerock	North	Private	0	0	263,338	263,338
QQ	Tecolote Canyon	Central	City	100	0	0	0
R 1	Proctor Valley	South	City Enterprise	100	289,998	0	289,998
U15	SANDER	Central	City Enterprise	100	332,043	0	332,043
U 19	Cubic	Central	Private	0	0	319,380	319,380
X 5	Nobel Drive	North	City	100	318,019	0	318,019
X 7	Nobel Research **	North	City	100	272,225	0	272,225
				Subtotal VPMMP Monitoring and Management Cost	**9,108,508**	**9,035,882**	**18,144,390**
				Data Tracking and Reporting (Bio III 1 day per week annually, City responsibility for all sites)	**1,096,160**	**0**	**1,096,160**
				Changed Circumstances (refer to Table A-11 for detail, assumes City is responsible for all costs)	**1,762,158**	**0**	**1,762,158**
				Contingency	**928,058**	**0**	**928,058**
				Total One-Time Fence/Sign Installation Cost (only certain complexes, as detailed in Table A-12)	**180,681**	**450,892**	**631,573**
				One-Time Vernal Pool HGM Baseline Survey (see Table A-4 for detail)	**77,482**	**71,694**	**149,176**
TOTAL COST FOR VPMMP IMPLEMENTATION					**13,153,048**	**9,558,467**	**22,711,515**

= Land not owned by City of San Diego.

Bold = Land not owned by City of San Diego or under the City of San Diego's land use authority.

Table F-9: Focal Vernal Pool Weed Control Cost Estimate Detail

Weed Control Task	Description of Activity	Cost/Acre	Cost/Pool
Level 2 Focal Vernal Pool Weed Control			
Dethatching 2	One-time visit (4 person crew) in pools with focal species and 20-foot buffer	$3,000	$277
Weed Control Level 2	Two visits (4 person crew) per spring and 20-foot foot buffer	$2,500	$231
	TOTAL	**$5,500**	**$508**
Level 3 Focal Vernal Pool Weed Control			
Dethatching 3	One-time visit (4 person crew) in pools with focal species and 35-foot buffer	$3,000	$558
Weed Control Level 3	Four visits (4 person crew) per spring and 35-foot buffer	$4,000	$744
	TOTAL	**$7,000**	**$1,302**

Level 2 Watershed Area

Avg pool size (acres)	0.018
Avg pool size (sq ft)	784.08
Avg pool radius	15.80
Radius + 20-ft buffer	35.80
Area of watershed (sq ft)	4024.83
Area of watershed (acres)	0.092
Watershed/pool ratio	5.13

Level 3 Watershed Area

Avg pool size (acres)	0.018
Avg pool size (sq ft)	784.08
Avg pool radius	15.80
Radius + 35-ft buffer	50.80
Area of watershed (sq ft)	8103.89
Area of watershed (acres)	0.186
Watershed/pool ratio	10.34

Note: Costs include labor and other direct costs such as field vehicle rental, fuel, herbicide, and equipment

Table F-10: City and Consultant Staff 2014 Rates

City Staff	Fully Loaded Rate	Rate with Travel
Senior Planner/Natural Resource Manager	$88.61	$91.42
Biologist I	$58.58	$61.39
Biologist III	$85.00	$87.81
Pesticide Applicator (PA)	$53.10	$55.91
Pesticide Applicator (PA) plus Herbicide	$59.35	$66.63
Grounds Maintenance Manager (GMM)	$71.62	$74.43
Ranger	$57.04	$59.85
Senior Ranger	$73.33	$76.14

Consultant Staff	Fully Loaded Rate	Rate with Travel
Senior Restoration Ecologist/Biologist	$163.62	$179.25
Biologist I	$88.65	$104.28
Maintenance/Restoration Crew	$48.93	$64.56
Maintenance/Restoration Crew plus Herbicide	$55.18	$70.81

Notes:

Fringe and overhead are included in the fully loaded rates
Rates with travel include $2.81 per hour for City staff (City fleet car) and $15.63 per hour ($125/8hr day) for Consultant staff (rental vehicle plus fuel)

Herbicide Cost Assumptions:

Herbicide $ per acre =	50
Hours for 1 acre herbicide spraying =	8
Herbicide $/hr =	6.25

Table F-11: Cost Estimate for Changed Circumstances

Task	Assumptions	Staff	Title	Loaded Rate	Avg. Hours	Unit	Timing	Cost per Unit	Avg. Pools/ Complexes Requiring Enhanced Management*	Total Cost
Enhanced Fairy Shrimp Management										
Shrimp Cyst Collection	Performed by permitted biologist	Consultant	Bio I	$104	0.5	Pool	Annual	$52	23	$1,178
Shrimp Cyst Bulking	Performed by permitted biologist	Consultant	Bio I	$104	120	Complex	Annual	$12,514	4	$51,932
Shrimp Cyst Dispersal	Performed by permitted biologist	Consultant	Bio I	$104	0.25	Pool	Annual	$26	23	$589
* Assumes 5% of focal species pools/complexes within the VPHCP Preserve will require enhanced fairy shrimp management once every 5 years									**Total (Avg)**	**$53,700**
									Total (6 times over 31 Years)	**$322,200**
Post-Fire Management										
Perform Post-Fire Management	Assume 2 average size complex (50 vernal pools each) burns once every 10 years. Burned complexes will require certain Level 3 management activities (general maintenance, weed control, and seeding) to recover. Level 3 qualitative and quantitative (focal plants and shrimp pools) monitoring would also be necessary. Following the 5-year period, the site would be	Consultant	Varied (see Table A-3 for specific Level 3 staff)	Varied (see Table A-3 for rates for Level 3 staff)	Varied (see Table A-3 for Level 3 hours for various tasks)	All pools and overall complex for limited Level 3 management and monitoring	Two complexes once per 10 years	Level 3 costs for specified management and monitoring activities	Total of 6 complexes (50 pools each) burn during life of the HCP Permit (31 years)	
									Total for 31 Years at Level 3	$3,202,072
									Avg. Annual Post-Fire Cost (6 complexes)	$103,293
									Avg. Level 1 Ongoing Cost (6 complexes)	$56,842
									Total Annual Avg Post-Fire Cost (Level 3 less Level 1)	$46,450
									Total Post-Fire Costs for 31 Years	**$1,439,958**

Total Changed Circumastances over 31 Years	**$1,762,158**
Total Avg. Annual Changed Circumastances Costs	**$56,844**

Table F-12: Fence and Sign Installation Cost Assumptions

Complex ID	Name	Geographic Area	Fencing Assumed (Y/N)	20' Buffer Perimter Around Complex (LF)
B 11	Mesa Norte	North	N	
B 5	Tierra Alta	North	Y	186
B 6	Lopez Ridge (CDFG)	North	N	
B 7-8	Crescent Heights	North	N	
	Lopez Ridge (City)	North	N	
C 17-18	Fieldstone	North	N	
C 27	Mira Mesa Market Center	North	N	
D 5-8	Parkdale Carroll Canyon	North	N	
	Carroll Canyon	North	N	
F 16-17	Menlo KM Parcel	Central	N	
H 1-10, 13-15, 18-23, 24-26	Del Mar Mesa (State/Federal)	North	N	
	Del Mar Mesa (Private)	North	Y	1,336
	Del Mar Mesa (City)	North	Y	3,049
	Rhodes	North	N	
H 17	Shaw Lorenz	North	Y	457
H 33	East Ocean Air Drive	North	N	
H 38	Carmel Mountain	North	N	
H 39	Greystone Torrey Highlands	North	N	
I 1	Arjons	North	Y	1,185
I12	Pueblo Lands	North	N	
I 6 B	Ford Leasing (Bob Baker)	North	N	
I 6 C	Facilities Development (Eastgate Miramar Associates)	South	Y	1,180
J 11 E	Slump Block Pools	South	Y	2,113
J 11 W	J 11 West	South	Y	1,416
J 12	J 12	South	Y	1,648
J 13 E	South Otay J 13 East	South	N	
J 13 N	South Otay 1 acre (City)	South	Y	2,514
J 13 S	South Otay J 13 South	South	Y	5,719
	Bachman	South	Y	203
J 14	Anderprises (City)	South	Y	226
	Cal Terraces (South)	South	N	
	Brown Field Basins	South	N	
	Handler	South	Y	2,249
	Bachman	South	N	
J 16-18	Goat Mesa (Private)	South	Y	220
	Goat Mesa (City)	South	N	
	Wruck Canyon	South	Y	983
J 2	Cal Terraces (North), Otay Mesa Road Parcels	South	N	
	Clayton Parcel	South	Y	5,278
	St. Jerome's	South	Y	1,366
J 20-21	La Media ITS	South	Y	6,354
J 21	La Media Swale South	South	Y	1,630
J 27	Empire Center	South	Y	812

Table F-12: Fence and Sign Installation Cost Assumptions

Complex ID	Name	Geographic Area	Fencing Assumed (Y/N)	20' Buffer Perimter Around Complex (LF)
J 28 E	La Media Swale North	South	Y	1,356
J 31	Hidden Trails	South	N	
J 32	West Otay A	South	N	
	West Otay B	South	Y	1,146
	West Otay C	South	Y	965
J 34	Bachman	South	Y	2,102
	Candlelight	South	Y	4,392
J 35	Brown Field	South	N	
J 36	Southview	South	Y	2,836
J 4	Robinhood Ridge	South	N	
	California Crossing	Central	Y	1,323
K 5	Otay Lakes	Central	N	
KK 2	Pasatiempo	South	Y	1,383
MM 1	Marron Valley	Central	N	
N 1-4	Teledyne Ryan	Central	N	
N 5-6	Montgomery Field	Central	N	
N 7	Serra Mesa Library	Central	N	
N 8	General Dynamics	North	N	
NC	Li Collins	South	N	
	Kelton	North	N	
OO	Salk Institute	Central	N	
Q2	Mission Trails Regional Park School District	Central	Y	300
Q 3	Castlerock	Central	N	
QQ	Tecolote Canyon	South	Y	1,738
R 1	Proctor Valley	Central	N	
U15	SANDER	Central	Y	
U 19	Cubic	North	Y	3,793
X 5	Nobel Drive	North	N	
X 7	Nobel Research	North	N	
Total				61,458

Type	Cost per Linear Foot (LF)
Peeler Log	$7.61
3-strand Wire	$5.50
Average Cost	$6.56
Installed LF/hr	20
Labor/hr per LF	$3.72
Loaded Rate/hr per LF	$10.28

Note: Costs include fence and sign materials plus installation by a GMM

Table F-13: City of San Diego Baseline Vernal Pool Monitoring and Management Comprehensive Cost Estimate by Complex (2014 Dollars)

Complex ID	Name	Planning Unit	Inside or Outside Baseline	Management Funding Responsibility	Total Pools with Plant Focal Species	Plant Focal Species Pools Subsample (Level 1)	Pools with Plant Focal Species (Level 2)	Pools with Plant Focal Species (Level 3)	Total Pools with Shrimp Focal Species	Shrimp Focal Species Pool Subsample (Level 1)	Shrimp Focal Species Pool Subsample (Level 2)	Shrimp Focal Species Pool Subsample (Level 3)	Total Annual Ongoing Cost for Level 1 Mngmt & Monitoring ($)	City Annual Ongoing Cost for Level 1 Mngmt & Monitoring ($)	Baseline Mngmt & Monitoring Level	Total One-Time* Cost for Required VPMMP Mngmt & Monitoring Level 2 or 3 or SSMP ($)	City One-Time* Cost for Required VPMMP Mngmt & Monitoring Level 2 or 3 or SSMP ($)	Cost for VPMMP Implementation (31 Years)	City Cost for Required VPMMP Implementation (31 Years)
B 11	Mesa Norte	North	Inside	Private	16	2	16	16	24	10	10	10	11,449	0	Level 1	0	0	354,927	0
B 6	***Lopez Ridge (CDFG)***	***North***	***Inside***	***State***	***1***	***1***	***1***	***1***	***0***	***0***	***0***	***0***	***8,539***	***0***	***Level 1***	***0***	***0***	***264,699***	***0***
B 7-8	Lopez Ridge (City)	North	Inside	City Enterprise	10	2	10	10	2	2	2	2	9,156	9,156	Level 1	0	0	283,834	283,834
C 17-18	Fieldstone	North	Inside	Private	8	1	8	8	0	0	0	0	0	0	None	0	0	0	0
C 27	Mira Mesa Market Center	North	Inside	Private	1	1	1	1	1	1	1	1	0	0	None	0	0	0	0
D 5-8	Parkdale Carroll Canyon	North	Inside	City	0	0	0	0	0	0	0	0	8,495	8,495	Level 1	0	0	263,338	263,338
	Carroll Canyon	North	Inside	City	76	11	76	76	5	5	5	5	10,411	10,411	Level 1	0	0	322,743	322,743
H 1-10, 13-15,18-23, 24-26	***Del Mar Mesa (State/Federal)***	***North***	***Outside***	***State/Federal***	***154***	***18***	***154***	***154***	***10***	***10***	***10***	***10***	***8,495***	***0***	***Level 1***	***0***	***0***	***263,338***	***0***
	Del Mar Mesa (Private)	North	Inside	Private	2	1	2	2	1	1	1	1	0	0	None	0	0	0	0
	Del Mar Mesa (City)	North	Inside	City	54	6	54	54	8	8	8	8	12,152	12,152	Level 1	0	0	376,704	376,704
	Rhodes	North	Inside	Private	12	2	12	12	4	4	4	4	8,825	0	$SSRP_3$	219,750	0	449,209	0
H 17	Shaw Lorenz	North	Inside	Private	0	0	0	0	1	1	1	1	8,781	0	Level 1	0	0	272,225	0
H 33	East Ocean Air Drive	North	Inside	Private	2	1	2	2	0	0	0	0	0	0	None	0	0	0	0
H 38	Carmel Mountain	North	Inside	City	0	0	0	0	2	2	2	2	9,068	9,068	SSRP	70,951	70,951	306,722	306,722
H 39	Greystone Torrey Highlands	North	Inside	City	6	2	6	6	0	0	0	0	8,583	8,583	Level 1	0	0	266,060	266,060
I 1	Arjons	North	Inside	Private	25	4	25	25	1	1	1	1	0	0	None	0	0	0	0
I12	Pueblo Lands	North	Inside	City Enterprise	0	0	0	0	2	2	2	2	9,068	9,068	Level 1	0	0	281,112	281,112
I 6 B	Ford Leasing (Bob Baker)	North	Inside	Private	1	1	1	1	3	3	3	3	0	0	None	0	0	0	0
I 6 C	Facilities Development (Eastgate Miramar Associates)	North	Inside	Private	11	2	11	11	6	6	6	6	0	0	None	0	0	0	0
J 11 E	Slump Block Pools	South	Inside	Private	0	0	0	0	0	0	0	0	0	0	None	0	0	0	0
J 11 W	J 11 West	South	Inside	Private	0	0	0	0	1	1	1	1	0	0	None	0	0	0	0
J 12	J 12	South	Inside	Private	0	0	0	0	0	0	0	0	0	0	None	0	0	0	0
J 13 N	South Otay 1 acre (City)	South	Inside	City	3	3	3	3	0	0	0	0	0	0	None	0	0	0	0
J 13 S	South Otay J 13 South	South	Inside	Private	0	0	0	0	0	0	0	0	0	0	None	0	0	0	0
	Bachman	South	Inside	Private	0	0	0	0	0	0	0	0	0	0	None	0	0	0	0
J 14	Anderprises (City)	South	Inside	City	0	0	0	0	0	0	0	0	8,495	8,495	Level 1	0	0	263,338	263,338
	Cal Terraces (South)	South	Inside	City	63	14	63	63	36	10	10	10	11,976	11,976	SSRP	780,650	780,650	1,092,029	1,092,029
	Brown Field Basins	South	Inside	City Enterprise	0	0	0	0	0	0	0	0	0	0	None	0	0	0	0
	Bachman	South	Inside	Private	0	0	0	0	0	0	0	0	0	0	None	0	0	0	0
J 16-18	Goat Mesa (Private)	South	Inside	Private	0	0	0	0	0	0	0	0	0	0	None	0	0	0	0
	Goat Mesa (City)	South	Inside	City Enterprise	4	1	4	4	0	0	0	0	8,539	8,539	Level 1	0	0	264,699	264,699
	Wruck Canyon	South	Inside	City	0	0	0	0	0	0	0	0	8,495	8,495	Level 1	0	0	263,338	263,338
J 2	Cal Terraces (North), Otay Mesa Road Parcels	South	Inside	City	219	70	219	219	216	11	22	43	14,664	14,664	Level 1	0	0	454,588	454,588
	Clayton Parcel	South	Inside	City	1	1	1	1	0	0	0	0	8,539	8,539	Level 1	0	0	264,699	264,699
J 27	Empire Center	South	Inside	Private	9	1	9	9	0	0	0	0	0	0	None	0	0	0	0
J 28 E	La Media Swale North	South	Inside	Private	0	0	0	0	0	0	0	0	0	0	None	0	0	0	0
J 3	***J3***	***South***	***Outside***	***State***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***None***	***0***	***0***	***0***	***0***
J 31	Hidden Trails **	South	Inside	City	0	0	0	0	1	1	1	1	8,781	8,781	Level 1	0	0	272,225	272,225
J 32	West Otay A (Private)	South	Outside	State	2	2	2	2	0	0	0	0	0	0	None	0	0	0	0
	West Otay B	South	Inside	City	0	0	0	0	0	0	0	0	8,495	8,495	SSRP	64,604	64,604	285,469	285,469
	West Otay C	South	Inside	City	1	1	1	1	0	0	0	0	8,539	8,539	Level 1	0	0	264,699	264,699
J 34	Bachman	South	Inside	Private	0	0	0	0	0	0	0	0	0	0	$None_1$	0	0	0	0
	Candlelight	South	Inside	Private	0	0	0	0	1	1	1	1	8,781	0	SSRP	66,246	0	294,564	0
J 35	Brown Field	South	Inside	City Enterprise	0	0	0	0	0	0	0	0	0	0	None	0	0	0	0
J 36	Southview	South	Inside	Private	0	0	0	0	5	10	10	10	0	0	None	0	0	0	0
J 4-5	Robinhood Ridge	South	Inside	City	50	8	50	50	41	10	10	10	11,713	11,713	Level 1	0	0	363,093	363,093
	California Crossing	South	Inside	Private	0	0	0	0	5	5	5	5	0	0	None (reporting)	0	0	0	0

Table F-13: City of San Diego Baseline Vernal Pool Monitoring and Management Comprehensive Cost Estimate by Complex (2014 Dollars)

Complex ID	Name	Planning Unit	Inside or Outside Baseline	Management Funding Responsibility	Total Pools with Plant Focal Species	Plant Focal Species Pools Subsample (Level 1)	Pools with Plant Focal Species (Level 2)	Pools with Plant Focal Species (Level 3)	Total Pools with Shrimp Focal Species	Shrimp Focal Species Pool Subsample (Level 1)	Shrimp Focal Species Pool Subsample (Level 2)	Shrimp Focal Species Pool Subsample (Level 3)	Total Annual Ongoing Cost for Level 1 Mngmt & Monitoring ($)	City Annual Ongoing Cost for Level 1 Mngmt & Monitoring ($)	Baseline Mngmt & Monitoring Level	Total One-Time* Cost for Required VPMMP Mngmt & Monitoring Level 2 or 3 or SSMP ($)	City One-Time* Cost for Required VPMMP Mngmt & Monitoring Level 2 or 3 or SSMP ($)	Cost for VPMMP Implementation (31 Years)	City Cost for Required VPMMP Implementation (31 Years)
K 5	Otay Lakes	Central	Inside	City Enterprise	46	6	46	46	6	6	6	6	10,478	10,478	Level 1	0	0	324,825	324,825
MM 1	Marron Valley	South	Inside	City Enterprise	0	0	0	0	5	5	5	5	9,928	9,928	SSRP	75,878	75,878	334,009	334,009
N 5-6	Montgomery Field	Central	Inside	City Enterprise	129	13	129	129	10	10	10	10	0	0	Level 1	0	0	0	0
N 7	Serra Mesa Library	Central	Inside	City	0	0	0	0	0	0	0	0	8,495	8,495	Level 1	0	0	263,338	263,338
N 8	General Dynamics **	Central	Inside	City	20	3	20	20	6	6	6	6	10,346	10,346	Level 1	0	0	320,741	320,741
NC N	Li Collins	North	Inside	Private	0	0	0	0	0	0	0	0	0	0	None	0	0	0	0
NC S	Kelton	South	Inside	City	0	0	0	0	0	0	0	0	0	0	None	0	0	0	0
Q 2	Mission Trails Regional Park	Central	Inside	City	0	0	0	0	6	6	6	6	10,215	10,215	Level 1	0	0	316,658	316,658
QQ	Tecolote Canyon	Central	Inside	City	0	0	0	0	0	0	0	0	0	8,495	None	0	0	0	0
R 1	Proctor Valley	South	Inside	City Enterprise	0	0	0	0	3	3	3	3	9,355	9,355	Level 1	0	0	289,998	289,998
X 5	Nobel Drive	North	Inside	City	1	1	1	1	6	6	6	6	10,259	10,259	Level 1	0	0	318,019	318,019
X 7	Nobel Research **	North	Inside	City	0	0	0	0	1	1	1	1	8,781	8,781	Level 1	0	0	272,225	272,225
												Subtotal Monitoring and Management Cost	**297,895**	**251,519**		**1,278,079**	**992,084**	**10,227,466**	**8,328,504**
												Data Tracking and Reporting (Bio III 1 day per week annually, City responsibility for all sites)	**35,360**	**35,360**				**1,096,160**	**1,096,160**
												Changed Circumstances	**54,910**	**54,910**				**1,702,216**	**1,702,216**
												Contingency Annually	**29,937**	**29,937**				**928,058**	**928,058**
												TOTAL COST	**418,103**	**371,727**		**1,278,079**	**992,084**	**13,953,900**	**12,054,938**

= Land not owned by City of San Diego.

Bold = Land not owned by City of San Diego or under the = Land not owned by City of San Diego or under the City of San Diego's land use authority.

SSRP = Site-specific Restoration Plan, not part of VPHCP. For cost-estimating purposes, Level 3 costs are assumed.

SSMP = Site-specific Management Plan, not part of VPMMP. Assumes SSMP will be updated to be consistent with the VPHCP. For cost-estimating purposes, Level 3 costs are assumed.

None$_1$ = These sites are privately held and may seek development entitlement in the future. During the development entitlement process the City will ensure the property owner implements the Recommended Management.

None$_2$ = These site have been developed pursuant to prior approval by City of San Diego. No management was required at that time, nor is any management being required as part of this VPHCP. As funding becomes available the City may work with the owner to implement the Additional Recommended Management.

* = One-time costs are assumed for a 3-year period for monitoring and management for VPMMP-required Level 2 and 5-years for Level 3. After the initial 3 or 5-years, all complexes are assumed at the annual ongoing Level 1 cost. Sites at Level 1 are NOT included in this column as they are part of the on-going annual costs.

** = Development projects were approved on these three sites after the adoption of the City of San Diego's Multiple Species Conservation Plan (MSCP) Subarea Plan (SAP). The City was granted a Conservation Easement as a condition of the discretionary land use entitlement. While the ownership is private, the City committed to provide the biological management of these sites as a condition easement pursuant to the requirements of the MSCP SAP.

City Enterprise Sites		**Department**
I12	Pueblo Lands	Public Utilities Waste Water Department
J 16-18	Wruck Canyon	Public Utilities Waste Water Department
J 35	Brown Field	Airports
K 5	Otay Lakes	Public Utilities Water Department
MM 1	Marron Valley	Public Utilities Water Department
N 5-6	Montgomery Field	Airports
R 1	Proctor Valley	Public Utilities
U15	SANDER	Environmental Services