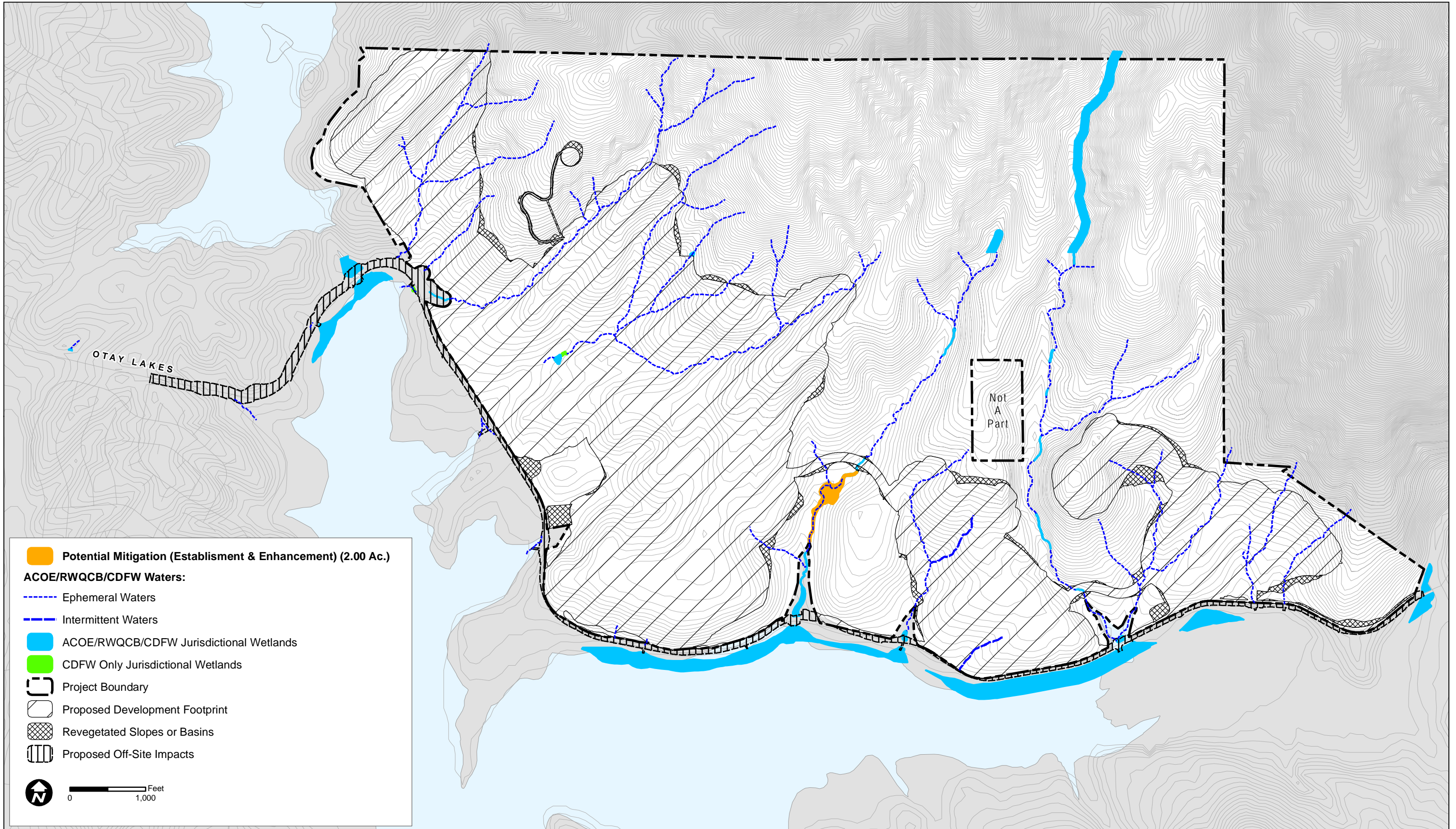


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## Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village

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### 3.1.9 Mitigation Benefit

Each potential site will be evaluated to determine the acreage and extent of mitigation that could be achieved at that location. Sites where a greater amount of potential mitigation benefits could be achieved would be ranked higher than sites that would result in fewer benefits.

### 3.1.10 Long-Term Management Considerations

Long-term management considerations, including the degree to which a site would be self-sustaining, the potential occurrence of non-native invasive plant species, future access constraints, and potential flood issues, will be evaluated for each potential mitigation site. Sites that would be self-sustaining; have less potential for the reoccurrence of invasive, non-native plant species; provide long-term access; and that would be less prone to adverse flood effects, would be considered to be more suitable for mitigation.

### 3.2 Location and Size of Compensatory Mitigation Site

Detailed information will be provided upon coordination with the resource agencies.

### 3.3 Functions and Services (Values)

To be provided.

### 3.4 Jurisdictional Delineation

The Jurisdictional Waters Delineation Map shows the jurisdictional waters, including wetlands (Figure 3). Table 8 provides a summary of the wetland resource acreages on the project site, by jurisdiction.

**Table 8**  
**Jurisdictional Waters – Acreages and Linear Feet**

	On Site		Off Site on County lands (does not include Cornerstone Lands)		Total	
	<i>Acre</i> s	<i>Linear Feet</i>	<i>Acre</i> s	<i>Linear Feet</i>	<i>Acre</i> s	<i>Linear Feet</i>
Total ACOE/CDFW/RWQCB Wetlands*	7.94	—	0.80	—	8.74	—
Total CDFW Wetlands*	0.06	—	0.03	—	0.09	—
Total ACOE/CDFW/RWQCB Ephemeral Waters	2.90	61,685	0.12	2,679	3.02	64,364
Total ACOE/CDFW/RWQCB/ Intermittent Waters	0.04	1,711	—	—	0.04	1,711
<b>Total</b>	<b>10.94</b>	<b>63,396</b>	<b>0.95</b>	<b>2,679</b>	<b>11.89</b>	<b>66,075</b>

\* See Table 1 for the acreage of specific wetland vegetation communities

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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### **3.5 Present and Proposed Uses of Mitigation Sites**

Present uses of the proposed mitigation area include undeveloped land as described in the existing conditions section.

Establishment, enhancement, and restoration will consist of wetland and riparian areas under the jurisdiction of ACOE, CDFW, and RWQCB. Enhancement and restoration sites will consist of wetland and riparian areas under the jurisdiction of RWQCB and/or CDFW. A conservation easement, deed restriction, or similar preservation mechanism, will be recorded over the mitigation areas. These mitigation areas will function as wetland and riparian vegetation communities and will be part of the dynamic fluvial process of the lake and stream systems. There will be no public access to, or use of, the mitigation sites.

### **3.6 Reference Sites**

Because all mitigation is either done on site or within the City Cornerstone lands off site, reference sites will be immediately adjacent to the mitigation sites. Reference sites have not been selected at this time.

# Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village

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## 4 MITIGATION IMPLEMENTATION PLAN

The Implementation Plan includes the following:

- Initial weed control
- Clearing and grubbing
- Topsoil salvaging where appropriate
- Grading and re-contouring wetlands establishment areas
- Applying mulch or other amendments and incorporating into topsoil if deemed necessary by soil testing
- Installing temporary irrigation system
- Weed control through weed reduction (i.e., grow-and-kill) cycles
- Installing container plants
- Applying native seed mix
- A 120-day plant establishment period
- A 5-year maintenance and monitoring period.

### **4.1 Rationale for Expecting Project Success**

Establishment areas (i.e., creation areas) will be planted with species found in impacted wetland vegetation communities observed successfully growing on site. With the use of plant species adapted to the site conditions, probability of project success is increased.

Weed control measures will be implemented for five years after the initial installation, or until ultimate performance criteria has been achieved and may include remedial actions that will be implemented, as needed, to promote project success. The suppression of weed growth and reproduction over the extended maintenance period will allow establishing native vegetation to become dominant over non-native plant species throughout the project site. The newly established vegetation will have a positive effect on many aspects of biological and hydrological functions and services including sediment entrainment, moderation of flow velocities, carbon storage, shade that will suppress non-native seedling recruitment and moderate water runoff temperatures, and enhance wildlife resources. Trash removal will occur as part of the maintenance regime during the maintenance and monitoring period.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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### **4.2 Financial Assurances**

A revegetation agreement shall be signed and notarized by the property owner following approval of this revegetation plan and accompanied by the required security as agreed upon by the County of San Diego.

### **4.3 Schedule**

To be provided following agency negotiations.

### **4.4 Site Preparation**

#### **4.4.1 Construction Plans**

Following approval of this plan, a final Conceptual Mitigation Plan, and then construction documents may be prepared for construction purposes. If prepared, construction drawings and specifications will conform to all aspects of the agency approved mitigation plan and permit conditions required by the permitting agencies. Construction documents will incorporate the most current site condition information available. Any significant changes to site conditions and final mitigation plans may be subject to review and comment by permitting agencies. The construction document plan package will include a site plan showing proposed mitigation boundaries, access routes, temporary staging/laydown areas, grading plans, , irrigation plans, planting plans, associated legends and detail sheets, a cost estimate and written specifications.

#### **4.4.2 As-Built Conditions**

As-built plans for the mitigation areas will only be required if the installation substantially deviates from this CWMMP and/or the permit conditions.

#### **4.4.3 Existing Resource Impact Avoidance**

If initial site vegetation clearing is unavoidable during the nesting bird season (March 1–September 30), the Project Biologist<sup>1</sup> will conduct pre-construction surveys no earlier than 7 days prior to ground-disturbing activities that occur during the nesting/breeding season of special-status bird species potentially nesting on the site. The pre-construction surveys will be conducted between March and September or as determined by the Project Biologist, depending on the location of the ground-disturbing activities. The purpose of the surveys will be to determine if active nests of special-status birds are present in the disturbance zone or within 500

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<sup>1</sup> The Project Biologist will be qualified to conduct all avian surveys. For nesting riparian birds, the Project Biologist will be qualified and permitted to conduct surveys for willow flycatcher and least Bell's vireo.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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feet of the disturbance zone boundary. If active nests are found, ground-disturbing activities within 300 feet of the nest (or 500 feet for most raptors and tricolored blackbird colonies) will be postponed or halted, at the discretion of the Project Biologist, until the nest is vacated and juveniles have fledged, as determined by the Project Biologist. If ground-disturbing activities are delayed, then additional pre-disturbance surveys will be conducted such that no more than 7 days elapse between the survey and ground-disturbing activities. Limits of construction to avoid an active nest shall be established in the field with flagging, fencing, or other appropriate barriers, and construction personnel will be instructed on the sensitivity of nest areas. The Project Biologist will serve as a construction monitor during those periods when construction activities are to occur near active nest areas to avoid inadvertent impacts to these nests. The Project Biologist may adjust the 300 or 500-foot setback at his or her discretion depending on the species and the location of the nest (e.g., if the nest is well protected on a rocky outcrop or buffered by dense vegetation).

### **4.4.4 Site Access**

Site access for mitigation/construction work will be located such that additional impacts to sensitive resources are not incurred. Upon completion of construction all temporary access roads will be ripped and seeded with a native erosion control mix and have temporary BMPs installed. No public access will be provided to the mitigation sites. The sites will be fenced and posted with signage indicating the presence of sensitive resource areas. Orange construction fencing and erosion control silt fence will identify the limits of mitigation work. This orange fencing will remain in place and be maintained by the Restoration Contractor through the first growing season. If the construction fencing is damaged by storm flows, it may be recommended for replacement based on the Project Biologist's discretion.

### **4.4.5 Grading**

Wetland establishment sites will require grading and contouring in order to create appropriate hydrologic conditions for the establishment of the proposed wetland vegetation communities. The grading work will result in appropriate topographic conditions for establishment of the target vegetation communities. Swales and channels will be formed with primary and secondary benches for establishing the proposed vegetation communities.

Soil samples shall be collected from the sites and analyzed for their structure and chemical makeup to determine if they would be suitable for native plant establishment. Soils will be amended if needed, based on soil test results and recommendations.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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### **4.4.6 Initial Non-Native Invasive Plant Removal**

Non-native plant species found within the mitigation sites will be controlled prior to project installation. This may include hand removal, chemical control, or mechanical removal, as directed by the Project Biologist.

All weed control and removal work shall be performed in compliance with all applicable federal and state laws and regulations, safety precautions, and pesticide label directions. The Restoration Contractor shall possess a valid California Qualified Applicator Certificate or Qualified Applicator License, and Pest Control Business License or Maintenance Gardener Pest Control Business License, as appropriate for the situation. Weed slash and debris will be bagged or containerized and removed from the site. If viable weed seed or propagules are present weed slash shall be bagged or containerized to prevent further dispersal during transport to the composting or landfill facility. Weeds that do not pose a re-germination threat may be ripped or tilled into the topsoil to add organic content, as deemed appropriate by the Project Biologist. Non-native trees and shrubs (excluding giant reed) may be chipped and used for dust control or soil amendment if deemed appropriate by the project biologist.

The Restoration Contractor shall refer to the specific pesticide label for information on proper timing, application rates, and any use restrictions. The Restoration Contractor must follow all applicable label directions, laws, regulations, and safety precautions when performing weed control. Should the Restoration Contractor require a specific weed control recommendation for any control effort, he or she shall consult a licensed pest control adviser for a written recommendation.

### **4.4.7 Erosion Control and Best Management Practices**

Proposed habitat restoration sites are located primarily within areas which may receive surface flow. Natural streambed scour and sediment deposition associated with periodic high-velocity storm flows is expected. Since this is considered a desirable natural occurrence, no other artificial measures to modify or control fluvial processes are proposed.

To minimize the potential for loss of soils and vegetation from the sites during construction the installation and planting should be started in the spring, if irrigation is available to the site, after the likelihood of significant storm events has decreased. This will allow for an establishment period before the first fall rainy season. BMPs including, but not limited to silt fences, fiber rolls, and gravel bags will be incorporated into the final revegetation construction documents or erosion control plans, as appropriate..



## Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village

BMPs affected/lost due to storm flow events will be replaced, modified, or repaired. If the mitigation project includes one-acre or more of grading and or ground disturbance activities a Stormwater Pollution Prevention Plan (SWPPP) will be prepared by a Qualified SWPPP Developer (QSD) and the site monitored by a Qualified SWPPP Practitioner (QSP) during construction.

### **4.5**      **Planting Plan**

#### **4.5.1**      **Plant Palettes**

A total of four vegetation communities will be established on site: cismontane alkali marsh, freshwater marsh, mulefat scrub, and southern willow scrub. Disturbed habitat will be mitigated as freshwater marsh. No planting will occur for open water, ephemeral waters, and intermittent waters. Planting will only occur for establishment (creation) sites. No initial planting will occur for enhancement or revegetation for temporary impacts (see Section 1.4 for discussion of temporary impacts). If areas of temporary impact are not meeting annual performance criteria by the end of year two of the monitoring period, then installation of hydroseed and container plants may be recommended.

##### **4.5.1.1**      ***Coastal and Valley Freshwater Marsh***

This vegetation community is described in Section 1.6.3. A site-specific plant palette is shown in Table 9.

**Table 9**  
**Coastal and Valley Freshwater Marsh Container Plant Palette**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Size</b>	<b>Spacing (feet on center)</b>	<b>Plants per Acre</b>
<i>Anemopsis californica</i>	yerba mansa	liners	3	242
<i>Eleocharis macrostachya</i>	Pale spikerush	liners	3	194
<i>Juncus mexicana</i>	Mexican rush	liners	3	290
<i>Juncus xiphioides</i>	iris-leaved rush	liners	3	194
<i>Leymus triticoides</i>	creeping wild rye	liners	4	163
<i>Schoenoplectus americanus</i>	Common three-square	liners	3	242
<i>Schoenoplectus californicus</i>	Tule	liners	4	681
<b>Total</b>				<b>2,006</b>

## Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village

### 4.5.1.2 Southern Willow Scrub

This vegetation community is described in Section 1.6.6. A site-specific plant palette is shown in Table 10. Although willows can be planted as cuttings, the project proposes to use container plants due to the relatively dry environment.

**Table 10**  
**Southern Willow Scrub Plant Palette**

Botanical Name	Common Name	Container Size (gallon)	Average Spacing (feet on center)
<i>Container Plants</i>			
<i>Baccharis salicifolia</i>	mulefat	1	8
<i>Carex spissa</i>	San Diego sedge	1	4
<i>Iva hayesiana</i>	San Diego marsh elder	1	4
<i>Muhlenbergia rigens</i>	deergrass	1	4
<i>Juncus acutus</i>	spiny rush	1	4
<i>Rosa californica</i>	California wild rose	1	8
<i>Rubus ursinus</i>	California blackberry	1	8
<i>Salix exigua</i>	sandbar willow	1	8
<i>Salix lasiolepis</i>	arroyo willow	1	8
<i>Salix gooddingii</i>	black willow	1	8
<b>Hydroseed Mix</b>		<b>% Purity/ % Germination</b>	<b>Lbs. Per Acre</b>
<i>Ambrosia psilostachya</i>	western ragweed	2/30	2
<i>Anemopsis californica</i>	yerba mansa	45/60	4
<i>Artemisia douglasiana</i>	mugwort	10/50	6
<i>Artemisia palmeri</i>	San Diego sagewort	15/50	4
<i>Leymus triticoides</i>	beardless wild rye	90/80	3
<i>Oenothera elata</i>	evening primrose	98/75	1
<i>Pluchea odorata</i>	marsh fleabane	35/60	2
<b>Total Lbs. Per Acre</b>			<b>22</b>

**NOTE:** All hydroseed mixes shall include seed mix indicated in Lbs. per acre and virgin wood cellulose fiber mulch at 2,500 Lbs. per acre.

### 4.5.1.3 Mulefat Scrub

This vegetation community is described in Section 1.6.4. A site-specific plant palette is shown in Table 11.

**Table 11**  
**Mulefat Scrub Plant Palette**

Botanical Name	Common Name	Container Size (gallon)	Average Spacing (feet on center)
<i>Container Plants</i>			
<i>Baccharis salicifolia</i>	mulefat	1	8
<i>Iva hayesiana</i>	San Diego marsh elder	1	4

## Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village

**Table 11**  
**Mulefat Scrub Plant Palette**

Botanical Name	Common Name	Container Size (gallon)	Average Spacing (feet on center)
<i>Leymus condensatus</i>	giant wild rye	1	6
<i>Muhlenbergia rigens</i>	deergrass	1	4
<i>Rubus ursinus</i>	California blackberry	1	8
Hydroseed Mix		% Purity/ % Germination	Lbs. Per Acre
<i>Ambrosia psilostachya</i>	western ragweed	2/30	2
<i>Artemisia douglasiana</i>	mugwort	10/50	5
<i>Artemisia palmeri</i>	San Diego sagewort	15/50	4
<i>Oenothera hookeri</i>	Hooker's evening primrose	98/75	1
<i>Pluchea odorata</i>	marsh fleabane	35/60	2
Total Lbs. Per Acre			14

**NOTE:** All hydroseed mixes shall include seed mix indicated in Lbs. per acre and virgin wood cellulose fiber mulch at 2,500 Lbs. per acre.

### 4.5.1.4 Cismontane Alkali Marsh

This vegetation community is described in Section 1.6.1. A site-specific plant palette is shown in Table 12.

**Table 12**  
**Cismontane Alkali Marsh Plant Palette**

Scientific Name	Common Name	% Purity/ % Germination	Rate (Lbs./Acre)
<i>Seed Mix</i>			
<i>Ambrosia psilostachya</i>	Western ragweed	2/30	1
<i>Distichlis spicata</i>	Salt grass	80/60	4
<i>Leymus triticoides</i>	Alkali rye	90/80	1
<i>Pluchea odorata</i>	Marsh fleabane	35/60	0.5
Total Lbs./Acre			6.5
<b>Container Plants</b>			
Scientific Name	Common Name	Size	Spacing (feet on center)
<i>Anemopsis californica</i>	Yerba mansa	1 gallon	3
<i>Baccharis salicifolia</i>	Mulefat	1 gallon	8
<i>Distichlis spicata</i>	Salt grass	liners	1
<i>Iva hayesiana</i>	San Diego marsh elder	1 gallon	3
<i>Juncus acutus ssp. leopoldii</i>	Southwestern spiny rush	1 gallon	5
<i>Juncus mexicana</i>	Mexican rush	1 gallon	3
<i>Malvella leprosa</i>	Alkali mallow	1 gallon	3
<i>Scirpus americanus</i>	Winged three-square	1 gallon	3
<i>Sporobolus airoides</i>	alkali sacaton	1 gallon	3

**NOTE:** All hydroseed mixes shall include seed mix indicated in Lbs. per acre and virgin wood cellulose fiber mulch at 2,500 Lbs. per acre.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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### **4.5.2 Container Plant Installation**

Implementation of this plan must be coordinated with the Restoration Contractor, Applicant, the grading contractor, and the Project Biologist. Plant materials for the planting plan will include container stock, and native seed mixes as indicated herein. The Project Biologist will check container plants for viability, general health, and to ensure they are free of weeds, insect pests and disease upon their arrival at the mitigation site. Plant materials not meeting acceptable standards will be rejected. The Project Biologist will confirm plant species and quantities after delivery. Plants will be placed by the Restoration Contractor, and locations adjusted by the Project Biologist prior to planting.

Standard planting procedures will be employed for installing container plants. Holes will be dug at two times the diameter of the rootball of the plant and the same depth as the container. Holes will be filled with water and allowed to drain immediately prior to planting. Backfill soil containing amendments will be placed in each planting hole following soaking; container plants will be installed so that the top of the root ball even with the surrounding grade. Some woody riparian plant species specified by the Project Biologist will be planted into the soil slightly deeper than standard, approximately 2 to 4 inches above the root collar of the plant. This additional planted depth will help ensure sufficient rooting strength and provide additional protection against seasonal scour and/or uprooting due to high flow velocities after winter storm events.

Amendments for backfill will be based on agricultural suitability soil test results. Amendments will be incorporated as backfill as to specifically support initial establishment of the target container plant. No commercial fertilizer will be broadcast onto the soil surface, as this can promote weed growth. Additional mycorrhiza inoculant will not be added at the time of planting, as the majority of native plant nurseries inoculate container plants at the time of potting. Furthermore, mycorrhizal colonization is anticipated to occur naturally through the native soil.

A mulch of weed-free organic material will be applied around container plants that are not within the expected flow path of the channel. Mulch will be applied in a diameter of 2 feet or 1.5 times the drip line, whichever is greater. Mulch will be 3 to 4 inches deep. This mulch is in addition to the mulch made from salvaging/chipping native material from on site.

### **4.5.3 Seed Application**

After container plant installation, mitigation areas will be seeded with the specified seed mixes for each vegetation community. The Project Biologist will inspect and approve labels for each mixture prior to application. Seed may be applied in a hydromulch or by hand (applied with a calibrated belly spreader and raked into the soil). If applied in a hydromulch,

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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the hydromulch shall contain the specified seed mix at the prescribed rate per acre: virgin wood cellulose fiber mulch at 2,000 pounds per acre, amendments based on soil test results, and a commercial guar gum-based binder at 100 pounds per acre.

### **4.6        Irrigation System Installation**

The primary goal of this plan is to establish native vegetation communities capable of maintaining and supporting themselves in perpetuity. However, native container plants and seed may require irrigation for establishment on the mitigation areas, especially during summer months. Therefore, a temporary, on-grade system is recommended to facilitate plant establishment until the vegetation can survive without supplemental water based on observed and predicted seasonal rainfall, overland flow, and effective plant rooting depth.

Due to the potential for high-velocity storm flows, an irrigation system is not recommended for lower elevation areas in the flow paths of channels. The system will be installed on the primary and secondary benches outside of the anticipated flow paths.

The Restoration Contractor will install all irrigation in accordance with the construction documents and specifications. The irrigation system will be designed with aboveground components to facilitate removal once the system is decommissioned.

Supplemental irrigation will only be used during plant establishment, as the goal of the restoration effort is to create native, self-sustaining plant communities. The irrigation schedule will be set to promote deep rooting of plant materials, with infrequent, long-duration cycles. Irrigation use will be discontinued at least 2 years before the end of the 5-year maintenance period to demonstrate the vegetation community's ability to survive without supplemental water.

A temporary water meter will be installed, or, if available, the temporary irrigation system may be connected to adjacent permanent landscape irrigation. Irrigation design and layout will be provided with the final construction plans.

The irrigation system may utilize a series of solar-operated controllers that operate independent irrigation circuits, minimizing irrigation maintenance requirements for the project site. Irrigation on site will likely consist of polyvinyl chloride or high-density polyethylene pipe staked at grade, with coverage provided by spray heads, and possibly drip emitters where applicable.

Should portions of the irrigation system become damaged or lost, they will be replaced, and the design modified based on the individual circumstances per the Project Biologist's recommendations.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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# Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village

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## 5 MAINTENANCE ACTIVITIES DURING THE MONITORING PERIOD

All mitigation areas will be subject to the requirements specified in this plan, including mitigation areas for temporary impacts both on and off site. The Applicant will be responsible for ensuring the maintenance and monitoring of the mitigation sites until the permitting agencies grant release of mitigation obligations.

Because the goal of this plan is to reestablish natural vegetation communities that can support themselves with little or no maintenance, the primary effort of the maintenance plan is concentrated in the first few seasons of plant growth following the restoration and enhancement efforts, when weeds can easily out-compete native plants. The intensity of the maintenance activity is expected to subside each year as the native plant materials become more established and as local competition from non-native plants for resources in the mitigation areas is minimized through control of non-native plants.

### **5.1 Maintenance Activities**

#### **5.1.1 Pest Management**

In general, little or no pest control, other than non-native plant species control, is anticipated for the Mitigation Project. The Project Biologist will advise the Restoration Contractor as to which pest species to control. The concepts of integrated pest management (Dreistadt 1994) will be used on this project.

Target weed species include those on the most current version of the California Invasive Plant Council's (Cal-IPC) *California Invasive Plant Inventory* (Cal-IPC 2006/ 2014). Additional species beyond those listed in the Cal-IPC resource may require control. The Project Biologist will determine any additional species requiring control. Based on the discretion of the Project Biologist, some innocuous, naturalized annual weeds that are common to the area but do not normally out-compete or invade native habitats may be tolerated.

Physical removal of non-native plants, including the roots, may be the best method for those species for which the root system can readily be pulled out with the aboveground portions of the plant. These species will be physically removed before seed-set. If hand removal is possible only after seed-set, then seed heads will be cut off, bagged, and removed from the site prior to the weed removal.

Herbicides will be used for the invasive plant species that have root systems that are impractical to remove or that regenerate from root fragments. Any herbicide use should be conducted using methods that minimize effects to adjacent/desirable native species, such as brush application or

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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spot spraying. Only herbicides registered for aquatic use can legally be used in locations where they might come in contact with open water.

Follow-up control measures will likely be necessary for invasive plant species with extensive root systems that cannot usually be killed with one herbicide application. Follow-up herbicide treatment should be done at the biologically appropriate time when the recovering plants are still relatively small and before they have time to regain strength and vigor.

Invertebrate pests, such as snails, slugs, insects, mites, spiders, etc., are not expected to be a significant problem in the project area but will be controlled by the Restoration Contractor, if necessary. Vertebrate pests, such as gophers, ground squirrels, rabbits, rats, voles, etc., may become a problem and will be controlled by the Restoration Contractor, if necessary. Vertebrate pests classified as non-game mammals by CDFW may be taken at any time and in any manner, but game mammals have certain restrictions that must be met before they can be controlled, and a hunting license and/or scientific collecting permit may be required. Snail control may be required during the establishment period when the irrigation system is operated regularly. Plant diseases could become a problem during the plant establishment period but can generally be prevented or controlled by cultural measures.

Pest control will be conducted following all applicable laws, regulations, label directions, and safety precautions. Should the Restoration Contractor require specific pest control recommendations, he or she shall consult a licensed pest control adviser. The Restoration Contractor shall provide reports of all pest control measures implemented at the site, including details of method used, including any pesticide applications. Copies of any written recommendations shall also be provided. The Restoration Contractor shall provide copies of all pesticide use reports to the appropriate entity to document pesticide use and reporting.

### **5.1.2 Trash Removal**

Trash will be removed from the mitigation areas by hand during maintenance visits. Trash consists of all man-made materials, equipment, or debris dumped, thrown, washed, blown, and left within the mitigation areas. Trash and inorganic debris washed or blown onto the mitigation sites will be removed regularly. Deadwood and leaf litter of native trees and shrubs will not be removed. Downed logs and leaf litter provide valuable micro-habitats for invertebrates, reptiles, small mammals, and birds. In addition, the decomposition of deadwood and leaf litter is essential for the replenishment of soil nutrients and minerals.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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### **5.1.3 Irrigation Maintenance**

The majority of the sites will be irrigated to promote plant survival during the drier parts of the year, primarily the summer months. Irrigation may be used in winter months to simulate an average or above-average rain season if natural precipitation is lacking. Irrigation is expected to last for a maximum of 3 years. Once the plants have become established, irrigation will be gradually reduced over time to acclimate plants to a non-irrigated condition prior to complete cessation of irrigation. Irrigation from June to November may be minimized to allow plants to experience normal drought cycles and to promote appropriate root growth. The Restoration Contractor will maintain the irrigation system at the optimum level of operation.

Consultation with the Project Biologist will be necessary to determine the timing for the cessation of irrigation. Irrigation should stop at the earliest possible date without risking significant plant loss. It is expected that the irrigation system will be abandoned no earlier than the end of year one of the 5-year monitoring and maintenance period. Irrigation is expected to be diminished in years two and three and discontinued at the end of year three.

### **5.2 Maintenance Schedule**

Maintenance activities will be conducted concurrent with installation of mulch, container plant, and seed materials in the mitigation areas, and will continue throughout the initial 120-day establishment period, through the long-term maintenance and monitoring period, and concluding once success criteria have been met. Restoration Contractor maintenance activities on the site are anticipated to be conducted monthly during the first year, every 2 months during the second year two and quarterly thereafter during the 5-year maintenance period.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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# Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village

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## 6 MONITORING PLAN FOR THE MITIGATION SITES

To ensure that the Mitigation Project meets success criteria to be established by the permitting agencies, a 5-year monitoring period will be implemented. Monitoring will consist of construction/installation monitoring, monitoring during the 120-day plant establishment period, and monitoring during the 5-year maintenance period. The project site will be monitored by the Project Biologist, who will then make recommendations to the Restoration Contractor to perform maintenance tasks necessary to keep the project site in compliance with success criteria. Should the project not meet the final sign-off criteria by the end of year five, the monitoring period may be extended until agency signoff is obtained.

### **6.1 Performance Standards and Success Criteria**

Performance standards include minimum growth, survivorship, and vegetative cover target criteria, as well as target functions and services based on a functional assessment. A combination of assessment methods are important to understanding the ecological functioning and, thereby, the success of the mitigation.

#### **6.1.1 CRAM Functional Assessment**

The California Rapid Assessment Method (CRAM) will be utilized as a tool for characterizing and describing the state and progression of the mitigation sites. CRAM is a functional assessment methodology that could be used routinely to assess and monitor the condition of wetlands and riparian habitats. CRAM was developed through collaborations among the San Francisco Estuary Institute, the Southern California Coastal Water Research Project, the Central Coast District of the California Coastal Commission, and the Moss Landing Marine Laboratory.

CRAM provides a means of assessing wetland conditions based on field observations that correlate to quantitative measures of wetland function, condition, or beneficial use that vary predictably along gradients of environmental stress. Stressors such as habitat conversion, biological invasion, hydro-modification, and pollution are anthropogenic causes of changes in wetland function.

CRAM scores are based on best-fit narrative descriptions of habitat condition among a standardized set of mutually exclusive descriptions. Each wetland class has a particular set of narrative descriptions that allow comparison of CRAM scores within a wetland class, but not between classes for local, regional, and statewide monitoring purposes. CRAM attributes and metrics are presented in Table 13. Specific details about the individual attributes and metrics and the methodology used to conduct the CRAM analysis can be found in the *California Rapid Assessment Method for Wetlands*, version 6.1 (Collins et al. 2013).

## Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village

**Table 13**  
**CRAM Attributes and Metrics**

Attributes		Metrics	
Buffer and Landscape Context		Landscape Connectivity	
		Buffer	Submetric A: Percent of AA with Buffer
			Submetric B: Average Buffer Width
			Submetric C: Buffer Condition
Hydrology		Water Source	
		Hydroperiod or Channel Stability	
		Hydrologic Connectivity	
Structure	Physical	Structural Patch Richness	
		Topographic Complexity	
	Biotic	Plant Community	Submetric A: Number of Plant Layers Present or Native Species Richness (vernal pools only)
			Submetric B: Number of Co-dominant Species
			Submetric C: Percent Invasion
		Horizontal Interspersion and Zonation	
		Vertical Biotic Structure	

**Source:** Collins et al. 2013.

**Note:** AA = assessment area

Each metric and submetric is initially given a letter score A through D. The letter scores are converted to numerical scores upon completion of the CRAM assessment, and metric and submetric scores are combined to create the four attribute scores. The total attribute scores are calculated by dividing the raw attribute score (the sum of each metric and/or submetric within an attribute) by its maximum possible raw score. Each final attribute score has a potential maximum value of 1.00 and a minimum value of 0.25. The overall CRAM score for each assessment area (AA) is calculated by averaging the four final attribute scores. The total overall CRAM score can range from 0.25 to 1.00.

A baseline CRAM assessment will be performed prior to project initiation for each mitigation site to determine existing baseline CRAM scores prior to implementation of the mitigation and monitoring period. This will also inform the Project Biologist of realistic and attainable positive changes in individual CRAM attributes. These CRAM target attributes will be established by the Project Biologist, and presented in the first annual report. CRAM is scheduled to be performed during years 3 and 5 of the maintenance and monitoring period. Results of the CRAM events will be presented in the years 3 and 5 annual reports respectively.



## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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### **6.1.2 Growth, Survivorship, and Vegetative Cover Success Criteria**

Minimum growth, survivorship, and cover performance shall be measured based on random samples taken during annual monitoring. If the minimum growth, survivorship, and/or cover are not achieved for these evaluations, then the Applicant shall be responsible for taking the appropriate corrective measures to achieve the specified growth, survivorship, and/or cover criteria. The Applicant shall be responsible for any costs incurred during the revegetation or in subsequent corrective measures. If "acts of Nature" (flood, fires, or drought) occur after the vegetation communities have met the 3-year criteria for growth, survival, and cover, the Applicant will not be responsible for replanting damaged areas. If these events occur prior to the plants meeting the 3-year criteria, the Applicant shall be responsible for replanting the area one time only.

Minimum growth performance standards are based on expected growth of the planted tree species. Vegetation communities to be established on site that will be planted with tree species include SWS and MFS.

In addition to native cover performance criteria, the success of the site shall be evaluated by the cover of non-native species. The cover of non-native species shall not exceed 10% at any time during the period of documenting successful restoration.

Performance criteria will be utilized to help assess the annual progress of the mitigation sites and are regarded as interim project objectives designed to achieve the final goals. Fulfillment of these criteria will indicate that the site is progressing toward the vegetation communities that constitute the long-term goals of the mitigation plan. If mitigation efforts fail to meet the performance standards listed in any one year, the Project Biologist may recommend remedial actions to be implemented (e.g., supplemental planting, seeding, transplanting, changes to cultural practices, etc.) that will enhance the vegetation communities to a level in conformance with performance standards.

### **6.2 Target Functions and Services (Values)**

To be provided.

### **6.3 Target Hydrological Regime**

To be provided.

### **6.4 Target Acreages**

To be provided.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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### **6.5      Monitoring Methods**

After each site visit by the Project Biologist, a site observation report will be provided to the Applicant and to the Restoration Contractor. The site observation report will include a description of the project status, site conditions, and any maintenance recommendations or remedial actions.

The Project Biologist will perform monitoring of the mitigation areas during the 120-day establishment period and regularly throughout the duration of the project. Frequency of monitoring is shown in Table 14. Both horticultural (qualitative) monitoring and biological (quantitative) monitoring will be conducted at the mitigation areas. On an annual basis, the Project Biologist will provide a complete summary of results of the monitoring activities completed in the prior year period.

#### **6.5.1      Construction/Installation Monitoring**

The Project Biologist will make regular site visits during project implementation. The Project Biologist also will review activities for conformance to this plan, environmental permit conditions, and the requirements of contract plans and specifications. Each site observation visit will be documented in an observation report. Photo-documentation of site conditions will be conducted, as needed.

#### **6.5.2      120-Day Plant Establishment Period and Monitoring**

Upon successful completion of installation the 5-year long-term monitoring phase will begin. During the first 120 days of the long-term monitoring period, container plants will be monitored for health and vigor. Should any of the container plants die during the 120-day plant establishment period, they should be replaced in kind at the expense of the Restoration Contractor to 100% the original quantities, at the recommendation of the Project Biologist.

The Project Biologist will perform monitoring monthly (every 30 days) during the 120-day plant establishment period and will make recommendations to the Restoration Contractor to ensure conformance with the 120-day plant establishment requirements.

While not part of the initial 120-day plant establishment period, seed/hydroseed that fails to adequately germinate after it is applied in the third phase of project installation shall be reapplied at the expense of the Restoration Contractor, as determined by the Project Biologist.

At the end of the 120-day establishment period, weeds will make up no more than 5% of the entire cover on site, and invasive exotic plant species such as perennial pepperweed, giant reed, and salt cedar will be fully controlled on the project site.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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### **6.5.3 Qualitative Monitoring**

Data of native vegetation coverage, weed presence, and site progress will be collected during monitoring visits to be used in the annual monitoring report. Qualitative monitoring will be conducted to assess native plant vigor and development, seedling recruitment from native seed application and natural sources, soil moisture content, presence/absence of plant pests or diseases, erosion and/or drainage conditions on site, presence/absence of non-native or invasive plant species, trash or debris accumulation, wildlife presence/absence, and project fencing. All qualitative monitoring visits to the mitigation areas will be documented with a monitoring report, which will be forwarded to the Restoration Contractor and the Applicant. Any project deficiencies will be noted in the monitoring report, with accompanying recommendations for maintenance or remedial actions.

### **6.5.4 Quantitative Monitoring**

Quantitative monitoring will be conducted to determine native species cover and composition and total non-native species cover and composition.

Quantitative monitoring will be conducted by establishing permanent vegetation transects within the mitigation areas at random locations by the Project Biologist at the end of year one. These transects will be utilized to help determine achievement of the yearly performance standards and compliance with agency standards, and a permanent photo-documentation station will be established along each transect to record the progress of the mitigation site and graphically record plant establishment over the 5-year period.

Transects will be sampled using the point-intercept method. A transect tape will be run between two posts, and vegetative intercept line will be visually projected above and below the tape at every half-meter mark. Transects will be no longer than 25 meters, but may vary in length based on location, and size of the individual restoration or enhancement area. Each herb, shrub, or tree that intercepts the projected line will be recorded by species. In addition, all plant species present within the 5-meter-wide "species richness" portion of each transect will be recorded by species. All data will be utilized to determine total percent plant cover, percent native cover, percent non-native cover, and overall species richness and diversity. Quantitative monitoring will be conducted once annually beginning in year one and extending through year five of the Mitigation Project.

## **6.6 Monitoring Schedule**

A preliminary monitoring schedule is shown in Table 14.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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**Table 14  
Preliminary Monitoring Schedule**

<b>Year</b>	<b>Frequency</b>	<b>Annual Report</b>
1	Monthly	January
2	Every other month	January
3	Every other month	January
4	Quarterly	January
5	Quarterly	January

### **6.7 Annual Monitoring Reports**

Monitoring reports shall be prepared in accordance with agency permit conditions and as outlined in the approved conceptual mitigation plan.

Annual monitoring reports will be submitted to the permitting agencies and the Applicant during the 5-year maintenance and monitoring period of the proposed project. Annual reports outlining the results of the vegetation community monitoring will be submitted in the first month of each calendar year. The monitoring reports will describe the existing conditions of the project areas derived from qualitative field observations and quantitative vegetation data collection. The reports will provide a comparison of annual success criteria with field conditions, identify all shortcomings of the project, and recommend remedial measures necessary for the successful completion of the enhancement project. Each yearly report will provide a summary of the accumulated data. Annual reports also will include:

- A list of names, titles, and companies of persons who prepared the annual report and participated in monitoring activities
- A copy of the resource agency permits, special conditions, and subsequent letters of modification
- Prints of biological monitoring photographs, as appropriate
- Maps identifying monitoring areas, planting zones, and weed removal areas, as appropriate
- Quantitative data from transect measurements in years one through five of the mitigation efforts
- Results of the CRAM analysis in the years that a functional assessment is conducted

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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Any significant issue or contingency that arises on the job site (e.g. plant survival issues, fire, or flooding) shall be reported in writing to the County of San Diego within two weeks from the date of the incident. Accompanying the report shall be a plan for remediation, with an implementation schedule and a monitoring schedule.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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### **7 COMPLETION OF COMPENSATORY MITIGATION**

#### **7.1 Agency Notification at End of Monitoring Period**

The Applicant will notify the permitting agencies upon submitting the annual report for the final year that the 5-year monitoring period is complete. If the mitigation project is meeting established performance criteria, the Applicant will request acceptance of the site and release from the permit conditions. If the Mitigation Project is not meeting established performance criteria, an analysis of the shortcomings will be elucidated and a resolution will be proposed. Removal of the irrigation system and temporary fencing would occur prior to final sign-off.

#### **7.2 Regulatory Agency Confirmation**

Following receipt of the notification of completion, the permitting agencies may request a site visit to confirm completion of the mitigation effort, in accordance with permit conditions.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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### **8 CONTINGENCY MEASURES**

If the final success criteria are not met, the Project Biologist and the Applicant will prepare an analysis of the cause(s) of failure within the appropriate annual report and, if determined necessary by permitting agencies, propose remedial action for agency approval. The Applicant's maintenance and monitoring obligations will continue until contingency measures are negotiated and implemented to bring the mitigation site into compliance with the established standards or until the permitting agencies grant final mitigation project permit compliance/approval.

#### **8.1 Initiating Contingency Procedures**

Adaptive management will be implemented in the event of unforeseen or unpredictable circumstances. Due to the complexity and dynamic nature of ecosystems, and anticipation of unexpected events or outcomes, a flexible resource management plan is desirable.

For purposes of this Mitigation Project, adaptive management is defined as a flexible, iterative approach to the long-term management of biological resources that is directed over time by the results of ongoing monitoring activities and direct observation of environmental stressors that are producing adverse results within the mitigation areas. Adaptive management will include the utilization of regular qualitative assessments and rapid qualitative assessment data gathered in the field prior to and during the mitigation effort to assess the health and vigor of vegetation communities within the mitigation areas. Rigorous and consistent monitoring is key to effective adaptive management to ensure that the decisions regarding future management are based on accurate assessments of the status of the resources being managed. Following an event that causes damage to all or part of a mitigation area, the data will be used in part to drive management considerations for repair of the damaged areas.

It is the intent of the adaptive management strategy in this plan to intervene only as necessary to help ensure the conservation of the functions and services of the mitigation sites and the conservation of native vegetation communities and individual native species within the mitigation sites. Remedial measures will only be implemented if it is determined, in consultation between the Applicant, the Project Biologist, and the resource agency personnel, that there is a risk to the persistence of the functions and services, native vegetation, or native species on site. Achieving the key goals of mitigation completion and establishment of self-sustaining native vegetation communities will be the focus of adaptive management decisions. Individual environmental stressors are discussed below, along with an anticipated range of management responses to correct damage that may occur to the mitigation areas.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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In addition to the dynamic nature of ecosystems discussed above, the area surrounding the sites will be subject to changes associated with the proposed development. These changes may result in unanticipated consequences that may need to be addressed. Therefore, the approach of the mitigation program may be altered to respond to changed conditions and to better ensure the persistence of the intended functions and services of the habitats within the mitigation sites. Any substantial deviations from the approved conceptual mitigation plan shall be approved by the resource agencies prior to implementation of new programs.

### **8.1.1 Herbivory**

Some grazing and browsing by native mammals is expected to occur within the mitigation areas. The plant palettes for each vegetation community have been designed to accommodate a moderate level of plant browsing. If browse levels should become elevated (i.e., if significant plant mortality and cover reduction occurs) as indicated by qualitative or quantitative monitoring of the mitigation sites, remedial measures may be recommended. Browse guards (plastic fencing or tree shelters) may be installed around the base of tree and young shrub container plants in affected areas to reduce plant mortality. In addition, remedial planting or seeding may be necessary depending upon the stage of the mitigation effort. If irrigation has not been ceased, then remedial planting with container plants may be possible to restore cover. If irrigation has ceased, then remedial seeding utilizing hand tools may be possible within affected areas to help restore cover. Each of these options would require the use of contingency funds to restore affected areas.

### **8.1.2 Flooding**

Flooding is anticipated to occur annually within the active stream channels. Flooding may periodically reduce overall plant cover within the active stream channel. If monitoring of the channel indicates that cover is being reduced below acceptable levels, remedial planting (if irrigation is operational) or seeding may be required. Additional mulch, cuttings, or container plants may be placed in strategic areas to address changed flow characteristics of the stream channel. Due to the highly volatile nature and flood regime of the portions of the mitigation sites, additional flow entrainment or velocity protection features may be recommended.

### **8.1.3 Drought**

Seasonal drought is a normal annual cycle in San Diego County, and all plant palettes have been designed with drought-tolerant plant species that are capable of withstanding seasonal fluctuations in available moisture. However, an extended drought could potentially occur, including low seasonal rainfall and prolonged high temperatures that may negatively affect the mitigation areas

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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(e.g., lower native cover, higher plant mortality, increased potential for pest infestations on site, etc.). Irrigation will reduce or eliminate the effects of drought on container plants and seedlings during the first 3 years of the mitigation effort. Any remedial options that may be necessary after 2 years from the installation date will likely require an additional period of site irrigation to relieve plants from drought stress and/or provide for new seed growth. All irrigation components will be left in place after year three in case remedial seeding and/or container planting is required at a later project date. If the irrigation system is required at a later date, it should be used only as necessary (i.e., periodic watering versus regular daily watering). After successful completion of the mitigation effort, the irrigation system will be removed from the site.

### **8.2      Alternative Locations for Contingency Compensatory Mitigation**

To be provided.

### **8.3      Funding**

The applicants will be responsible for funding the contingency measures if needed.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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### **9 LONG-TERM MANAGEMENT**

The primary focus of this mitigation plan is on the successful restoration of comparable wetland vegetation communities that will be impacted by the Resort Village project. The overall management goals of the mitigation program are designed to manage the mitigation sites such that none of the intended functions and services of the sites are lost over time, and so that the presence of native habitats and individual native species are conserved. The long-term management will be done in accordance with the requirements of the permits.

## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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## Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village

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## **Conceptual Wetlands Mitigation and Monitoring Plan for the Otay Ranch Resort Village**

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# **APPENDIX J**

## ***Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village***



## **APPENDIX J**

### **CONCEPTUAL VERNAL POOL MITIGATION PLAN**

**for the**

**OTAY RANCH RESORT VILLAGE**

**GPA 04-003; SPA 04-002; R04-009; TM 5361RPL; S08-028;  
ER#04-19-005; KIVA#03-1004387**

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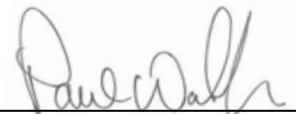
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# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

## TABLE OF CONTENTS

<u>Section</u>	<u>Page No.</u>
1 DESCRIPTION OF THE DEVELOPMENT PROJECT/IMPACT SITE FOR WHICH COMPENSATORY MITIGATION IS REQUIRED .....	1
<u>1.1 Responsible Parties</u> .....	1
<u>1.2 Location of the Development Project</u> .....	1
<u>1.3 Summary of Overall Development Project with Proposed Compensatory Mitigation</u> .....	1
1.3.1 Topography .....	2
1.3.2 Vegetation Types .....	7
1.3.3 Sensitive Plant Species .....	8
1.3.4 Sensitive Wildlife Species .....	11
1.3.5 Sensitive Resources Affected by the Project .....	18
1.3.6 Vernal Pool Impacts and Mitigation.....	23
2 GOAL OF THE COMPENSATORY MITIGATION PROJECT.....	29
<u>2.1 Responsibilities</u> .....	29
2.1.1 Applicant Responsibilities .....	29
2.1.2 Project Biologist Responsibilities .....	29
2.1.3 Restoration Contractor Responsibilities .....	30
2.1.4 Landscape Maintenance Contractor Responsibilities .....	31
2.1.5 Seed and Plant Collection and Procurement Responsibilities ...	31
<u>2.2 Types and Areas of Habitat to be Restored</u> .....	32
<u>2.3 Functions and Values to be Restored</u> .....	32
<u>2.4 Time Lapse</u> .....	33
<u>2.5 Cost</u> .....	33
3 PROPOSED VERNAL POOL MITIGATION SITES .....	35
<u>3.1 Site Selection</u> .....	35
3.1.1 Soils .....	35
<u>3.2 Location and Size of Compensatory Mitigation Site</u> .....	36
<u>3.3 Functions and Values</u> .....	39
<u>3.4 Present and Proposed Uses</u> .....	39
<u>3.5 Reference Sites</u> .....	39
4 IMPLEMENTATION PLAN FOR THE COMPENSATORY MITIGATION SITE .....	41
<u>4.1 Rationale for Expecting Implementation Success</u> .....	41

# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

## TABLE OF CONTENTS (CONTINUED)

<u>Section</u>		<u>Page No.</u>
<u>4.2</u>	<u>Financial Assurances</u> .....	42
<u>4.3</u>	<u>Schedule</u> .....	42
<u>4.4</u>	<u>Site Preparation</u> .....	42
	4.4.1 Preliminary Design Consideration and Site Modifications.....	44
	4.4.2 Topographic Reconstruction .....	47
	4.4.3 Fencing and Signage .....	53
<u>4.5</u>	<u>Planting Plan and Final Landscape and Revegetation Plans</u> .....	53
	4.5.1 As-Built Conditions.....	56
<u>4.6</u>	<u>Irrigation Plan</u> .....	56
5	MAINTENANCE DURING MONITORING.....	57
<u>5.1</u>	<u>Maintenance Activities</u> .....	57
	5.1.1 Pest Management.....	57
	5.1.2 Trash Removal .....	58
	5.1.3 Irrigation Maintenance .....	58
<u>5.2</u>	<u>Maintenance Schedule</u> .....	59
6	MONITORING PLAN FOR THE COMPENSATORY MITIGATION SITE .....	61
<u>6.1</u>	<u>Performance Standards for Target Dates and Success Criteria</u> .....	61
<u>6.2</u>	<u>Target Functions and Values</u> .....	63
<u>6.3</u>	<u>Target Hydrological Regime</u> .....	63
<u>6.4</u>	<u>Target Vernal Pool Mitigation Acreage</u> .....	63
<u>6.5</u>	<u>Monitoring Methods</u> .....	64
	6.5.1 Hydrology .....	64
	6.5.2 Flora .....	64
<u>6.6</u>	<u>Monitoring Schedule</u> .....	65
<u>6.7</u>	<u>Monitoring Reports</u> .....	65
7	COMPLETION OF COMPENSATORY MITIGATION .....	67
<u>7.1</u>	<u>Notification of Completion</u> .....	67
<u>7.2</u>	<u>Resource Agency Concurrence</u> .....	67
8	CONTINGENCY MEASURES.....	69
<u>8.1</u>	<u>Initiating Contingency Procedures</u> .....	69
<u>8.2</u>	<u>Alternative Locations for Contingency Compensatory Mitigation</u> ....	69
<u>8.3</u>	<u>Funding Mechanisms</u> .....	69
9	REFERENCES .....	71

# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

## **TABLE OF CONTENTS (CONTINUED)**

### **Page No.**

#### **FIGURES**

1	Regional Map .....	3
2	Vicinity Map .....	5
3	Vegetation Map with Proposed Development Footprint.....	21
4	Existing Vernal Pool Map .....	27
5	Proposed Vernal Pool Mitigation Area .....	37
6	Site Photographs of K6 and K8 Vernal Pool Complexes .....	45
7	Section of Typical Vernal Pool and Mima Mound Grading .....	49
8	Mima Mound Habitat Example.....	51

#### **TABLES**

1	Acreages of Plant Communities .....	7
2	Summary of Sensitive Plant Species Detected on Site .....	8
3	Summary of Sensitive Wildlife Species Detected on Site or with Moderate to High Potential to Occur.....	12
4	Plant Species Observed in K6 Vernal Pools.....	19
5	Plant Species Observed in K8 Vernal Pools.....	20
6	Impacts and Mitigation Acreages.....	23
7	Existing Conditions in the K8 Mesa for Potential Mitigation Pools .....	25
8	Vernal Pool Plant Species to be Seeded in Restored Vernal Pools .....	55
9	Species to be Seeded on Mima Mound Areas.....	55
10	Coastal Sage Scrub Seed Mix for Upland Enhancement Areas .....	56
11	Non-native Plant Species Documented at K6 and K8 Vernal Pools .....	58

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

## **1 DESCRIPTION OF THE DEVELOPMENT PROJECT/IMPACT SITE FOR WHICH COMPENSATORY MITIGATION IS REQUIRED**

The purpose of this document is to provide site-specific instructions for vernal pool restoration as mitigation for on-site impacts to vernal pools associated with the construction of the Otay Ranch Resort Village (Village 13) project area of Otay Ranch. This Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village (Mitigation Plan) is prepared in accordance with the Otay Ranch Resort Village Biological Resources Technical Report (Dudek 2014; see Section 5.3).

### **1.1 Responsible Parties**

The project applicants (JPB Development LLC and Baldwin & Sons LLC) are responsible for initiating and funding all mitigation installation, maintenance and monitoring requirements during the 5-year program. They shall be responsible for hiring a qualified landscape maintenance contractor to carry out all maintenance work and for hiring a qualified Project Biologist to carry out the monitoring program for the duration of the 5-year period.

### **1.2 Location of the Development Project**

The Otay Ranch Resort Village's Specific Plan area is located in southwestern San Diego County, approximately 13 miles east of the Pacific Ocean and 6 miles north of the international border with Mexico (Figure 1). The site is located in the Proctor Valley Parcel of the Otay Subregional Plan (SRP) approximately 0.25 mile east of the City of Chula Vista (Figure 2). As part of the planning for the development of Otay Ranch, several villages and planning areas were designated for various types of development while other areas were reserved for preservation of multiple species and habitats. An effort was undertaken to plan development of the ranch so as to conserve species and habitats in the region. The Otay Ranch Resort Village project area comprises approximately 1,869 acres, is located in an unincorporated portion of the County, and is designated for residential and resort development and for open space by the Otay Ranch *Subregional Plan* (SRP; Otay Ranch 1993). Associated with the project, off-site improvements to Otay Lakes Road required analysis of an approximately 43-acre area south and west of the project area.

### **1.3 Summary of Overall Development Project with Proposed Compensatory Mitigation**

The Resort Village (Village 13) project area of Otay Ranch comprises approximately 1,869 acres located in the unincorporated portion of San Diego County (County) and is designated for residential and resort development and for open space in the current Otay *Subregional Plan, Volume 2* ("Otay SRP"; 1993). The proposed land uses for the Otay Ranch Resort Village project

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

consist of single-family neighborhoods, a mixed use residential and commercial use neighborhood, a resort hotel with associated ancillary facilities, an elementary school site, a site for public safety facilities, open space, Otay Ranch Preserve (Preserve) land, and park and recreational uses. The proposed specific plan includes approximately 540.2 acres designated for 1,881 single-family detached homes. Five single-family neighborhoods are planned with an average density ranging from 3.2 to 4.4 dwelling units per acre.

### **1.3.1 Topography**

The Otay Ranch Resort Village consists of a broad mesa sloping to the south, broken by several steep canyons draining from north to south. Portions of the relatively flat mesa extend north into the Jamul Mountains, becoming part of steeper slopes. Site elevations range from approximately 500 feet above mean sea level (AMSL) at the southern end of the property to approximately 1,500 feet AMSL in the northeastern portions. The project area lies within the watershed of the Otay River, a westerly flowing stream which drains an area of approximately 145 square miles. The site is upstream of Savage Dam, which creates Lower Otay Lake.

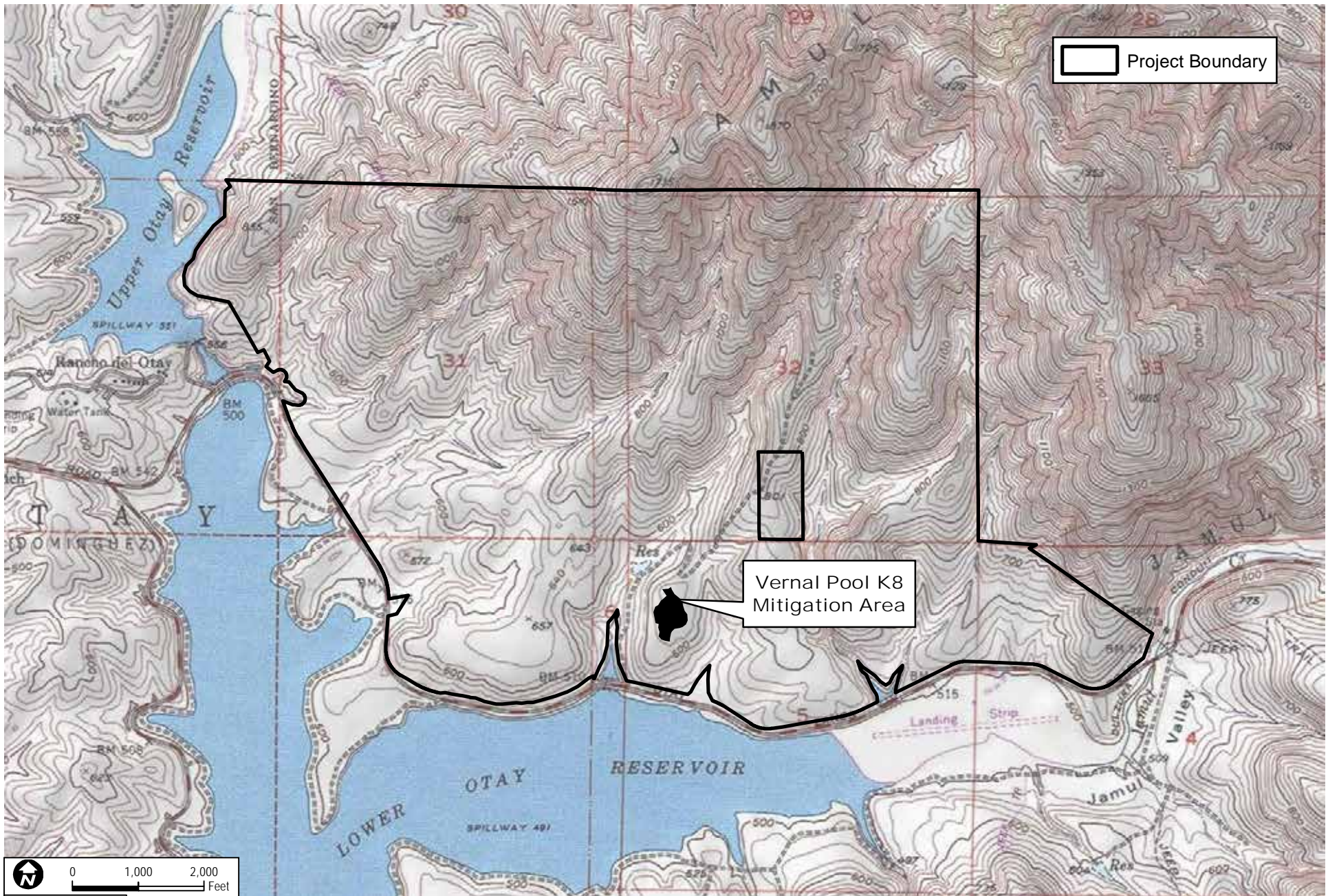
The southern half of the site contains three large mesas (K6, K8, and K9 from west to east), an expansive and relatively flat area in the west, and increasing elevations with steep canyons in the north. Drainages bisect the mesas and generally run north–south, with the exception of one drainage running east–west from the center to the western edge of the property. Several stock ponds have been intentionally created along the drainages on the property. Typical vernal pool and mima mound topography consists of depressions within undulating landscapes where soil mounds are interspersed with basins, swales, and drainages (USFWS 1997).



## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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SOURCE: USGS 7.5 Minute Series, Jamul Mountains Quadrangle

6524

Otay Ranch Resort Village Site - Conceptual Vernal Pool Mitigation Plan

**FIGURE 2**  
**Vicinity Map**

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

## 1.3.2 Vegetation Types

The project site is dominated by sage scrub, with substantial representation of grassland and chaparral (Table 1). Various wetland plant communities also occur on the site. Portions of the site have been historically mechanically disturbed by farming and grazing activity, reducing the presence of natural vegetation. In total, 16 plant communities and land cover types were mapped within the project area on site and off site, consisting of coastal sage scrub, chamise chaparral, southern mixed chaparral, scrub oak chaparral, disturbed valley needlegrass grassland, non-native grassland, cismontane alkali marsh, freshwater marsh, open water, mulefat scrub, southern willow scrub, stock pond, disturbed habitat, eucalyptus woodland, ornamental, and developed land. The coastal sage scrub, chamise chaparral, cismontane alkali marsh, and mulefat scrub were subdivided as the non-disturbed versus disturbed forms depending on the percent native shrub cover and dominance of non-native species.

**Table 1**  
**Acres of Plant Communities**

Plant Community Type	Holland Code	On Site	Off Site*	Total
<i>Sensitive Upland Communities</i>				
Coastal Sage Scrub	32500	1,121.52	7.61	1129.14
Disturbed Coastal Sage Scrub	32500	348.62	4.99	353.61
Chamise Chaparral	37210	143.14	—	143.14
Disturbed Chamise Chaparral	37210	15.67	—	15.67
Scrub Oak Chaparral	37900	22.45	—	22.45
Southern Mixed Chaparral	37121	4.95	—	4.95
Disturbed Valley Needlegrass Grassland	42110	110.58	0.03	110.61
Non-Native Grassland	42200	78.96	5.43	84.39
<i>Subtotal</i>		<i>1,845.89</i>	<i>18.07</i>	<i>1,863.96</i>
<i>Sensitive Wetland Communities (ACOE, RWQCB, CDFW, and County unless otherwise noted)</i>				
Cismontane Alkali Marsh	52310	6.39	—	6.39
Disturbed cismontane alkali marsh	11200	0.17	—	0.17
Freshwater Marsh	52410	—	0.17	0.17
Mulefat Scrub, all jurisdictions				
Mulefat Scrub, CDFW and County only	63310	0.08	—	0.08
Disturbed Mulefat Scrub	63310	—	0.13	0.13
Open Water	64140	0.17	0.49	0.66
Southern Willow Scrub	63320	1.19	0.04	1.23
<i>Subtotal</i>		<i>8.00</i>	<i>18.91</i>	<i>26.91</i>

# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 1**  
**Acreages of Plant Communities**

Plant Community Type	Holland Code	On Site	Off Site*	Total
<i>Non-Sensitive Communities and Land Covers</i>				
Developed Land	12000	0.87	19.22	20.10
Disturbed Habitat	11300	13.46	0.38	13.85
Eucalyptus Woodland	79100	—	0.61	0.61
Ornamental	11000	—	0.94	0.94
Stock Pond	18000	0.79	—	0.79
<i>Subtotal</i>		15.13	21.16	36.29
<b>Total</b>		<b>1,869.01</b>	<b>40.07</b>	<b>1,909.08</b>

## 1.3.3 Sensitive Plant Species

Sensitive plant species locations recorded during these surveys are summarized in Table 2. In addition to these current surveys, historical records of sensitive plant species were reviewed from the following published databases: Ogden (1992), Multiple Species Conservation Program (MSCP) maps (Ogden 1999), and California Department of Fish and Game (CDFW 2003).

**Table 2**  
**Summary of Sensitive Plant Species Detected on Site**

Scientific Name Common Name	Status Federal/State CRPR MSCP Coverage County List	Locations and Population Size on Site		
		Previous Studies	Current Surveys	Comments
<i>Acanthomintha ilicifolia</i> San Diego thornmint	FT/SE 1B.1 Covered Narrow Endemic A	MBA 89/91	Observed in all recent surveys	Identified in two disturbed areas with heavy clay soils. Associated vegetation consists of non-native grasses and annuals. Populations cover approximately 0.1 and 3.3 acres each. Because the population is densely distributed in these locations, the actual number of individuals was not quantified. Analysis of this plant is based on the acreage over which it occurs.
<i>Adolphia californica</i> California adolphia	None/None 2B.1 Not Covered B	Not observed	Observed in 1999	Identified in two locations in the western portion of the site within sparse coastal sage scrub (<20 individuals).
<i>Convolvulus simulans</i> Small-flowered morning-glory	None/None 4.2 Not Covered D	Not observed	Observed in 2000	Three locations in western part of project site in clay soil grasslands; approximately 120 total individuals.



## Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 2**  
**Summary of Sensitive Plant Species Detected on Site**

Scientific Name Common Name	Status Federal/State CRPR MSCP Coverage County List	Locations and Population Size on Site		
		Previous Studies	Current Surveys	Comments
<i>Dichondra occidentalis</i> Western dichondra	None/None 4.2 Not Covered D	MBA 89/90	Observed in 1999 and 2000	Recorded in eight locations on the central ridges of the site. A total of 30 patches were recorded that vary from 1 to 500 square feet. This species was recorded based on patch size due to low-growing dense form of the species. The species covers approximately 0.50 acre total over the 30 patches.
<i>Dudleya variegata</i> Variegated dudleya	None/None 1B.2 Covered – Narrow Endemic A	MBA 89/90	Observed in 1999 and 2000	Identified in 40 locations throughout the site. Estimated population size on site is approximately 5,833 individuals. Generally in clay soils and west-facing slopes, ridge lines, or margins of mesas.
<i>Ferocactus viridescens</i> San Diego barrel cactus	None/None 2B.1 Covered B	MBA 89/90	Observed in all recent surveys	Identified in approximately 50 locations throughout the project area, generally on south-facing slopes. Occurrences usually consist of <5 individuals; large stands contain 10–15 individuals. Approximately 217 individuals were recorded. Habitat association is generally open coastal sage scrub.
<i>Harpagonella palmeri</i> Palmer's grapplinghook	None/None 4.2 Not Covered D	Not identified	Observed in 1999 and 2000	Identified in three areas in the eastern and western portions of the site within disturbed coastal sage scrub, dirt road margins, and non-native grassland with heavy clay soils. Approximately 114 individuals were recorded.
<i>Iva hayesiana</i> San Diego marsh- elder	None/None 2B.2 Not Covered B	MBA 89/90	Observed in 1999 and 2000	Abundant within narrow drainages throughout the site. Total on-site population in the thousands. Generally associated with cismontane alkali marsh or sparsely vegetated, rocky stream channels. Due to densely occurring populations within these drainages, this plant was recorded by area rather than number of individuals. A total of 5.4 acres of this species was recorded on site.
<i>Juncus acutus</i> ssp. <i>leopoldii</i> Southwestern spiny rush	None/None 4.2 Not Covered D	MBA 89/90	Observed 1999 and 2000	Identified in 11 locations within cismontane alkali marsh. Occurrences typically contain <10 individuals within each location. Approximately 30 individuals present on site.
<i>Microseris douglasii</i> ssp. <i>platycarpa</i> Small-flowered microseris	None/None 4.2 Not Covered D	Not observed	Observed in 2000	Six locations identified in the western part of the site in open non-native grassland/coastal sage scrub. Approximately 1,270 individuals recorded on the site.

## Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 2**  
**Summary of Sensitive Plant Species Detected on Site**

Scientific Name Common Name	Status Federal/State CRPR MSCP Coverage County List	Locations and Population Size on Site		
		Previous Studies	Current Surveys	Comments
<i>Bloomeria [Muilla] clevelandii</i> San Diego goldenstar	None/None 1B.1 Covered A	MBA 89/90	Observed in 1999 and 2000	Identified in 21 locations in western and eastern portions of the site on mesic slopes containing sparse coastal sage scrub/native grassland. Approximately 1,146 individuals in western part of site and 1,400 individuals in eastern part in 2000. 1999 observations were fewer in number of individuals than 2000 observations presumably due to rainfall differences.
<i>Myosurus minimus</i> ssp. <i>apus</i> Little mouse-tail	None/None 3.1 Not Covered C	MBA 89/90	Not observed in recent surveys	Number of individuals was not recorded. Was not detected in recent focused surveys and is no longer considered to be present in K6 vernal pools.
<i>Ophioglossum californicum</i> California adder's- tongue	None/None 4.2 Not Covered D	MBA 89/90	Not observed	Two locations described near Otay Lakes Road in west and south-central portions of the site. Location was not mapped by MBA. Not identified during recent surveys; may no longer be present since it was not recorded during the rare plant surveys conducted in 2000.
<i>Pentachaeta aurea</i> ssp. <i>aurea</i> Golden-rayed pentachaeta	None/None 4.2 Not Covered D	Not observed	Observed in 2000	Four locations identified in western portion of site; Approximately 91 individuals occur in coastal sage scrub/grassland.
<i>Quercus dumosa</i> Nuttall's scrub oak	None/None 1B.1 Not Covered A	Not observed	Observed in all recent surveys	Occurs as a major component in areas mapped as scrub oak chaparral (approximately 200 individuals per acre). The acreage encompassed by this species is approximately 6.2 acres, including additional small patches within chaparral in the western portion of the site.
<i>Romneya coulteri</i> Coulter's matilija poppy	None/None 4.2 Not Covered D	Not observed	Observed on site	Number, location not mapped. Single location described as being adjacent to a drainage in eastern part of site.
<i>Salvia munzii</i> Munz's sage	None/None 2B.2 Not Covered B	MBA 89/90	Observed in all recent surveys	Occurs throughout the site but most densely in the northwestern quarter. Also occurs on K9 mesa. Most areas containing dense coastal sage scrub in this area contain approximately 50%–80% vegetation cover of <i>S. munzii</i> . Because the population is densely distributed in these locations, the actual number of individuals was not quantified. Analysis of this plant is based on the acreage over which it occurs, approximately 295 acres.

# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 2**  
**Summary of Sensitive Plant Species Detected on Site**

Scientific Name Common Name	Status Federal/State CRPR MSCP Coverage County List	Locations and Population Size on Site		
		Previous Studies	Current Surveys	Comments
<i>Viguiera laciniata</i> San Diego County viguiera	None/None 4.2 Not Covered D	MBA 89/90	Observed in all recent surveys	Occurs throughout the site but most densely in the northern portion. Encompasses approximately 1,071 acres of the site. Comprises between 5% and 30% of vegetation cover in coastal sage scrub.

**Federal Designations:**

FE Federally listed Endangered  
FT Federally listed as Threatened  
FSC Federal Species of Concern

**State Designations:**

P CDFW Protected and Fully Protected Species  
R California Rare Species  
SE State-listed as Endangered  
ST State-listed as Threatened.

**CNPS Designations:**

List 1A Presumed Extinct in California  
List 1B Rare or Endangered in California and Elsewhere  
List 2 Rare or Endangered in California, More Common Elsewhere  
List 3 Need More Information  
List 4 Plants of Limited Distribution  
1 Seriously endangered in California  
2 Fairly endangered in California  
3 Not very endangered in California

**MSCP Designations:**

Covered: Listed as Covered Species in Appendix B of biotechnical report, Implementing Agreement between CDFW, USFWS, and County of San Diego (March 1998)

Not Covered: Not Listed as Covered Species in Appendix B of biotechnical report, Implementing Agreement between CDFW, USFWS, and County of San Diego (March 1998).

**County Designations:**

List A Plants rare, threatened, or endangered in California and elsewhere (corresponds to CNPS List 1B)  
List B Plants rare, threatened, or endangered in California but more common elsewhere (corresponds to CNPS List 2)  
List C Plants which may be quite rare, but need more information to determine their rarity status (corresponds to CNPS List 3)  
List D Plants of limited distribution and are uncommon, but not presently rare or endangered (corresponds to CNPS List 4)

## 1.3.4 Sensitive Wildlife Species

Knowledge concerning the presence/absence of sensitive wildlife species was ascertained from previous studies of Otay Ranch, as well as from more current focused surveys for fairy shrimp and Quino checkerspot butterfly. Although focused surveys for sensitive nesting bird species, amphibians, reptiles, or mammals have not been conducted, incidental observations of many sensitive wildlife species have been made. Species locations recorded during these surveys are summarized in Table 3. Evaluation of wildlife use is based on suitable habitat since the species may occur in areas other than where observed.

# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 3**  
**Summary of Sensitive Wildlife Species**  
**Detected on Site or with Moderate to High Potential to Occur**

Species (Scientific Name)	Regulatory Status: Federal; State; MSCP; County Group	General Habitat Association	Status on Site		
			Previous Studies	Current Surveys	Comments
San Diego fairy shrimp ( <i>Branchinecta sandiegonensis</i> )	USFWS: FE CDFW: None MSCP: Covered County: 1	Small, shallow vernal pools, occasionally ditches and road ruts	Not observed	Observed in 2000, 2004, and 2008	A total of nine basins on K8 and one basin on K6 are confirmed occupied by this species.
Quino checkerspot butterfly ( <i>Euphydryas editha quino</i> )	USFWS: FE CDFW: None MSCP: Not Covered County: 1	Sparsely vegetated hilltops, ridgelines, occasionally rocky outcrops; host plant <i>Plantago erecta</i> and nectar plants must be present	Not observed (known from 1970s P. Ehrlich research)	Observed in 1999, 2000, 2004, and 2008	Focused surveys of the entire site in 1999 and 2000 resulted in the observation of 48 individuals. 2004 surveys of the open space area resulted in observation of 1 individual in the northwestern corner. Focused surveys of the entire site in 2008 resulted in the observation of 71 individuals after duplicates were removed. Observations were concentrated in the northern portion and along a ridgeline within the central portion of the site. A number of additional observations were scattered throughout the rest of the site.
Monarch butterfly ( <i>Danaus plexippus</i> )	USFWS: None CDFW: None MSCP: Not Covered. County: 2	Overwinters in eucalyptus groves	Not observed	Observed	This species occurs on site on occasion as single individuals in flight over the area; however, there are not sufficient resources available to make this a significant overwintering site.
Western spadefoot toad ( <i>Spea hammondi</i> )	USFWS: None CDFW: CSC MSCP: Not Covered County: 2	Most common in grasslands, coastal sage scrub near rain pools or vernal pools; riparian habitats	Not observed	Observed in 2000	Tadpoles incidentally observed in a single depression on K8 mesa. Could occur within pools that inundate.
Rosy boa ( <i>Charina trivirgata</i> )	USFWS: None CDFW: None MSCP: Not Covered County: 2	Rocky chaparral, coastal sage scrub, oak woodlands, desert and semi-desert scrub	Not observed	Observed in 2008	Observed in northeastern portion of the project site.



## Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 3**  
**Summary of Sensitive Wildlife Species**  
**Detected on Site or with Moderate to High Potential to Occur**

Species (Scientific Name)	Regulatory Status: Federal; State; MSCP; County Group	General Habitat Association	Status on Site		
			Previous Studies	Current Surveys	Comments
Western pond turtle ( <i>Emys marmorata</i> )	USFWS: None CDFW: CSC MSCP: Covered County: 1	Slow-moving permanent or intermittent streams, ponds, small lakes, reservoirs with emergent basking sites; adjacent uplands used during winter	Not observed	Observed in 2000	Incidentally observed laying eggs in a dirt road in northwestern corner of site. Another observation of an individual crossing Otay Lakes Road immediately south of the site.
Orangethroat whiptail ( <i>Aspidoscelis hyperythra</i> )	USFWS: None CDFW: CSC MSCP: Covered County: 2	Coastal sage scrub, chaparral, grassland, juniper, and oak woodland	MBA 89	Observed in 2000 and 2008	Observed in coastal sage scrub. Probably occurs elsewhere within open patches of coastal sage scrub and grassland.
Coastal whiptail ( <i>Aspidoscelis tigris stejnegeri</i> )	USFWS: None CDFW: None MSCP: Not Covered County: 2	Coastal sage scrub, chaparral	Not observed	Observed in 2000	Observed in sparse coastal sage scrub on site. Probably resident in open areas and sparse coastal sage scrub and chaparral throughout the site.
San Diego ringneck snake ( <i>Diadophis punctatus similis</i> )	USFWS: None CDFW: None MSCP: Not Covered County: 2	Open, rocky areas in moist habitats near intermittent streams: marsh, riparian woodland, sage scrub	Not observed	Observed on site.	Observed in the main eastern drainage. Moderate potential to occur within deeper canyons on site and under debris on site.
San Diego [coast; Blainville's] horned lizard ( <i>Phrynosoma blainvillii</i> )	USFWS: None CDFW: CSC MSCP: Covered County: 2	Coastal sage scrub, non-native grassland, chaparral, oak and riparian woodland, coniferous forest	MBA 89	Observed in 1999, 2000, and 2008	Observed within undisturbed coastal sage scrub and chamise chaparral.
Red-diamond rattlesnake ( <i>Crotalus ruber</i> )	USFWS: None CDFW: CSC MSCP: Not Covered County: 2	Variety of shrub habitats where there is heavy brush, large rocks, or boulders	Not observed	Observed in 1999, 2000, and 2008	Observed throughout the site within dense and sparse coastal sage scrub and chaparral.

# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 3**  
**Summary of Sensitive Wildlife Species**  
**Detected on Site or with Moderate to High Potential to Occur**

Species (Scientific Name)	Regulatory Status: Federal; State; MSCP; County Group	General Habitat Association	Status on Site		
			Previous Studies	Current Surveys	Comments
Two-striped garter snake ( <i>Thamnophis hammondi</i> )	USFWS: None CDFW: CSC MSCP: Not Covered County: 1	Streams, creeks, pools, streams with rocky beds, ponds, lakes, vernal pools	Not observed	Not observed	Probably occurs on site.
Cooper's hawk ( <i>Accipiter cooperii</i> )	USFWS: None CDFW: WL MSCP: Covered County: 1	Riparian and oak woodlands, montane canyons	Not observed	Observed in 2000	Observed flying over site; potential for nesting on site is low due to lack of developed forest or woodland habitats.
Southern California rufous-crowned sparrow ( <i>Aimophila ruficeps canescens</i> )	USFWS: None CDFW: WL MSCP: Covered County: 1	Grass-covered hillsides, coastal sage scrub, chaparral with boulders and outcrops	MBA 89	Observed in 1999, 2000, and 2008	Observed throughout the site and highly likely to nest on site.
Grasshopper sparrow ( <i>Ammodramus savannarum</i> )	USFWS: None CDFW: CSC MSCP: Not Covered County: 1	Open grassland and prairie, especially native grassland with a mix of grasses and forbs	MBA 89	Observed in 2000 and 2008	Observed mainly in southwestern and central portions of the project site.
Bell's sage sparrow ( <i>Artemisiospiza belli belli</i> ) (taxonomy was changed to Bell's sparrow ( <i>Artemisiospiza belli</i> ))	USFWS: None CDFW: WL MSCP: Not Covered County: 1	Coastal sage scrub and dry chaparral along coastal lowlands and inland valleys	MBA 89	Observed in 1999, 2000, and 2008	Identified in eastern and western portions of site in sparse coastal sage scrub.
Golden eagle ( <i>Aquila chrysaetos</i> )	USFWS: BCC CDFW: P, WL, Golden Eagle Protection Act MSCP: Covered County: 1	Open country, especially hilly and mountainous regions; grassland, coastal sage scrub, chaparral, oak savannas, open coniferous forest	Not observed	Observed in 1999, 2000, and 2008	Observed in eastern and north-central portion of the site. Site is in mapped primary foraging area for known golden eagle territory. Nearest known nest site is >3 miles from project site. No nesting observed; could forage.

# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 3**  
**Summary of Sensitive Wildlife Species**  
**Detected on Site or with Moderate to High Potential to Occur**

Species (Scientific Name)	Regulatory Status: Federal; State; MSCP; County Group	General Habitat Association	Status on Site		
			Previous Studies	Current Surveys	Comments
Red-shouldered hawk ( <i>Buteo lineatus</i> )	USFWS: None CDFW: None MSCP: Not Covered County: 1	Riparian and woodland habitats, eucalyptus	Not observed	Observed on site	Observed foraging over the site near the southern portion. Moderate potential to also occur on site as a breeding bird.
Turkey vulture ( <i>Cathartes aura</i> )	USFWS: None CDFW: None MSCP: Not Covered County: 1	Rangeland, agriculture, grassland; uses cliffs and large trees for roosting, nesting, and resting	Not observed	Observed in flight over site	Occasionally forages over the project area. No breeding potential.
Northern harrier ( <i>Circus cyaneus</i> )	USFWS: None CDFW: CSC MSCP: Covered County: 1	Open wetlands (nesting), pasture, old fields, dry uplands, grasslands, rangelands, coastal sage scrub	Not observed	Observed in 1999, 2000, and 2008	Observed foraging over grassland areas in the K6 and K8 mesas. Could nest on site.
White-tailed kite ( <i>Elanus leucurus</i> )	USFWS: None CDFW: P MSCP: Not Covered County: 1	Open grasslands, savanna-like habitats, agriculture, wetlands, oak woodlands, riparian	Not observed	Observed in 1999 and 2000	Observed foraging in grassland areas; nesting is unlikely due to lack of forest or woodlands.
California horned lark ( <i>Eremophila alpestris actia</i> )	USFWS: None CDFW: WL MSCP: Not Covered County: 2	Open habitats, grassland, rangeland, shortgrass prairie, montane meadows, coastal plains, fallow grain fields	Not observed	Observed in 1999, 2000, and 2008	Observed within sparse coastal sage scrub and grasslands on the project site.
Prairie falcon ( <i>Falco mexicanus</i> )	USFWS: BCC CDFW: WL MSCP: Not Covered County: 1	Grassland, savannas, rangeland, agriculture, desert scrub, alpine meadows; nest on cliffs or bluffs	Not observed	Observed in 2000	Observed within coastal sage scrub and grasslands. Rock outcrops on site suggest possible roosting and nesting.

# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 3**  
**Summary of Sensitive Wildlife Species**  
**Detected on Site or with Moderate to High Potential to Occur**

Species (Scientific Name)	Regulatory Status: Federal; State; MSCP; County Group	General Habitat Association	Status on Site		
			Previous Studies	Current Surveys	Comments
Loggerhead shrike ( <i>Lanius ludovicianus</i> )	USFWS: BCC CDFW: CSC MSCP: Not Covered County: 1	Open ground including grassland, coastal sage scrub, broken chaparral, agriculture, riparian, open woodland	MBA 89	Observed in 2000	Likely to nest on site, individuals observed in grassland and sparse coastal sage scrub.
Coastal California gnatcatcher ( <i>Poliophtila californica californica</i> )	USFWS: FT CDFW: CSC MSCP: Covered County: 1	Coastal sage scrub, coastal sage scrub–chaparral mix, coastal sage scrub–grassland ecotone, riparian in late summer	MBA 89	Observed in 1999, 2000, and 2008	Observed nesting in coastal sage scrub and chamise chaparral throughout the site. Based on previous and currently mapped locations, approximately 35 locations occur on site and 3 additional locations have been recorded within the Cornerstone Lands and could occur on site (MSCP data).
Western bluebird ( <i>Sialia mexicana</i> )	USFWS: None CDFW: None MSCP: Covered County: 2	Open forests of deciduous, coniferous or mixed trees, savanna, edges of riparian woodland saltmarsh, riparian habitats	Not observed	Observed during winter	This species once did not breed on the coastal plain; however, in recent years it has begun to do so. The only breeding opportunities for this species would be within wooded habitats which are not present on site.
Burrowing owl ( <i>Athene cunicularia</i> )	USFWS: BCC CDFW: CSC MSCP: Covered County: 1	Grassland, lowland scrub, agriculture, coastal dunes and other artificial open areas	MBA 89	Observed in 2000	Previously identified on eastern slope of K6 mesa as an incidental observation of single individual in central portion of site.
Barn owl ( <i>Tyto alba</i> )	USFWS: None CDFW: None MSCP: Not Covered County: 2	Open forests of deciduous, coniferous or mixed trees, savanna, riparian habitats , abandoned structures, mines	Not observed	Observed flying over site	This species has abundant foraging opportunities but limited nesting opportunities on site. It is unlikely that there is enough cover on site to support nesting by this species.

# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 3**  
**Summary of Sensitive Wildlife Species**  
**Detected on Site or with Moderate to High Potential to Occur**

Species (Scientific Name)	Regulatory Status: Federal; State; MSCP; County Group	General Habitat Association	Status on Site		
			Previous Studies	Current Surveys	Comments
San Diego black-tailed jackrabbit ( <i>Lepus californicus bennettii</i> )	USFWS: None CDFW: CSC MSCP: Not Covered County: 2	Arid habitats with open ground; grasslands, coastal sage scrub, agriculture, disturbed areas, rangelands	Not observed	Incidentally observed.	Observed throughout the site.
San Diego desert woodrat ( <i>Neotoma lepida intermedia</i> )	USFWS: None CDFW: CSC MSCP: Not Covered County: 2	Coastal sage scrub, chaparral, pinyon-juniper woodland with rock outcrops, cactus thickets, dense undergrowth	Not observed	Nests incidentally observed.	Middens were observed within chaparral areas on site.
Mountain lion ( <i>Puma concolor</i> )	USFWS: None CDFW: None MSCP: Covered County: 2	Coastal sage scrub, chaparral, riparian, woodlands, forest; rests in rocky areas, and on cliffs and ledges that provide cover	MBA 89	Not observed	Signs of movement through eastern portion of site.

**Federal Designations:**

FE Federally listed Endangered  
 FT Federally listed as Threatened  
 MNBMC Fish and Wildlife Service Migratory Nongame Birds of Management Concern.

**State Designations:**

CSC California Special Concern Species  
 P CDFW Protected and Fully Protected Species  
 R California Rare Species  
 SE State-listed as Endangered  
 ST State-listed as Threatened  
 WL Watch List.

**MSCP Designations:**

Covered Listed as Covered Species in Appendix B of Implementing Agreement between CDFW, USFWS, and County of San Diego (March 1998)  
 Not Covered Not Listed as Covered Species in Appendix B of Implementing Agreement between CDFW, USFWS, and County of San Diego (March 1998).

**County Designations:**

Group 1: High level of sensitivity, either because listed as threatened or endangered or because species has very specific natural history requirements that must be met  
 Group 2: Species is becoming less common, but is not yet so rare that extirpation or extinction is imminent without immediate action. These species tend to be prolific within their suitable habitat types.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

### **1.3.5 Sensitive Resources Affected by the Project**

Implementation of the proposed project would result in the direct impacts to sensitive vegetation communities, including vernal pools. Impacts would occur as the result of grading and the creation of fuel management zones.

A total of 34 potential vernal pools have been studied according to the Otay Ranch Resort Village Biological Resources Technical Report (Figure 3; Dudek 2014). In general, vernal pools on the project site contain flora that include wooly marbles (*Psilocarphus brevissimus*), graceful hairgrass (*Deschampsia danthonioides*), soft chess, narrow-leaved filago (*Filago gallica*), broad-leaved filaree, fascicled tarplant, and doveweed. Pools that held water during most of the survey period were found to contain American pillwort (*Pilularia americana*), long-stalk water-starwort (*Callitriche longipedunculata*), pale spike-sedge (*Eleocharis macrostachya*), wild heliotrope, and aquatic crassula (*Crassula aquatica*), in addition to other plant species listed above. Plant species observed within the vernal pools at the K6 and K8 mesas are listed in Tables 4 and 5. The surrounding vegetation on the western mesa (K6) consists of disturbed Valley needlegrass grassland, and sparse coastal sage scrub is found on the eastern mesa (K8).

# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 4**  
**Plant Species Observed in K6 Vernal Pools**

Scientific Name	Common Name	1*	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Allium</i> sp.	onion					X											
<i>Alopecurus howelli</i>	Howell's foxtail					X											
<i>Avena barbata</i>	slender oat								X	X		X			X	X	
<i>Brodiaea joloensis</i>	dwarf brodiaea			X		X		X	X			X	X				
<i>Bromus hordeaceus</i>	soft chess		X	X					X	X		X	X	X	X		X
<i>Bromus madritensis</i> ssp. <i>rubens</i>	foxtail chess				X						X				X	X	
<i>Calochortus splendens</i>	lilac mariposa				X												
<i>Calystegia macrostegia</i>	western bindweed																
<i>Castilleja exserta</i>	common owl's-clover																
<i>Centaurium venustum</i>	canchalagua							X	X								
<i>Chlorogalum parviflorum</i>	small-flowered amole		X		X							X			X	X	
<i>Cotula australis</i>	Australian brass-buttons																
<i>Crassula aquatica</i>	pygmyweed						X										
<i>Deinandra [Hemizonia] fasciculata</i>	fascicled tarweed		X	X	X		X	X	X	X	X	X	X	X	X	X	X
<i>Deschampsia danthonioides</i>	hairgrass			X		X		X	X		X		X	X			
<i>Dodecatheon clevelandii</i>	shooting star																
<i>Dudleya variegata</i>	variegated dudleya																
<i>Eleocharis macrostachya</i>	pale spike-rush			X									X				
<i>Eremocarpus setigerus</i>	doveweed																
<i>Eriogonum fasciculatum</i>	California buckwheat		X														
<i>Erodium botrys</i>	broad-leaved filaree																
<i>Erodium</i> sp.	filaree									X		X					X
<i>Filago gallica</i>	narrow-leaf filago																
<i>Gastrium ventricosum</i>	nitgrass				X	X	X	X	X	X	X	X			X		X
<i>Hordeum</i> sp.	barley			X			X							X			
<i>Hypochaeris glabra</i>	smooth car's-ear										X					X	
<i>Isocoma menziesii</i>	coastal goldenbush				X											X	
<i>Juncus bufonius</i>	toad-rush			X		X	X	X	X	X	X	X	X	X			
<i>Lepidium</i> sp.	peppergrass									X							X
<i>Lolium</i> sp.	ryegrass																
<i>Lythrum hyssopifolia</i>	Hyssop loosestrife			X		X	X	X	X	X	X	X	X				X
<i>Microseris douglasii</i>	Douglas's microseris																
<i>Myosurus minimus</i> var. <i>apus</i>	mouse-tail					X		X					X				
<i>Nassella pulchra</i>	purple needlegrass		X													X	
<i>Plagiobothrys</i> sp.	popcorn flower						X			X							
<i>Polypogon monspeliensis</i>	rabbit's-foot grass							X					X				
<i>Psilocarphus brevissimus</i>	woolly-heads			X		X	X	X	X	X	X		X	X			
<i>Selaginella cinerascens</i>	ashy spike-moss		X		X												
<i>Sisyrinchium bellum</i>	blue-eyed grass				X				X	X	X	X				X	X
<i>Spergularia bocconii</i>	sand spurrey																
<i>Tauschia arguta</i>	southern tauschia		X														
<i>Trichostema lanceolatum</i>	vinegar weed			X													
<i>Vulpia myuros</i>	rattail fescue							X	X			X				X	

\* No data collected

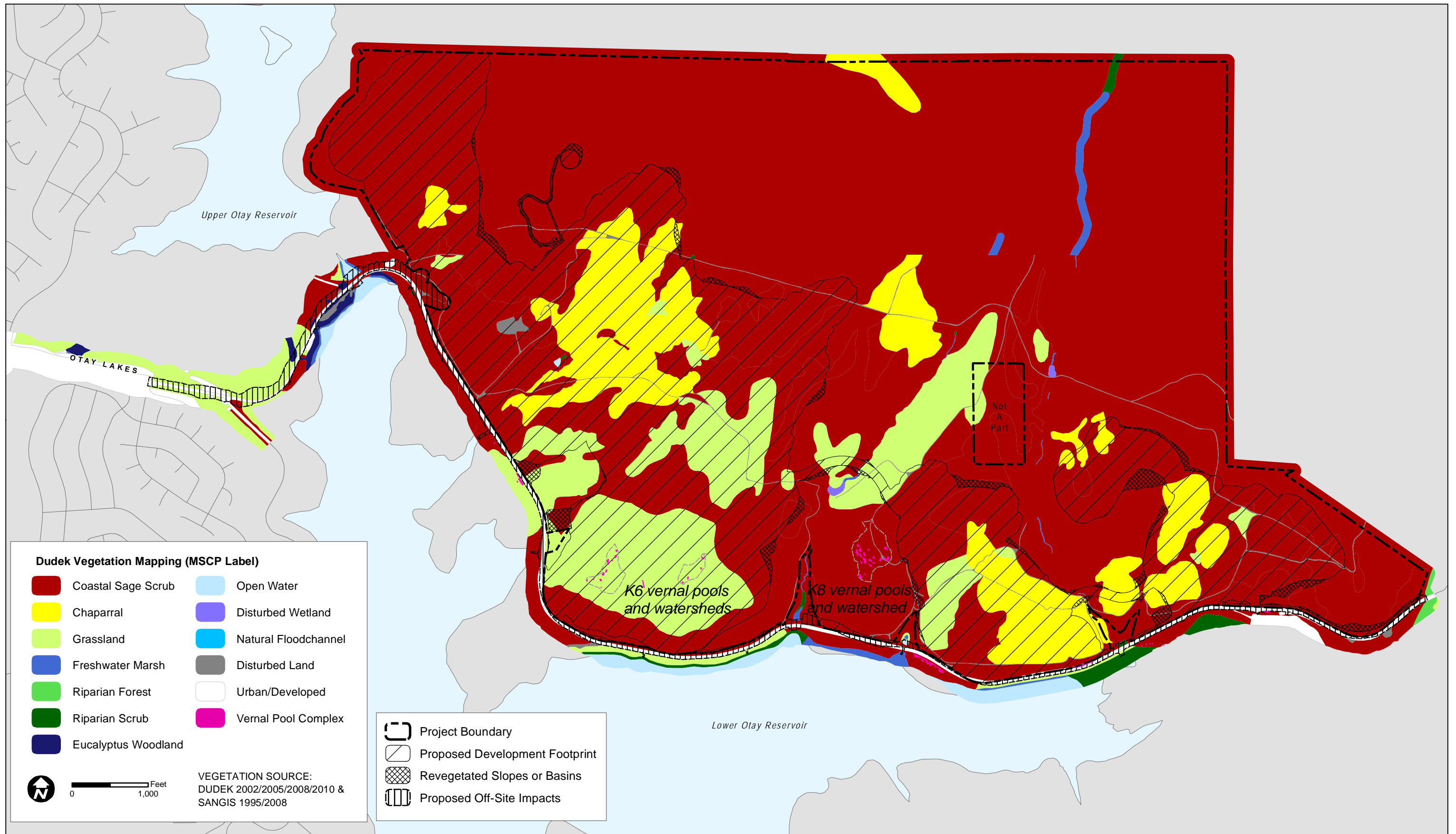
\*\* Might be helpful to indicate which spp are non-native.

# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 5**  
**Plant Species Observed in K8 Vernal Pools**

Plant Species Observed		Vernal Pool																	
Scientific Name	Common Name	1	2	4	5	6	7	8	10	11	13	14	15	16	A1	A2	A3	A4	
<i>Allium</i> sp.	onion												X						
<i>Alopecurus howelli</i>	Howell's foxtail		X	X	X	X	X	X		X	X	X	X	X	X		X	X	
<i>Avena barbata</i>	slender oat															X			
<i>Brodiaea joloensis</i>	dwarf brodiaea	X						X		X	X	X	X					X	
<i>Bromus hordeaceus</i>	soft chess	X	X	X		X	X	X	X	X			X	X	X	X		X	
<i>Bromus madritensis</i> ssp. <i>rubens</i>	foxtail chess																		
<i>Calochortus splendens</i>	lilac mariposa																		
<i>Calystegia macrostegia</i>	western bindweed				X					X		X							
<i>Castilleja exserta</i>	common owl's-clover							X							X				
<i>Centaureum venustum</i>	canchalagua	X						X											
<i>Chlorogalum parviflorum</i>	small-flowered amole							X	X					X					
<i>Cochla australis</i>	Australian brass-buttons	X																	
<i>Crassula aquatica</i>	pygmyweed	X													X				
<i>Deinandra</i> [Hemizonia] <i>fasciculata</i>	fascicled tarweed	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
<i>Deschampsia danthonioides</i>	hairgrass	X	X	X	X	X	X	X		X			X	X					
<i>Dodecatheon clevelandii</i>	shooting star														X				
<i>Dudleya variegata</i>	variegated dudleya																		
<i>Eleocharis macrostachya</i>	pale spike-rush	X			X			X		X	X								
<i>Eremocarpus setigerus</i>	doveweed	X					X			X			X	X					
<i>Eriogonum fasciculatum</i>	California buckwheat																		
<i>Erodium botrys</i>	broad-leaved filaree								X										
<i>Erodium</i> sp.	filaree															X			
<i>Filago gallica</i>	narrow-leaf filago	X																	
<i>Gastridium ventricosum</i>	nitgrass		X	X		X	X	X	X	X	X		X			X	X		
<i>Hordeum</i> sp.	barley	X	X	X				X							X				
<i>Hypochaeris glabra</i>	smooth car's-ear																		
<i>Isocoma menziesii</i>	coastal goldenbush																		
<i>Juncus bufonius</i>	toad-rush	X	X	X	X	X	X	X		X	X	X		X	X				
<i>Lepidium</i> sp.	peppergrass	X																	
<i>Lolium</i> sp.	ryegrass		X																
<i>Lythrum hyssopifolia</i>	Hyssop loosestrife	X	X	X		X	X	X		X	X	X	X	X	X			X	
<i>Microseris douglasii</i>	Douglas's microseris			X		X		X	X								X		
<i>Myosurus minimus</i> var. <i>apus</i>	mouse-tail																		
<i>Nassella pulchra</i>	purple needlegrass												X						
<i>Plagiobothrys</i> sp.	popcorn flower	X														X			
<i>Polypogon monspeliensis</i>	rabbit's-foot grass	X												X					
<i>Psilocarphus brevissimus</i>	woolly-heads	X	X	X	X	X	X	X		X		X	X	X	X			X	
<i>Selaginella cinerascens</i>	ashy spike-moss																		
<i>Sisyrinchium bellum</i>	blue-eyed grass							X	X	X	X				X				
<i>Spergularia bocconii</i>	sand spurrey	X																	
<i>Tauschia arguta</i>	southern tauschia																		
<i>Trichostema lanceolatum</i>	vinegar weed											X	X	X					
<i>Vulpia myuros</i>	rattail fescue																		





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# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

## 1.3.6 Vernal Pool Impacts and Mitigation

This Mitigation Plan provides guidance for on-site restoration and enhancement of vernal pools within the K8 vernal pool complex to compensate for significant impacts to 0.11 acre of vernal pools in the K6 vernal pool complex (Figure 3). Additional vernal pool mitigation has been proposed at the K8 vernal pool complex as mitigation for impacts to vernal pools associated with the Otay Ranch Villages Two and Three Projects (Dudek 2008). This Mitigation Plan has been prepared to be consistent with the *Otay Ranch Villages Two and Three Conceptual Vernal Pool Mitigation Plan (Off-site Mitigation at Otay Ranch Village Thirteen)* prepared by Dudek (2008), with minor exceptions as appropriate.

As stated in the Biological Resources Technical Report (Dudek 2014), significant direct impacts to 0.11 acre of vernal pool basin area would occur as a result of the project. The Resource Management Plan (RMP) contains guidelines for preservation and, when applicable, mitigation for impacts to vernal pools. The RMP was written in order to mitigate for biological resource impacts to satisfy California Environmental Quality Act (CEQA) and includes the requirement for providing a 100-foot buffer around the watershed but does not identify mitigation ratios. The County of San Diego provides mitigation ratios of 2:1 for Tier 1 habitat (includes vernal pools) but also indicates that 5:1 mitigation is required for areas outside of MSCP (San Diego, County of 2008). Because the K6 vernal pools impacted by the proposed project are characterized as having low to moderate value, the proposed mitigation will use a 2:1 mitigation ratio for the pools not occupied by San Diego fairy shrimp and 5:1 mitigation ratio for the occupied pool. Thus 0.025 acre will mitigate for impacts to the occupied pool, and 0.214 acre will mitigate for the impacts to the unoccupied pools for a total mitigation of 0.239 acre of vernal pool basin area. Ratios and acreages are shown in Table 6.

**Table 6**  
**Impacts and Mitigation Acreages**

Vernal Pool Impact Acreage	Mitigation Ratio	Mitigation Acreage
0.105	2:1	0.214
0.005	5:1	0.025
0.110	--	0.239

The following is the mitigation measure outlined in the *Biological Resources Technical Report* (Dudek 2014) which would successfully mitigate for the project's impacts under one of the following options:

**M-BTR-5 Option No. 1** This option consists of mitigation in the form of restoration of vernal pools within the Resort Village project site. This option would involve

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

restoration and reconfiguration of the K8 vernal pool group. These vernal pools are proposed to be preserved, and a 100-foot minimum buffer is provided for protection of the pools and their watershed. Mitigation would involve reconfiguration and reconstruction of the mima mounds and basins, removal of weedy vegetation, revegetation of the mounds with upland sage scrub species and inoculation of the pools with vernal pool species.

A Conceptual Vernal Pool Mitigation Plan shall be prepared that outlines the location and activities of the restoration (Appendix J of the Biotechnical Report (Dudek 2014)—to be provided). A ratio of at least 1:1 restoration shall include the establishment of new vernal pool basins within the K8 vernal pool group. The balance of the mitigation ratio shall include enhancement of the existing pools. There is a total of 0.26 acre available for enhancement within the existing pools. The additional restoration mitigation requirement (a total of 0.112 acre) will be directed towards establishing new basins within the K8 vernal pool group to the greatest extent feasible. An additional area of potential vernal pool restoration is located within the K9 mesa if needed. This area also is composed of suitable soils for vernal pools. These soils are present on the K6 and K8 mesas. This additional area is composed of non-native grass species, is of relatively flat topography, and exhibits some mounding characteristics similar to mima mounds.

Based on the inundation records, fairy shrimp surveys, and floral inventory, the following potential vernal pools meet the previously applied ACOE jurisdictional criteria:

- K6 – Vernal Pools 1, 3, 5, 6, 7, 8, 9, 10, 12, 13 (0.11 acre – total basin area)
- K8 – Vernal Pools 1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 16, A1, A4 (0.26 acre – total basin area).

Assuming all of K6 is impacted and the mitigation requirement is a combination of 2:1 and 5:1 as outlined above, a total mitigation of 0.239 acre is required. Impacts to vernal pool resources at Villages 2 and 3 also were proposed to be mitigated at the K8 mesa. The mitigation requirement for these impacts was proposed to be 406 square feet or approximately 0.009 acre. Thus the total mitigation requirement is 0.248 acre. This is typically satisfied by providing at least 1:1 as restoration and the balance as enhancement. Enhancement within the K8 pools will likely be restricted by the resource agencies to those pools not containing fairy shrimp. The following table (Table 7) summarizes the existing conditions of the pools within the K8 mesa.

## Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 7**  
**Existing Conditions in the K8 Mesa for Potential Mitigation Pools**

Pool #	Basin Size (sq. ft.)	Basin Size (acre)	Inundation	Cysts	Shrimp	Vernal Pool Plants
A1	443.53	0.010	—	—	—	x
A2	230.75	0.005	—	—	—	—
A3	675.34	0.016	—	—	—	—
A4	997.88	0.023	x	—	—	x
A5	49.81	0.001	x	—	—	—
VP1	1693.63	0.039	x	—	x	x
VP10	408.97	0.009	x	x	—	—
VP11	1220.88	0.028	x	x	x	x
VP13	322.44	0.007	x	x	—	—
VP14	658.59	0.015	x	x	x	x
VP15	533.09	0.012	x	—	—	x
VP16	627.19	0.014	x	—	—	x
VP2	711.00	0.016	x	—	x	x
VP4	224.16	0.005	x	—	—	x
VP5	530.94	0.012	x	—	x	x
VP6	806.91	0.019	x	—	—	x
VP7	647.25	0.015	x	x	x	x
VP8	1671.41	0.038	x	x	—	x

Vernal pools 1, 2, 5, 7, 10, 11, 13, and 14 are occupied by fairy shrimp and would likely not be available for enhancement mitigation. The other pools shown in Table 7 do not contain fairy shrimp and would be able to be enhanced by conducting weed removal, introducing vernal pool plant species, and potentially inoculating with other species including fairy shrimp. A total of 0.14 acre of existing vernal pool is available for enhancement. A total of 0.14 acre is proposed for enhancement/restoration in that the basin of existing pools would be enlarged, weeds removed, and pools inoculated as suitable. This leaves the requirement for a total of 0.108 acre of restoration of vernal pool habitat. There are potentially 18 basins that could be restored within the K8 mesa. If the average size of the new basins is 700 square feet, the total acreage of restored pools is potentially 0.289 acre which is more than is required to satisfy the mitigation needs. Thus the combined acreage for mitigation, including enhancement, enhancement/restoration (enlarging existing pools), and restoration for the impacts to the K6 pools and the Villages 2 and 3 is proposed to total 0.248 acre, which meets the requirement of a combined 2:1 and 5:1 mitigation ratio.

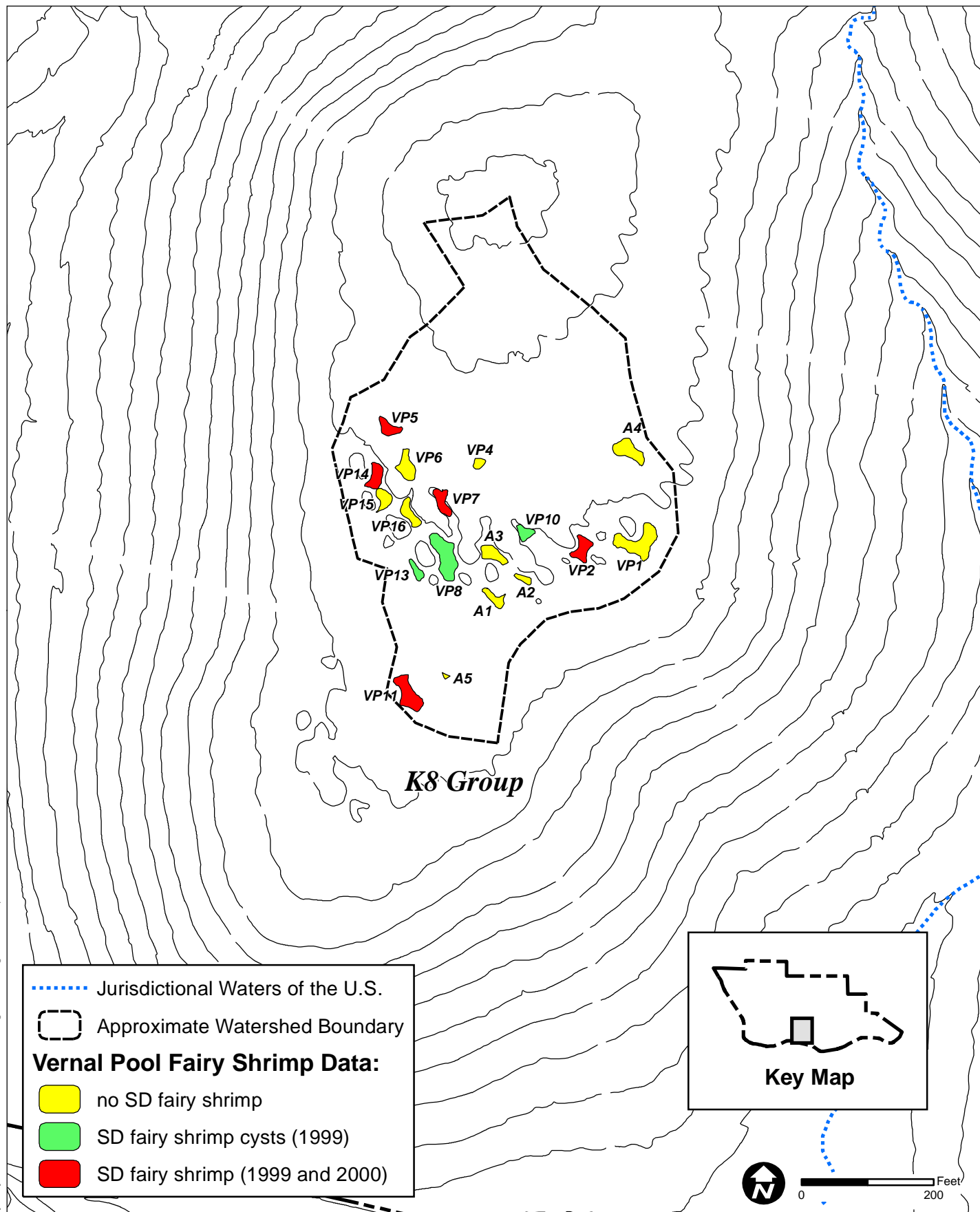
## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

**Option No. 2** Option No. 2 consists of mitigation in the form of purchase of vernal pool mitigation bank credits for a total of 0.239 acre at a combined 2:1 and 5:1 mitigation ratio.

This concept mitigation plan addresses mitigation for impacts to vernal pools in accordance with Option No. 1 of Mitigation Measure M-BTR-5. This mitigation option would reduce direct impacts to vernal pools to a level below significance by ensuring that there will be no net loss of vernal pool basin area within the region.

Vernal pool mitigation will include vernal pool restoration and enhancement within a disturbed upland habitat area nearby existing vernal pools within the K8 mesa that is assumed to have historically supported vernal pool habitat (Figure 4). The mitigation program will include the following steps that are further outlined in this document:

1. Preparation of conceptual design guidelines to outline the biological restoration and the required implementation procedures for the vernal pool mitigation program.
2. Preparation of biddable construction documents to implement the design intent. (To be prepared at a later date upon approval of this Mitigation Plan per Section 2.11 of the County Report Format and Content Requirements).
3. Control of non-native plant species from the restoration site and surrounding uplands.
4. Grading and re-sculpting of the restoration area to provide the intended grade elevations and hydrology for the restored vernal pools.
5. Collection of seed and inoculum from appropriate on-site vernal pools at the K6 mesa, with subsequent inoculation into the restored vernal pools.
6. Application of additional collected native upland plant species seed to help revegetate disturbed mima mounds and adjacent upland areas.
7. Enhancement of adjacent disturbed upland habitats through seed application with appropriate native species.
8. Construction of access barriers surrounding the restoration site, to protect the existing vernal pool and mima mound habitat from future disturbance.
9. Maintenance of permanent perimeter fencing around the vernal pool preserve area.
10. Long-term maintenance of restoration areas and implementation of remedial measures as necessary.
11. Long-term biological monitoring and reporting.
12. Ultimate achievement of success criteria and performance standards.



## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

## **2 GOAL OF THE COMPENSATORY MITIGATION PROJECT**

The primary goal of the proposed vernal pool mitigation for the Otay Ranch Resort Village Project is to compensate for the impacts to the K6 vernal pools located on site within the development footprint through enhancement and restoration of vernal pools within the K8 vernal pool complex that will be preserved on site. As components of the overall goal, this Mitigation Plan will provide guidance for enhancement and restoration of adjacent mima mounds and degraded transitional upland areas surrounding the vernal pools on the K8 mesa.

### **2.1 Responsibilities**

The project applicants (JPB Development LLC and Baldwin & Sons LLC) are responsible for initiating and funding all installation, maintenance and monitoring requirements during the 5-year program. They shall be responsible for hiring a qualified landscape maintenance contractor to carry out all maintenance work and for hiring a qualified Project Biologist to carry out the monitoring program for the duration of the 5-year period. The specific identity of the compensatory mitigation project designer, the installation contractor, the Project Biologist and the revegetation maintenance contractor will be determined at a later date during the permitting process.

#### **2.1.1 Applicant Responsibilities**

Dudek submits this Restoration Plan on behalf of the applicant, Baldwin & Sons LLC (contact: Mr. Stephen Haase) and JPB Development LLC (contact: Mr. Rob Cameron).

The applicant shall be financially responsible for all negotiations and costs associated with the implementation, monitoring, maintenance and long-term management and protection of the mitigation areas, as defined in this document. The applicant shall select and may replace, at their discretion, the landscape contractor, maintenance contractor, and Project Biologist for this project at any time. The applicant or current owner shall submit a bond to cover the anticipated costs for the implementation, maintenance, and monitoring of the program through the end of a 5-year maintenance and monitoring program. The applicant, or current owner, shall place a conservation easement over the new mitigation areas before project installation.

Proposed mitigation areas shall be accessible to the County throughout the project review and permitting phase, as well as during the installation and 5-year maintenance and monitoring period.

#### **2.1.2 Project Biologist Responsibilities**

A qualified Project Biologist shall be retained to monitor the implementation and perform long-term biological monitoring, as outlined in this plan. The Project Biologist may be an individual or a team of individuals and must have demonstrated experience in vernal pool restoration. The

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

Project Biologist must demonstrate an understanding of local plant community ecology and habitat restoration, and have expertise in plant and wildlife identification.

The Project Biologist shall help ensure that the applicant follows the guidelines of this plan, County permits, and final detailed revegetation construction documents for the interpretation of such plans, field monitoring of project installation, monitoring through the 120-day maintenance period, and biological monitoring throughout the 5-year monitoring period.

The Project Biologist shall be required to monitor throughout the construction period. Monitoring time may increase or decrease as required by field conditions, construction activities, and resource agency permit requirements. During the construction, the Project Biologist will have the authority to stop work in situations where biological resources, not permitted to be impacted, are in imminent danger of impacts from construction activities. Each site visit will be documented in a monitoring observation report that will note construction activities relating to the mitigation plan and any project deficiencies.

Biological monitoring will be performed following acceptance of mitigation installation and throughout the 5-year, long-term monitoring phase.

### **2.1.3 Restoration Contractor Responsibilities**

Restoration project installation and associated labor shall be provided by a contractor who has a valid California landscape contractor's license, has previous experience with habitat revegetation in the region, and can demonstrate successful similar revegetation project experience in Southern California. The contractor must demonstrate knowledge of techniques for growing, transplanting, and installing native plant species.

The contractor will be responsible for conformance to this plan, resource agency permits, and construction documents. The construction documents will include detailed graphic revegetation construction plans and written specifications that are in substantial conformance with the information and direction contained within this plan. The contractor's responsibility will continue until successful revegetation and final acceptance by the project applicant and Project Biologist at the end of the initial 120-day plant establishment period. The contractor will not be released from contractual obligations until written notification is received from the applicant, in consultation with the Project Biologist, certifying satisfactory completion of all required installation tasks as defined in the installation contract, construction documents, this plan, and resource agency permits.

After initial installation and completion of the 120-day plant establishment period, the applicant will have 5-year maintenance services performed by an experienced landscape maintenance contractor that specializes in habitat restoration. Maintenance work shall be performed as

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

indicated herein and according to the Project Biologist's recommendations. The applicant may choose to hire a maintenance contractor that is separate from the installation contractor.

### **2.1.4 Landscape Maintenance Contractor Responsibilities**

A landscape contractor shall provide 5-year maintenance. The contractor shall possess a valid California landscape contractor's license, have previous experience with habitat revegetation in the region, and be able to demonstrate successful similar revegetation project experience in Southern California. The contractor must demonstrate knowledge of techniques for maintaining native plant species and control of non-native species.

The contractor must possess a Qualified Applicator's License issued by the California Department of Pesticide Regulation, and maintenance laborers must receive appropriate annual herbicide training. Maintenance laborers must be trained to distinguish common native and non-native plants.

Maintenance work shall be performed as indicated herein and according to the Project Biologist's recommendations. The landscape maintenance contractor will be responsible for conformance to this CWMMP and any other conditions of County or resource agency permits. The contractor's responsibility will continue until final project approval by the County. The contractor will not be released from contractual obligations until written notification is received from the applicant certifying satisfactory completion of all required maintenance activities.

### **2.1.5 Seed and Plant Collection and Procurement Responsibilities**

Container plant material may be purchased from a native plant nursery (such as Tree of Life Nursery in San Juan Capistrano, Moosa Creek Nursery in Valley Center, Las Pilitas Nursery in Escondido, El Nativo Nursery in Azusa, Matilija Nursery in Moorpark, or other sources of local native plant material approved by the Project Biologist). If project timing allows, seed collected from the project area will be provided for propagation to one of the native plant nurseries listed above. At a minimum container plants shall have origins from cismontane San Diego County. The container plant provider is responsible for providing the quantity and sizes of plants specified in this plan in a pest, disease and weed-free condition.

Seed for inclusion in the seed mix may be obtained from S&S Seeds in Carpinteria, California, or an alternative source approved by the Project Biologist. The seed provider will be responsible for meeting the pure live seed and germination percentages standards listed in this plan and documenting the provenance of the seed collected. If feasible, seed shall be collected from the project site. At a minimum seed shall have origins from cismontane San Diego County.

# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

## **2.2 Types and Areas of Habitat to be Restored**

This Mitigation Plan proposes restoration of disturbed areas within the K8 vernal pool complex, including the road which bisects existing preserved areas of the K8 vernal pool complex. The habitat to be restored will consist of a mosaic of sage scrub and grassland habitat, typical of vernal pool complexes in the region. The mitigation area will include vernal pools (both existing and newly established), mima mounds, and surrounding uplands.

Because the K6 vernal pools impacted by the proposed project are characterized as having low to moderate value, the proposed mitigation will use a 2:1 mitigation ratio for the pools not occupied by San Diego fairy shrimp and 5:1 mitigation ratio for the occupied pool. Thus 0.025 acre will mitigate for impacts to the occupied pool, and 0.214 acre will mitigate for the impacts to the unoccupied pools for a total mitigation of 0.239 acre of vernal pool basin area.

Recent biological field work and topographic analysis have identified locations for establishment of some additional mima mounds and vernal pools within the K8 vernal pool complex. The mesa has been previously disturbed (both vegetation and topography), and several areas that appear to have previously functioned as vernal pools and mima mounds are impaired and no longer functioning as such. These areas will be contoured to enhance the concave/convex attributes of vernal pool/mima mound topography. Surrounding topography will be left undisturbed. However, the vegetation that currently exists is largely non-native and the intent of the Mitigation Plan is to enhance the surrounding habitat with the addition of native species. Habitat enhancement in the surrounding habitat areas will consist of weed control and native species seeding. Detailed construction drawings and specifications will be prepared once direction has been provided by the permitting resource agencies and this plan is approved and finalized.

## **2.3 Functions and Values to be Restored**

The degraded condition of the K8 mesa site is the result of previous vehicular access, grazing activities, sediment accumulation from erosion, and other prior site disturbances. As a result of prior disturbances, we believe that the area is currently functioning well below capacity relative to historic conditions. Thus, the functions and services to be restored include those typical of a properly functioning vernal pool/mima mound complex. For example, this Mitigation Plan intends to improve the existing functions and services, including adding additional vernal pool and mima mound area through restoration, thereby increasing biological and hydrological functions and services, controlling non-native vegetation in and around the existing and restored vernal pools, protecting the area from future disturbance with exclusionary fencing, restoring the roadway that bisects the vernal pool complex to native habitat, protecting and preserving the pool's watershed (?) and providing adaptive, long-term management to address the viability of the vernal pool complex in perpetuity. The upland mima-mounds surrounding the restored pools

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

will be planted and/or enhanced with available salvageable, native vegetation collected from adjacent areas, from acquired seed and from the proposed graded areas within the mitigation site. These enhancement measures will help stabilize the surface soils and will help improve long-term habitat quality through exotic plant and weed reduction, through native plant establishment and by providing a native plant buffer for the restored vernal pool habitat.

### **2.4 Time Lapse**

It is likely that the restoration areas will require many years to approach the ultimate structure and composition of naturally occurring vernal pool habitat; however, within 5 years it is anticipated that the intended floral compositions for the restored pools should be established sufficiently to persist on their own under natural conditions. In addition, the hydrology anticipated to support the restored vernal pools should be similar to the hydrology of the existing vernal pools within the K8 group and should not affect the functionality of the existing pools. By the end of the 5-year maintenance and monitoring period it should be apparent whether the restoration and enhancement effort is proceeding toward successful establishment of a viable vernal pool habitat.

The success criteria outlined in Section 6.1 herein, which are goals to be achieved during the 5-year monitoring period, represent an intermediate stage in the development of the vernal pool habitat. The target species composition and cover to be achieved during the 5-year period should provide an adequate foundation for the long-term development of the restored vernal pool habitat.

### **2.5 Cost**

Costs of preparation of the mitigation for the impacts to vernal pools are estimated based on past experience and knowledge of the site. It is estimated that the cost for preparation of the detailed construction plans and specifications, the implementation including topsoil salvage, vernal pool basin creation, and vegetation planting, and the mitigation site maintenance and monitoring for 5 years is \$135,000.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

## **3 PROPOSED VERNAL POOL MITIGATION SITES**

### **3.1 Site Selection**

This Mitigation Plan has designated 21 vernal pool basins as potential basin location sites, but will select approximately 12–13 of the sites for basin location restoration. The 12–13 basin locations will be those determined to be the most suitable, requiring the least amount of topographic modification.

#### **3.1.1 Soils**

Soil type is a critical factor in the formation of vernal pools and must consist of a nearly impermeable surface or subsurface soil layers (USFWS 1997). According to Bowman (1973), soils within the Otay Ranch Village 13 project site consist of Olivenhain cobbly loam, San Miguel–Exchequer rocky silt loams, Redding cobbly loam, and Friant rocky fine sandy loam. The San Miguel–Exchequer soils occur in the northwestern portion of the site. The Redding soils occur in and around the tall hilltop in the eastern portion of the site. The Friant soils occur in much of the northern portions and in the far eastern portion of the site and are characterized by rapid runoff, high erosion hazard, and prolific rock outcrops. A small portion of Diablo–Olivenhain complex occurs in the western portion, adjacent to Otay Lakes Road. The Olivenhain soils occur in the southern, western, and central portion of the Village 13 site, including the three large mesas, within which the vernal pool complexes K6 and K8 exist. This soil type is known to support vernal pools and certain rare plant species.

The Olivenhain cobbly loam soil, which comprises the mitigation site, consists of a clay subsoil that has a high water holding capacity. Evidence of the clay subsoil can be seen in the road ruts running through the area. As a result, it is anticipated that the proposed mitigation site contains appropriate soil characteristics for successful establishment of vernal pool habitat. Typical vernal pool and mima mound topography consists of depressions within undulating landscapes where soil mounds are interspersed with basins, swales, and drainages (USFWS 1997). This specific topography exists within the proposed mitigation site, but in the proposed pool restoration areas the topography is currently too shallow and needs to be modified to function as sufficient vernal pool basins. The existing site conditions will be altered slightly in order to restore the proper micro-topography to support vernal pools.

As an additional design feature, this Mitigation Plan proposes to salvage soil from the K6 vernal pool group prior to development impacts, if the soil appears appropriate for use. Clay subsoil from the K6 vernal pools will be salvaged for use in development of clay hardpans in the restored vernal pools within the mitigation area at the K8 complex. This will ensure that the appropriate clay hard pan conditions exist within the restored pools.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

Detailed biological information for the proposed mitigation site is provided in Tables 4 through 7 which provide the determination of occupation of the pools by fairy shrimp and a plant list for each existing vernal pool. The mitigation site is readily accessible by vehicle and an existing ranch road is present that provides access directly to the K8 mesa.

### **3.2 Location and Size of Compensatory Mitigation Site**

The mitigation/restoration area is located within an existing vernal pool complex known as the Vernal Pool K8 Group, located in the south-central portion of the Otay Ranch Resort Village property boundaries, City of Chula Vista, County of San Diego, California (Figure 2). The property is situated in U.S. Geological Survey (USGS) 7.5-minute series, Jamul Mountains quadrangle. Elevations within the restoration site are at approximately 620 feet above mean sea level.

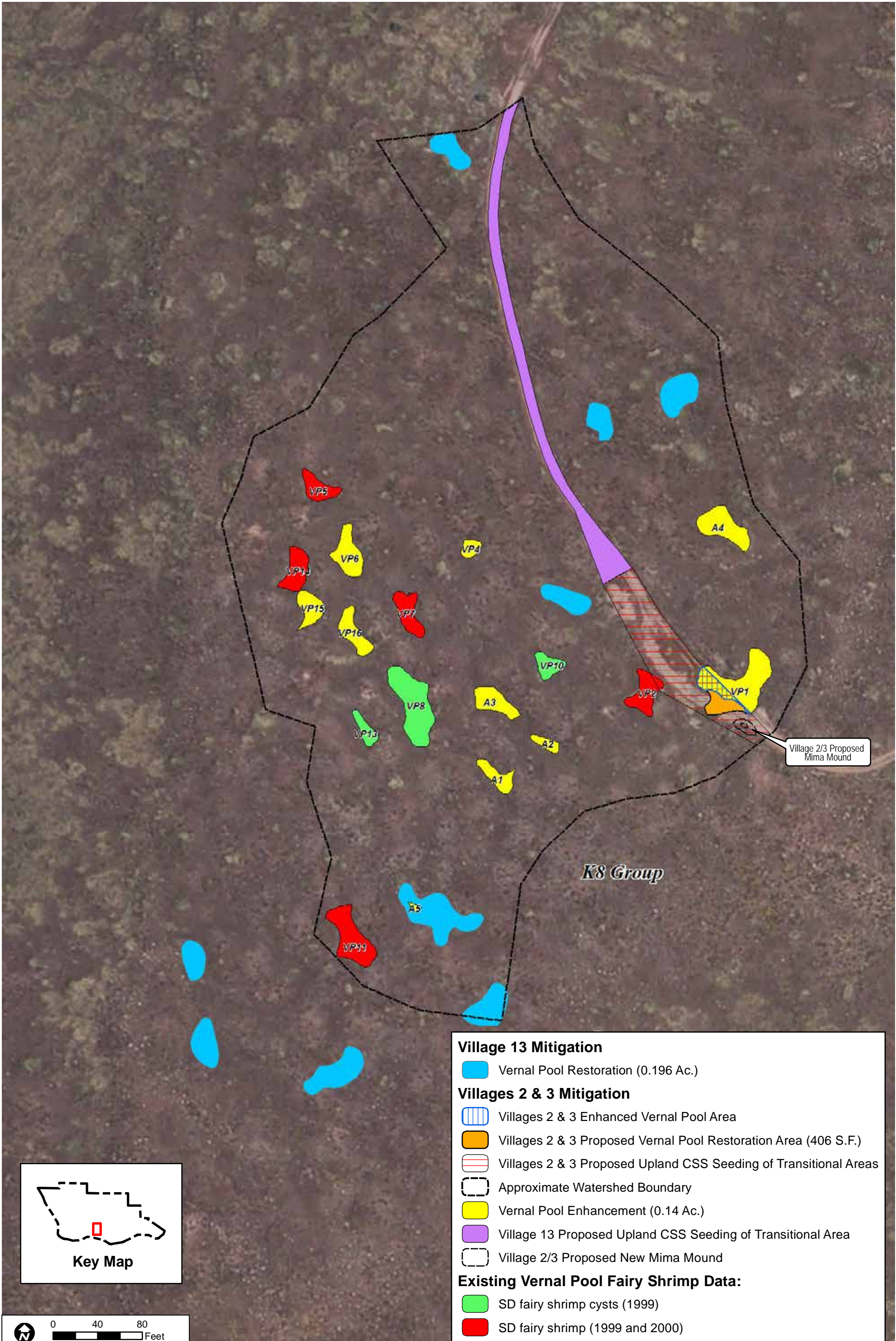
The location of the vernal pool mitigation area includes the entire K8 vernal pool complex, including the area within the estimated watershed boundary and a 100-foot buffer (Figure 5). The area is approximately 11.5 acres in size. The area is located on a gently sloping mesa that declines in elevation to the west, south and east.

Vernal pool area required for mitigation totals 0.239 acre or 10,411 square feet. Vernal pool enhancement will consist of weed control within the vernal pools not known to support San Diego fairy shrimp (*Branchinecta sandiegonensis*) in order to avoid direct impacts to this federally listed, endangered species. This includes a total acreage of 0.144 acre. The proposed credit proportion for the enhancement efforts is 30%, therefore enhancement efforts will provide 0.043 acre of the mitigation credit needed. The balance of the mitigation credit (0.196 acre) will come from restoration and/or establishment of additional vernal pools at the K8 mesa.

The average size of the existing vernal pools at the K8 complex is 692 square feet. Based on the average size of the existing vernal pools at this location, restoration of 8 vernal pools comparable in size would achieve the required acreage amount. A total of 8 potential vernal pool restoration basin sites have been identified within the mesa (Figure 5). The 8 potential vernal pool restoration basin sites have high suitability, are within ideal locations with excellent potential, and are within flat areas suitable for ponding and water retention. Some modifications and design work may be required but in general, the locations are suitable for vernal pools.



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**FIGURE 5**  
**Proposed Vernal Pool Mitigation Area (K-8 Group)**

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# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

## **3.3 Functions and Values**

As described in Section 2.2, the condition of the K8 mesa site is degraded from previous vehicular access, grazing activities, sediment accumulation from erosion, and other prior site disturbances. The abundance of non-native plant species at the site is indicative of prior site disturbance. The vegetation is composed of a mosaic of patchy coastal sage scrub and non-native annual grassland. Non-native species are predominantly annuals, such as filaree (*Erodium* spp.), wild oat (*Avena* spp.), brome grasses (*Bromus* spp.), annual ryegrass (*Lolium multiflorum*), totalote (*Centaurea melitensis*), and mustard (*Hirschfeldia incana* and *Brassica nigra*).

A dirt access road bisects the K8 vernal pool complex, which diminishes contiguity of vernal pools, mima mounds and their associated plant and wildlife resources. Additionally, the dirt access road facilitates soil erosion and sediment transport from the north (uphill) towards the vernal pools.

As a result of prior disturbances, the area is currently functioning well below capacity relative to historic conditions.

## **3.4 Present and Proposed Uses**

Prior uses of the mitigation area include off-road vehicular activity and grazing/ranching. Currently, the perimeter of the area is fenced; however the fencing is designed to allow the use of the dirt access road that bisects the site. The site is not currently being used for anthropogenic purposes, other than vehicular access.

Proposed use of the mitigation site will be for plant and wildlife habitat and as a preservation area for mima mound and vernal pool habitat. The restored vernal pool area will be preserved and managed as part of a natural open space area, consistent with the preservation of vernal pool resources and other natural habitat in nearby areas. The elimination and restoration of the road and the enhancement of upland vegetation surrounding the restored vernal pools will also help provide an added buffer to the vernal pool habitat, will link the two portions of the complex that had been bisected by the road and will help eliminate future disturbance. Additional preserve fencing and signage will help preclude future impacts by off-road vehicles

## **3.5 Reference Sites**

Typically, a reference site is selected which provides the conditions against which the mitigation site is compared. Because the proposed vernal pool mitigation site is located within an existing area with vernal pools, the K8 vernal pool site itself serves to function as a reference site.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

## **4 IMPLEMENTATION PLAN FOR THE COMPENSATORY MITIGATION SITE**

The following section describes the necessary implementation measures for restoring the intended habitat and implementing the intended restoration and enhancement program. Final grading plans and revegetation plans for the mitigation area will be prepared at a later date, in coordination with the Project Biologist, in order to implement the biological intent outlined in this document. The Project Biologist will supervise implementation of the mitigation and monitoring program.

### **4.1 Rationale for Expecting Implementation Success**

As observed in previous surveys conducted by Dudek, the vernal pools within the K8 complex experience seasonal inundation for a long enough period to support the establishment of vernal pool conditions (e.g., vernal pool indicators). However, the proposed vernal pool restoration sites consist of insufficient depressions, inadequate hardpan subsoil, or too much disturbance to currently develop vernal pool conditions. Some of the locations are believed to have existed as functioning vernal pools in the past (particularly those locations within the dirt roadway). Further, the overall topographic patterns of the mitigation site are of hummocks (mima mounds) and depressions on a relatively gently sloping mesa.

Through topographical modification (i.e., either mechanical and/or by hand), the drainage patterns within the restoration site will be altered sufficiently to help retain hydrologic input within the restored basins consistent with appropriate vernal pool topography.

The soil conditions are generally appropriate, as evidenced from the existing vernal pools on the mesa and the presence of Olivenhain Cobbly Loam soil series (Bowman 1973). However, to ensure that an adequate clay hardpan exists to form an impermeable soil layer within the restored vernal pools, clay subsoil salvaged from the vernal pools at the K6 mesa will be imported and compacted in the bottom of the basins, if appropriate.

Successful restoration of vernal pools is increased when the pools to be restored are located near existing pools (USFWS 1997). The fact that the proposed vernal pool restoration area is adjacent to existing vernal pool habitat, provides assurance that the site is suitable, and also improves the likelihood that the appropriate vernal pool species will be able to persist at the mitigation site.

A 100-foot buffer from the edge of the approximate watershed boundary will also be enhanced through weed management and native seeding to help improve the adjacent upland habitat areas. Enhancement of this buffer area will help increase the success of the restored vernal pools by limiting the input of non-native plant propagules into the vernal pool complex.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

Vernal pools are not homogenous throughout San Diego County due to differences in climate, topography and soils (USFWS 1997). Therefore, the plant species composition of the surrounding vernal pool habitat will be used as the model for the restoration effort. Native seed and inoculum will be collected from the K6 vernal pools that contain vernal pool species. Seed for the upland habitat enhancement will be collected from local sources for use as propagules for the seeding effort. The use of local seed and inoculum improves the chances for successful restoration because the species are locally adapted to the conditions present at the site. Because the restoration pools are immediately adjacent to existing vernal pools natural recruitment is likely to occur.

### **4.2 Financial Assurances**

The applicant shall post a performance bond or letter of credit jointly with the resource agencies for the full amount of the cost of implementation of the restoration and enhancement program. This shall include the following elements and associated costs: (1) clearing and grubbing; (2) plant salvaging, seed collection and storage; (3) site preparation and grading; (4) salvaged plant and seed installation; (5) 120-day plant establishment maintenance; (6) 5-year maintenance and (7) 5-year biological monitoring. The total actual cost shall be determined at completion of the final revegetation construction documents.

A revegetation agreement shall be signed and notarized by the property owner following approval of this revegetation plan and accompanied by the required security as agreed upon by the County of San Diego.

### **4.3 Schedule**

Maintenance activities described above will be conducted monthly during the initial 120-day plant establishment period and then four times per year thereafter for the remainder of the 5-year maintenance and monitoring period. Maintenance visits will be timed to be conducted during the most productive and effective time of year for weed control (e.g., winter and early spring).

### **4.4 Site Preparation**

#### **Tasks**

1. Under the direction of the Project Biologist, the restoration contractor will collect vernal pool inoculum, propagules, clay topsoil and upland plant species seed from the K6 vernal pool and upland mima mound areas. The salvaged material will be stored at an appropriate location (e.g., native plant nursery or seed storage facility) until it can be utilized at the restoration area.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

2. As determined appropriate by the Project Biologist, the restoration contractor will salvage some of the perennial plants and bulbs from the K6 area and store/maintain these materials until the appropriate planting period for the adjacent upland areas within the mitigation site.
3. Native vegetation, within the limits of grading for the restored vernal pools will be salvaged and/or cut and mulched as deemed appropriate by the Project Biologist, for reuse in the restoration area.
4. The mitigation site will be weeded prior to grading to control non-native plant species. Following the initial weeding, the thatch and weed material will be removed and disposed of off-site. Weed management procedures will be continued on a monthly basis until deemed by the Project Biologist as being appropriately controlled for seeding.
5. Prior to any grading/excavation, temporary perimeter construction fencing and silt fencing will be installed around the perimeter of the existing vernal pools to prevent inadvertent disturbance and deposition of soil and dust within the existing vernal pools.
6. Prior to excavation of the restored vernal pool basins, the contractor shall perform a soil analysis to determine the soil conditions and whether there is an existing clay pan layer. This would be done to determine whether over-excavation of the basin bottom and importation of clay subsoil to create an appropriate impermeable subsurface are necessary.
7. Excavate (mechanical and/or by hand) the restoration basins and restore/create adjacent mima mound topography. Contour the basins and mima mounds to have a natural form comparable to that of the existing basins and mima mounds on the K8 mesa.
8. Perform soil compaction analysis on restored pools and compare against existing pools. Soil compaction within the restored pool should be similar to the soil compaction within the existing pools (i.e., no more than a 5% variation).
9. After soil compaction analysis, it may be necessary to further compact the soil within the restored vernal pool basins to the appropriate level. Subsequent soil compaction analyses should follow to verify that the appropriate compaction has been achieved.
10. Rip the dirt access road within the mitigation area with the exception of the proposed vernal pool restoration sites. Rip the soils on-contour to 12-inch depth. Ripping shall not run downhill as this can exacerbate erosion. Rips shall be no more than 8-inches apart.
11. Install any salvaged live plant materials from the K6 mesa within the ripped roadway and other open, disturbed areas within the enhancement area as directed by the Project Biologist. Water in any planted live plants using a water truck and hose.
12. Apply native seed mix on newly restored mima mounds. Also, apply native seed mix within designated enhancement areas within the surrounding upland habitat.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

13. Apply the salvaged vernal pool inoculum and vernal pool seed mix to the restored vernal pools.
14. Upon successful completion of the initial restoration phase, initiate biological monitoring and maintenance and continue for 5 years as described later in this Mitigation Plan.

**Note.** The actual dates for implementation of these tasks will be determined based on seasonal weather constraints and through coordination with the resource agencies. All restoration work involving soil manipulation shall be conducted during the dry season prior to the onset of the rainy season. Final dates for the start of construction and the ultimate installation completion are contingent upon the developers phasing strategies.

### **4.4.1 Preliminary Design Consideration and Site Modifications**

Previous detailed mapping of the existing vernal pools within the K8 vernal pool group was utilized to evaluate the existing spatial distribution of vernal pools and mima mounds within the target mitigation/restoration area (Figure 4). The general location and quantity of the potential vernal pool restoration sites are based upon previous biological surveys of the area conducted by Dudek biologist Vipul Joshi, and Dudek habitat restoration specialist/landscape architect John Minchin. This site was evaluated relative to the mitigation needs and overall site potential.

The site encompasses sufficient area to support the intended restoration effort, and appears to have adequate watershed area to support the additional vernal pool basins, without adversely affecting the existing vernal pools.

The preliminary plan view layout for the vernal pool restoration area with details of basin locations is shown on Figure 5. This plan shows the locations of the proposed vernal pool restoration areas in relation to the existing pools in the K8 Group area. The exact locations, sizes, and shapes of the restored vernal pools will be further analyzed during field review during the design phase. The site encompasses sufficient area to support the intended restoration effort, and has adequate watershed area to support the expanded vernal pool basin, without adversely affecting the adjacent vernal pools. The site would also be protected from future disturbance by the existing fenced boundaries of this portion of the preserve, through the abandonment of the existing road, and through new exclusionary fencing to permanently block-off the area. Photographs of the existing site conditions at the proposed vernal pool mitigation area are shown on Figure 6 (Photos 3–6).

Existing mima mounds between the proposed vernal pool restoration areas may be heightened with the excavated material from the basin bottoms. If not already present, new mima mounds may be created to frame the restored vernal pool locations. An important design consideration for the mima mound alterations is the presence of existing native plant resources. If existing mima mound vegetation is largely native and undisturbed, it will be unmodified. Mima mounds with an abundance of non-native plants and exhibiting a disturbed character may be modified.





1 - View of K6 Vernal Pool Complex looking south (May 2009)



2 - View of K6 Vernal Pool Complex looking southeast (May 2009)



3 - View of K8 Vernal Pool Complex near Vernal Pool 8 looking northeast (May 2009)



4 - View of K8 Vernal Pool Complex near Vernal Pool 11 looking southeast (May 2009)



5 - View of K8 Vernal Pool Complex near Vernal Pool 6 looking south (May 2009)



6 - View looking south of existing access road to be restored (May 2009)

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## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

Figure 7 provides a typical schematic cross sectional view illustrating the relationship of the existing topography, vernal pool basin excavation, and new mima mound creation/modification. Figure 8 provides an example plan view layout for the proposed revegetation treatments for the modified or newly established mima mounds.

The initial site preparation work necessary to prepare the restoration area will include the removal of weeds and invasive species from the limits of the mitigation site, including the adjacent upland areas. This will include the physical removal of non-native herbs and grasses, exotic plants and all associated debris. Disposal of these materials shall be at an acceptable off-site source or landfill facility. Dudek recommends hand clearing around any desirable native vegetation during the initial weed removal effort. If determined appropriate by the Project Biologist, native perennials within the vernal pool and mima mound restoration areas (i.e., limits of disturbance), would be salvaged prior to grade modification and would later be transplanted into the improved upland mima mound and transitional upland areas.

After the grading of the restored vernal pool and mima mound area has been achieved, hydrological data will be collected the following winter to determine whether additional excavation may be necessary to attain the desired vernal pool hydrology.

### **4.4.2 Topographic Reconstruction**

Prior to final design of the vernal pool restoration effort (i.e., preparation of detailed construction documents), a detailed Global Positioning System (GPS) mapping of the mitigation area will need to be conducted to further document existing site conditions and to help refine a final grading scheme for the restoration effort. Given the fine elevation intervals between vernal pool maximum depths and mima mound peaks, elevation data to within 0.5' accuracy will be surveyed or otherwise obtained. This information will be used to provide base information for the preparation of the final detailed revegetation construction documents (i.e., plans and specifications) that would be produced at a later date, once this Mitigation Plan is approved. Topographic grading plans for the vernal pool area will be prepared as part of the final revegetation construction document package.

Prior to the start of any site preparation and/or grading work, the perimeter of the existing pools will be staked with pin flags to provide visible demarcation of the existing pool boundaries. One stake shall be clearly labeled at each pool with the corresponding pool number for future identification. Upon completion of the restored pool grading, the perimeter of the restored pool shall also be staked with metal t-bar posts and flagging tape shall be installed between the posts completely surrounding the pool for identification and protection purposes. The roadway shall be completely blocked-off and/or relocated around the vernal pool preserve area if temporary access

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

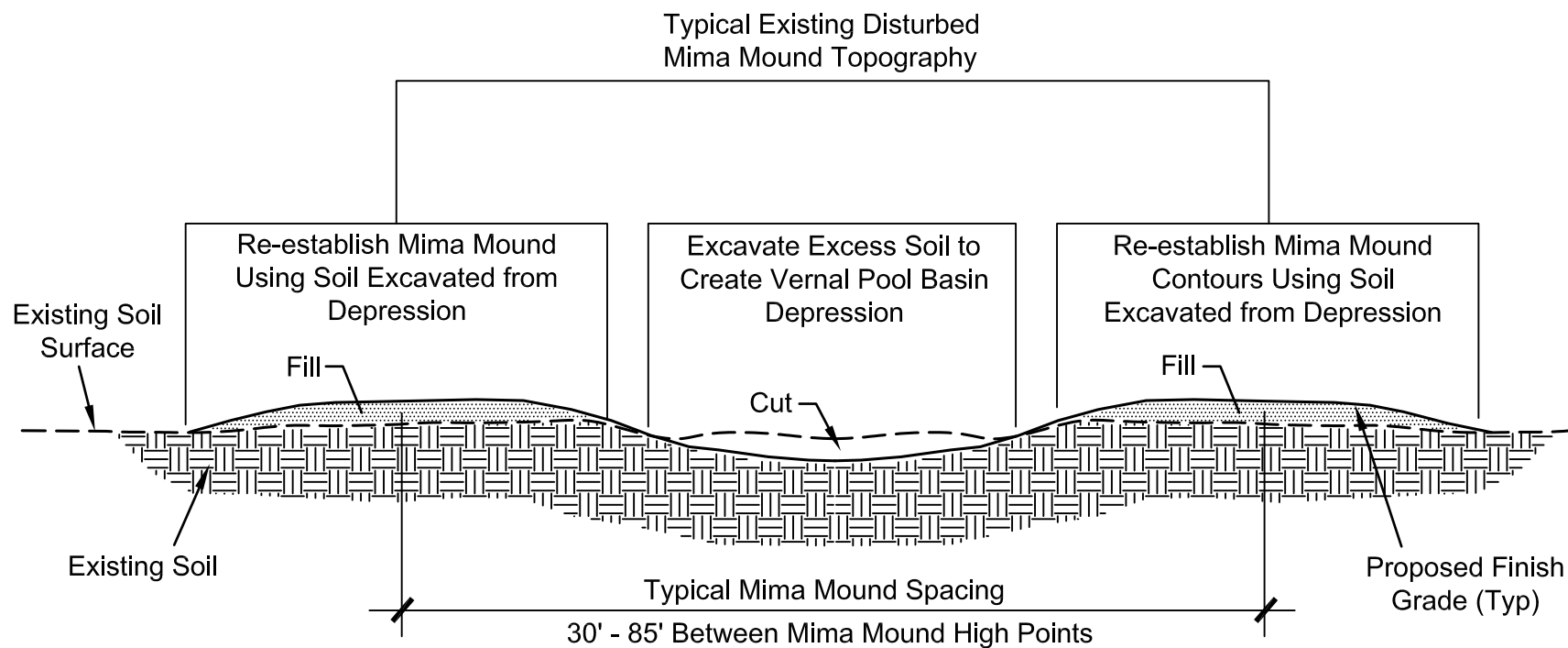
is still needed. Fencing to secure the area from future disturbance shall be installed and kept in place in perpetuity.

As a result of the past disturbances, such as the bisecting dirt access road, the capacity of the area to capture and store water has been compromised. The dirt road promotes directed surface runoff down slope, as opposed to more desirable dispersed sheet flow across the mesa. Ripping followed by track walking the road may help reduce overall erosion. Restoration of the dirt access road will help achieve greater water retention within the restored vernal pool basins.

In order to create appropriate mima-mound and vernal pool habitat, existing upland areas will be excavated to a level that will promote the appropriate seasonal inundation. Excavation will be accomplished mechanically, and/or by hand where necessary to avoid negative impacts to the adjacent vernal pool habitat and vegetation. The final extent of pool excavation and mima mound creation will be determined by the Project Biologist in the field, based upon the inspection of soil color and texture and through soil test pits to determine if appropriate subsurface compaction conditions exist to allow for the proper water retention. In addition, a final soils analysis shall be conducted by a soil testing laboratory, after rough grading is completed, to verify whether additional soil remedial measures (i.e., amending, conditioning, substrate recreation, etc.) will be required to support the intended native species revegetation program.

Excavation (mechanical and/or hand) of the bottom of the vernal pool restoration areas will function to increase the water holding capacity of the individual basins. In addition, soil compaction analysis will be conducted on the existing pools and the restored pools to determine optimal soil conditions to facilitate the long-term water retention to support the desired vernal pool habitat. In order to restore the water holding capacity of the restored pools to that of the existing pools, the soils within the restored pool may need to be compacted, or sub-grade modification made to create an impervious sub-surface layer, in order to match the soil compaction within the existing pools.

A qualified Project Biologist will supervise the restoration grading activities. Grading of the restoration site will be conducted during the summer and early fall in order to minimize soil disturbance during the rainy season when vernal pools fill with water. The grading plans will identify the limits of grading, as well as those areas of existing habitat that are not to be impacted by the restoration activities and that would be protected/preserved.



**NOTE:**

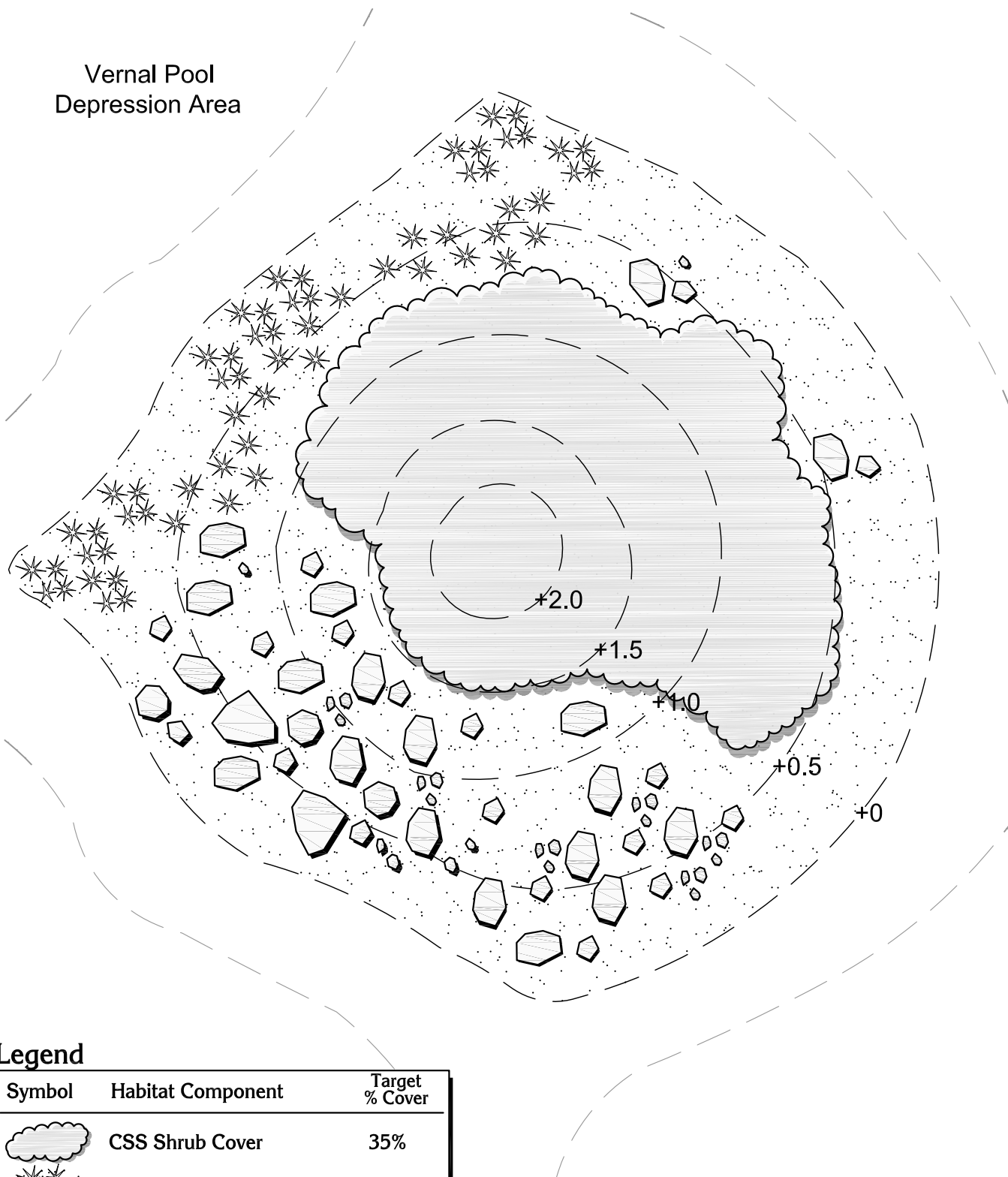
1. Height of mima mound fill soil will be directly proportional to the depth & area of excavation.

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## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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# Vernal Pool Depression Area



## Legend

Symbol	Habitat Component	Target % Cover
	CSS Shrub Cover	35%
	Bunch Grass	10%
	Rock/Bare Ground/Annuals	55%



Scale: 1/4" = 1' - 0"

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Otay Ranch Resort Village Site - Conceptual Vernal Pool Mitigation Plan

FIGURE 8  
**Mima Mound Habitat Example**

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

These areas will be defined by temporary barriers (staking, flagging, silt fencing, etc.) prior to initiation of the grading activities.

Silt fencing will be installed around the perimeter of the adjacent existing vernal pools during construction and during the weed eradication procedures, to help protect the pools from windblown seed invasion and siltation. The silt fencing will be removed after all weed eradication and revegetation procedures are complete. Silt fence trenches will be backfilled and compacted to match the adjacent non-disturbed soil and seeded with the appropriate seed mix, as indicated by the Project Biologist.

### **4.4.3 Fencing and Signage**

Exclusionary fencing will be installed and maintained, beginning with the commencement of grading to ensure the exclusion of disturbances including off-road vehicles, foot traffic, and/or mountain bikes through the mitigation/restoration area. The exclusionary fencing will be installed at the 100-foot buffer distance from the edge of the watershed boundary. The fencing will match the existing preserve area fencing and will consist of metal T-Bar stakes and three-strand barbed wire fencing. The existing fencing that generally follows the watershed boundary perimeter may be left in place or relocated as the 100-foot buffer fencing. Fencing shall remain in place in perpetuity. No vehicular access will be allowed through the mitigation/restoration area after completion of restoration work. If vehicular access is needed through this area, then access shall be re-routed around the outside of the perimeter fencing at the 100-foot buffer distance.

Steel signs (12 inches × 18 inches) indicating that habitat restoration is in progress and that the area is an ecological preserve, with no trespassing allowed, will be attached to the fencing at 200-foot intervals along the fence. Penalties for trespassing will also be cited on the signs. Signage text will be provided in both Spanish and English. The Project Biologist shall provide the final wording for the signs, in coordination with the contractor.

### **4.5 Planting Plan and Final Landscape and Revegetation Plans**

A final set of landscape construction documents including a grading plan, fencing plan, planting plan, and details and specifications acceptable for bidding and construction shall be prepared by a registered landscape architect to implement the conceptual guidelines for the restoration and enhancement program outlined in this Mitigation Plan. The final plans shall be submitted to the County of San Diego and the resource agencies prior to implementation of the mitigation/restoration program. Implementation of the landscape construction documents and restoration/enhancement program must be coordinated among the resource agencies, County, Project Biologist, landscape architect, landscape contractor, and plant material suppliers. The contracting nursery and seed collectors should be given the maximum possible lead time (i.e., no less than 12 months prior to actual seed application) to salvage, collect seed, store and to prepare

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

plant material for the project in order to assure availability and minimize cost. Field coordination shall be provided by the Project Biologist to verify the sources for plant material propagation and for construction of the restoration areas. Coordination also will be essential to affect the successful salvage, storage, and eventual replanting of salvaged native plant materials.

Species to be planted in the restored vernal pool areas are shown on Table 8. The selection of species to be planted in the vernal pools is based on the known native plant species present within the vernal pools at the K6 and K8 mesas (see Tables 4 and 5). Excavation of the vernal pool basin within the proposed limits of grading will result in the removal of some topsoil. If determined appropriate by the Project Biologist, the topsoil will be reserved and redistributed within the new upland mima mound area, as the topsoil may contain a seed bank of upland species. Inoculum from the K6 vernal pools to be impacted by the development project will also be collected, stored, and redistributed within the restored vernal pools when the grading and contouring of the restored basins is complete. All seed collection from existing vernal pools should be overseen by a qualified Project Biologist to ensure the collection of appropriate species from the designated K6 location.

Planting at the site will be accomplished during the late fall through early winter of the implementation year. Any native perennials and bulb species salvaged prior to grading will be transplanted onto the new mima mounds and adjacent uplands. Organic mulch shall be used around all salvaged/relocated plant material. The new and enhanced mima mounds will be hand seeded with seed and bulbs collected from the project area and/or the project vicinity (southwest San Diego County). The species list was compiled based on the composition of existing pools and adjacent native upland vegetation. Seeding and/or planting of the vernal pools, mima mounds, and adjacent uplands should be timed to take advantage of seasonal rainfall patterns and should be performed ideally between November 1 and January 1. The plant species to be seeded within the restored vernal pools and mima mounds are listed in Tables 8 through 9 and the coastal sage scrub seed mix for the upland enhancement area is shown in Table 10.

A seed supplier specializing in native species, such as S&S Seeds in Carpinteria, or an approved equal, should be contracted with to collect, store, and supply the necessary seed. The applicant or the designated contractor shall make these arrangements a minimum of 12 months prior to actual implementation.

## Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 8**  
**Vernal Pool Plant Species to be Seeded in Restored Vernal Pools**

Species		Source
Scientific Name	Common Name	
<i>Alopecurus howelli</i> [=saccatus]	Howell's foxtail	Seed from K6 and K8
<i>Brodiaea jolonensis</i>	Dwarf brodiaea	Salvaged corms and seed from K6
<i>Crassula aquatica</i>	pygmy weed	Seed from K6 and K8
<i>Deschampsia danthonioides</i>	annual hairgrass	Seed from K6 and K8
<i>Eleocharis macrostachya</i>	Pale spike-rush	Salvaged plants and seed from K6 or from local source
<i>Juncus bufonius</i>	Toad-rush	Seed from K6 or from local source
<i>Myosurus minimus</i> var. <i>apus</i>	Mouse-tail	Seed from local source; although originally recorded in K6 in 1990, this species has not been detected in the K6 pools.
<i>Plagiobothrys</i> spp.	popcorn flower	Seed from K6 or from local source
<i>Psilocarphus brevissimus</i>	wooly marbles	Seed from K6

\* All species requiring special collection from local sources or from on site.

**Table 9**  
**Species to be Seeded on Mima Mound Areas**

Species		Source
Scientific Name	Common Name	
<i>Castilleja exserta</i>	owl's clover	Seed from local source
<i>Eriogonum fasciculatum</i>	California buckwheat	Seed from local source
<i>Deinandra fasciculata</i>	fascicled tarweed	Seed from local source
<i>Gnaphalium californicum</i>	California everlasting	Seed from local source
<i>Hazardia squarrosa</i> ssp. <i>grindelioides</i>	saw-toothed golden bush	Seed from local source
<i>Lasthenia californica</i>	coast goldfields	Seed from local source
<i>Nassella lepida</i>	foothill needle-grass	Seed from local source
<i>Nassella pulchra</i>	purple needle-grass	Seed from local source
<i>Plagiobothrys</i> spp.	popcorn flower	Seed from local source
<i>Plantago erecta</i>	dot-seed plantain	Seed from local source
<i>Selaginella cinerascens</i>	ashy spike-moss	salvaged clumps from K6
<i>Viguiera laciniata</i>	San Diego sunflower	Seed from local source

# Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village

**Table 10**  
**Coastal Sage Scrub Seed Mix for Upland Enhancement Areas**

Botanical Name	Common Name	Min. % PLS	Lbs./acre
<i>Artemisia californica</i>	California sagebrush	10%	2.0
<i>Baccharis sarothroides</i>	chaparral broom	3%	4.0
<i>Castilleja exserta</i>	owl's clover	25%	1.0
<i>Cneoridium dumosum</i>	bushrue, coast spicebush	40%	1.0
<i>Eriogonum fasciculatum</i>	California buckwheat	10%	6.0
<i>Helianthemum scoparium</i>	rock rose	80%	2.0
<i>Isocoma menziesii</i>	coast goldenbush	15%	1.0
<i>Isomeris arborea</i>	bladderpod	60%	4.0
<i>Lupinus bicolor</i>	Pigmy-leaf lupine	90%	2.0
<i>Lotus scoparius</i>	deerweed	85%	1.0
<i>Mimulus aurantiacus</i>	sticky monkeyflower	2%	2.0
<i>Nassella lepida</i> (de-awned)	valley needlegrass	65%	2.0
<i>Nassella pulchra</i> (de-awned)	purple needlegrass	75%	2.0
<i>Phacelia parryi</i>	Parry's phacelia	80%	1.0
<i>Plantago erecta</i>	dwarf plantain	85%	4.0
<i>Salvia apiana</i>	white sage	25%	2.0
<i>Sisyrinchium bellum</i>	blue-eyed grass	80%	2.0
<i>Viguiera laciniata</i>	San Diego sunflower	20%	2.0
<b>Total lbs. per acre:</b>			<b>41.0</b>

**Note** Additional native upland plant species may be salvaged from areas within the grading limits of the project and may be transplanted to the perimeter upland areas

## 4.5.1 As-Built Conditions

The applicant will submit a report to the County, USFWS, and CDFG within 6 weeks of completion of the installation, describing the as-built conditions of the mitigation site. The report will include a marked-up duplicate copy of the planting plan drawing showing the final configuration of the restoration area. Photographs also will be included to document the final “as-built” field conditions. A final GPS map showing the final boundaries of all restoration areas shall also be provided. This map would also be used as a reference figure during the long-term maintenance and monitoring period.

## 4.6 Irrigation Plan

Irrigation will be temporary and will be surface mounted and removed upon success of the planting of the mitigation area. Irrigation plans will be prepared in conjunction with the preparation of the construction plans and specifications. Plans will show the point of connection, the available pressure, controller location, valves, piping, and head locations. The irrigation plans also will provide the required backflow protection at the point of connection and will identify the power source for the irrigation controller. Low precipitation rate heads and soil moisture sensors are recommended to avoid runoff and/or inappropriate ponding.

# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

## **5 MAINTENANCE DURING MONITORING**

The purpose of the maintenance program is to provide guidelines for maintenance of the restored habitats during an initial 120-day plant establishment period and then throughout the 5-year maintenance and monitoring period. Because the goal of the restoration program is to create a natural system that can ultimately support itself with little or no maintenance, the primary effort of the maintenance program is concentrated in the first few seasons of growth to control non-native plant species and to help the desired species become established. Maintenance will focus initially on addressing remedial measures to help achieve the success standards. Maintenance of the fencing and signage surrounding the site will be required throughout the 5-year maintenance period.

### **5.1 Maintenance Activities**

#### **5.1.1 Pest Management**

Non-native plant species are currently common within the proposed restoration area. The predominant maintenance work effort will be related to management and control of non-native plant species. Weed control efforts will include a combination of physical removal, and/or herbicide applications where appropriate and legal according to herbicide restrictions. Any herbicide use shall be coordinated with the Project Biologist to ensure that desirable vegetation is not inadvertently damaged from herbicide overspray.

The non-native plant species in Tables 4 and 5 are documented as being present within the K6 and K8 mesa vernal pools. All of these species are annuals; therefore, effective control will rely on minimizing the seed production. Many of these species are ubiquitous, and complete control will not be feasible (e.g., filaree, brome grasses, rattail fescue). Further, some of these species may not pose a considerable threat to the establishment and successful function of the vernal pool and mimia mound habitat (e.g., smooth cat's-ear, narrow-leaf filago, sand spurrey). While maintenance efforts will attempt to address all non-native species, the focus of the weed control efforts shall be on those species that present the greatest threat to the success of the project. Those species include those listed on the California Invasive Plant Council's (Cal-IPC) California Invasive Plant Inventory Database (Cal-IPC 2006) that have a moderate to high rating for threat to natural lands (see Table 11).

Weed control efforts should be conducted early in the growing season prior to seed set and dispersal. Thus, the maintenance visits will be closely spaced during the winter and early spring when the annual weed species are developing seed. Weed control efforts will likely be minimal in summer and fall when the annual weeds have died.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

Any rodent infestations (i.e., squirrels, gophers, etc.) which impact the mima mound vernal pool habitat should be controlled using acceptable pest management methods, as recommended by a Pest Control Advisor.

The fencing and signage will be checked and repaired as necessary and any trash and debris present in the mitigation area will be removed on a quarterly basis.

**Table 11**  
**Non-native Plant Species Documented at K6 and K8 Vernal Pools**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Cal-IPC Rating</b>
<i>Avena barbata</i>	Slender wild oat	Moderate
<i>Bromus hordeaceus</i>	Soft chess	Limited
<i>Bromus madritensis</i> ssp. <i>rubens</i>	Foxtail chess	High
<i>Cotula australis</i>	Australian brass-buttons	Not listed
<i>Erodium botrys</i>	filaree	Not listed
<i>Erodium cicutarium</i>	Filaree	Limited
<i>Filago gallica</i>	Narrow-leaf fillago	Not listed
<i>Gastridium ventricosum</i>	nitgrass	Not listed
<i>Hordeum</i> spp. ( <i>H. murinum</i> , <i>H. marinum</i> )	barley	Moderate
<i>Hypochaeris glabra</i>	Smooth cat's-ear	Limited
<i>Lolium multiflorum</i>	Annual ryegrass	Moderate
<i>Lythrum hyssopifolia</i>	Hyssop loosestrife	Limited
<i>Polypogon monspeliensis</i>	rabbit's foot grass	Limited
<i>Spergularia bocconii</i>	Sand spurrey	Not listed
<i>Vulpia myuros</i>	Rattail fescue	Moderate

### **5.1.2 Trash Removal**

Trash will be removed from the mitigation areas by hand during maintenance visits. Trash consists of all man-made materials, equipment, or debris dumped, thrown, washed, blown, and left within the mitigation areas. Trash and inorganic debris washed or blown onto the mitigation sites will be removed regularly. Deadwood and leaf litter of native trees and shrubs will not be removed. Downed branches and leaf litter provide valuable micro-habitats for invertebrates, reptiles, small mammals, and birds. In addition, the decomposition of deadwood and leaf litter is essential for the replenishment of soil nutrients and minerals.

### **5.1.3 Irrigation Maintenance**

The majority of the sites will be irrigated to promote plant survival during the drier parts of the year, primarily the summer months. Irrigation may be used in winter months to simulate an average or above-average rain season if natural precipitation is lacking. Irrigation is expected to

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

last for a maximum of 3 years. The irrigation system shall be programmed, scheduled and monitored to avoid run-off. Low precipitation rate heads allowing improved percolation and reduced run-off should be utilized. The irrigation system should include a soil moisture sensor and master valve to prevent overwatering. Once the plants have become established, irrigation will be gradually reduced over time to acclimate plants to a non-irrigated condition prior to complete cessation of irrigation. Irrigation from June to November may be minimized to allow plants to experience normal drought cycles and to promote appropriate root growth. The Restoration Contractor will maintain the irrigation system at the optimum level of operation.

Consultation with the Project Biologist will be necessary to determine the timing for the cessation of irrigation. Irrigation should stop at the earliest possible date without risking significant plant loss. It is expected that the irrigation system will be abandoned no earlier than the end of year one of the 5-year monitoring and maintenance period. Irrigation is expected to be diminished in years two and three and discontinued at the end of year three.

### **5.2 Maintenance Schedule**

Maintenance activities described above will be conducted monthly during the initial 120-day plant establishment period and then four times per year thereafter for the remainder of the 5-year maintenance and monitoring period. Maintenance visits will be timed to be conducted during the most productive and effective time of year for weed control (e.g., winter and early spring). Irrigation will be determined at a later date but will generally be dependent on winter rains. Irrigation will be removed after the third year after the mitigation has been installed.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

## **6 MONITORING PLAN FOR THE COMPENSATORY MITIGATION SITE**

The final success criteria and performance standards outlined herein will be used to determine fulfillment of the project's mitigation obligations. Fulfillment of these criteria and standards should help demonstrate that the mitigation area is progressing toward the habitat types, functions, and values that constitute the long-term goals of the mitigation effort. Specific performance standards are outlined in Section 6.1. The mitigation area will become part of the open space preserve area for Otay Ranch and will be managed over the long-term by the Otay Ranch Preserve Owner/Manager, pursuant to the Otay Ranch RMP and the MSCP Subarea Plans of the County.

### **6.1 Performance Standards for Target Dates and Success Criteria**

Due to the variability of seasonal rainfall patterns in the project region and the dependence of the vernal pool communities on precipitation and inundation for an appropriate period to encourage plant growth, it is difficult to establish rigid annual performance standards for an initial 5-year program. The annual performance standards proposed herein are both quantitative and qualitative, with an emphasis on vernal pool hydrology and achievement of vernal pool plant associations similar to the conditions of the existing pools at the K8 mesa. At the completion of each field season, hydrology and species cover will be evaluated to determine the progress towards plant establishment and the achievement of the final success criteria. The final assessment of the success of the restored vernal pool and mima mound habitat will be based on the achievement of the target performance criteria/standards and a determination of plant establishment within the mitigation area. This approach represents an adaptive restoration strategy that would be responsive to natural variation. The mitigation, maintenance, and monitoring program would be altered as necessary to respond to changing conditions and to help guide the project in an appropriate direction to help assure success.

The following target performance standards are guidelines to assess the success of the restored vernal pool and mima mound habitat. These performance standards may be modified as the mitigation, maintenance, and monitoring program evolves.

#### **Year One Target Performance Standards**

- The percent cover of non-native plant species within the restored vernal pool and mima mound habitat should not exceed 50%.

#### **Year Two Target Performance Standards**

- The percent cover of non-native plant species within the restored vernal pool and mima mound habitat should not exceed 40%.

# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

## **Year Three Target Performance Standards**

- The percent cover of non-native plant species within the restored vernal pool and mima mound habitat should not exceed 30%.

## **Year Four Target Performance Standards**

- The percent cover of non-native plant species within the restored vernal pool and mima mound habitat should not exceed 20%.

## **Year Five Target Performance Standards**

- The percent cover of non-native plant species within the restored vernal pool and mima mound habitat should not exceed 10%.

An average of 4.3 vernal pool indicator plant species must have been documented within the restored vernal pools during the 5-year monitoring period (see Tables 4 and 5 for examples of vernal pool indicator species). What about percent native cover? Maybe based on existing better quality pools?

The pool hydrology, (i.e., water retention and water depth) of the restored vernal pools should be similar to that of the existing vernal pools within the K8 mesa. For example, length of inundation within the restored pools should be similar to that of the existing pools. (Note: A 10% variation between the restored pools and the existing pools will be acceptable.)

The basis for the percent cover standards for non-native plant species is somewhat arbitrary, but assumes that if the vernal pools are composed of 10% non-native plant species cover or less by the end of the 5-year maintenance and monitoring period, that there is a high likelihood that they will be able to withstand invasion pressure from non-native plant species in the future. The basis for the threshold quantity of vernal pool indicator species is derived from analyzing the data from the existing vernal pools. On average, the vernal pools on the K6 and K8 mesas support 3.3 indicator species (see Tables 4 and 5 for species considered to be indicator species for these complexes of vernal pools). The average is higher (4.3 indicator species) if only the vernal pools that are considered to meet the criteria previously used by the ACOE to evaluate vernal pools (ACOE 1997) are used. The higher value was used based on the fact that many of the vernal pools have been subjected to disturbance, and may have a somewhat diminished presence of indicator species. The rationale for the pool hydrology performance standards is that the restored vernal pools are considered to be exhibiting sufficient hydrological characteristics for functioning vernal pools, as determined relative to existing vernal pools within the K8 mesa.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

For the vernal pools subject to enhancement efforts, performance standards are the same as the restored vernal pools in terms of percent non-native cover. Performance standards for vernal pool indicator species and hydrology do not apply to the vernal pools to be enhanced.

Specific annual performance standards for the upland enhancement areas have not been established because the approach of the enhancement effort is focused on non-native species management to keep weeds from inhibiting the success of the vernal pool restoration. The upland coastal sage scrub enhancement areas shall be qualitatively evaluated each year for native and non-native cover. The goal of the enhancement effort in the uplands buffer area is to maintain non-native species cover to below 30% annually.

### **6.2 Target Functions and Values**

The goal of the restoration and enhancement effort is to create a self-sustaining vernal pool and mima mound habitat which exhibits similar characteristics to the existing vernal pools in the K8 Group. The mitigation program intends to restore habitat with appropriate topography and vernal pool hydrology to support the intended vernal pool target species, as well as transitional upland species.

### **6.3 Target Hydrological Regime**

Previous habitat disturbances, including off-road vehicular activity, grazing, erosion and sediment dispersal and non-native plant invasion, have reduced the extent and biological functions of the assumed former vernal pool and mima mound area at the K8 mesa. The degraded areas at the intended restoration sites do not currently retain sufficient water, nor stay in an undisturbed condition for a sufficient period, to support vernal pool plant species. As described in Section 4.4.2, the existing depressions will be excavated to remove sediment and the excavated material will be used to supplement or form new mima mounds adjacent to the restored vernal pools. It is anticipated that the restoration of the vernal pool basins and adjacent mima mound topography will result in improved hydrologic conditions, with better retention of surface water within the restored basins for a period sufficient to sustain the vernal pool target species.

### **6.4 Target Vernal Pool Mitigation Acreage**

Total vernal pool mitigation acreage required for the Otay Ranch Resort Village Project is 0.239 acre. Mitigation for this impact will include a combination of enhancement of existing vernal pools and restoration or establishment of additional pools at the K8 mesa. Vernal pool enhancement will consist of weed control only within the vernal pools not known to support San Diego fairy shrimp in order to avoid direct impacts to this federally listed, endangered species. This includes a total acreage of 0.144 acre. The proposed credit proportion for the enhancement

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

efforts is 30%, therefore enhancement efforts will provide 0.043 acre of the mitigation credit needed. The balance of the mitigation credit (0.196 acre) will come from restoration and/or establishment of approximately 8 additional vernal pools at the K8 mesa.

### **6.5 Monitoring Methods**

The following monitoring methods shall be implemented as part of the long-term biological monitoring program.

#### **6.5.1 Hydrology**

Depth, duration, and frequency of inundation will be monitored within a representative sample of at least five of the existing pools (reference pools) and compared with the restored pools. Precipitation data will be determined from the closest regional location. Hydrological monitoring field methods shall be as follows.

The five reference pools and the restored pools will be mapped with a GPS unit to determine the extent of potential water inundation. In addition, a depth gauge will be temporarily installed at the lowest elevation of the reference pools and restored pools to measure maximum retained water depth. The gauge will be marked so that water depth can be read from the pool edge. Within 48 hours of each rainfall event of more than 0.5 inch, the pool water depth will be recorded, unless additional rainfall occurs within the 48-hour period. While the basins are inundated, the water depth will be recorded weekly until the pools dry-out. Each year a water-depth versus time graph will be prepared for each of the reference pools and the restored pools. This should provide an adequate comparison regarding the hydrological functioning of the existing and restored pools and provide an average of the period of typical inundation.

#### **6.5.2 Flora**

Plant species presence and relative cover will be monitored within the reference and restored pools and the presence of vernal pool indicator species will be assessed. Each pool will be assigned a unique code, marked in the field, and mapped using a GPS unit. Two square-meter quadrats shall be randomly placed over the vegetation within each of the reference and restored vernal pool basins. Percent cover by species shall be estimated within the square meter quadrat to the nearest 5%.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

Permanent photo documentation stations will be located at the reference and restored pools, and color photographs will be taken throughout the monitoring period to record establishment in accordance with the following schedule:

- Immediately after planting/seeding
- After the first heavy rain leading to vernal pool ponding/inundation
- During the flowering period of vernal pool indicator species
- During the dormant season.

These photographs will be included in the annual reports.

### **6.6 Monitoring Schedule**

The annual reports will be prepared by the end of each monitoring year, based upon the start date of the 5-year period.

### **6.7 Monitoring Reports**

Annual reports will include information regarding all persons involved in the collection of data and the preparation of the reports. The report shall include a copy of all pertinent permits which may be required, including any special conditions and/or modifications. The reports will contain analysis of all monitoring data, copies of the on-site photos, and copies of the GPS maps/figures showing the mitigation site.

Any significant issue or contingency that arises on the job site (e.g., plant survival issues, fire, or flooding) shall be reported in writing to the County of San Diego within two weeks from the date of the incident. Accompanying the report shall be a plan for remediation, with an implementation schedule and a monitoring schedule.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

## **7 COMPLETION OF COMPENSATORY MITIGATION**

### **7.1 Notification of Completion**

Upon completion of the 5-year maintenance and monitoring period, if the target success criteria and performance standards have been achieved, notification of completion will be included within the final annual report and request for release from the permit conditions will be requested from the resource agencies and the County. The final report also will include documentation that the vernal pool restoration success criteria have been met.

### **7.2 Resource Agency Concurrence**

After receiving the final annual report, representatives from the County and the resource agencies will be invited to a site visit to confirm the success of the restoration project and to confirm/authorize successful completion of the mitigation program and release from the permit obligations.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

## **8 CONTINGENCY MEASURES**

### **8.1 Initiating Contingency Procedures**

In the event that the annual performance standards are not achieved for all or a portion of the restoration project during the monitoring period, or if the final success standards are not achieved, the project applicants, or their designated representative, will submit to the County and the resource agencies an analysis of the deficiency and the cause thereof and, if required by the resource agencies, will propose remedial action. The monitoring period will be extended if the restoration site has not reached the final success standards by the end of the 5-year period and monitoring will continue until such time as the County and the resource agencies confirm completion of the mitigation program.

### **8.2 Alternative Locations for Contingency Compensatory Mitigation**

No alternative sites have been evaluated at this time. The K8 mesa is available, has adequate space for restoration of pools, has suitable soils and access. If it is deemed necessary to use other sites for the mitigation, there are vernal pools areas within the Proctor Valley Parcel north of the Resort Village.

### **8.3 Funding Mechanisms**

The project applicants will be responsible for funding contingency restoration measures, if necessary, until the County and the resource agencies confirm completion of the mitigation program. The project applicants will turn over perpetual management of the restoration site to the Otay Ranch Preserve Owner/Manager (POM) pursuant to the Preserve conveyance process and requirements of the Otay Ranch RMP. The mitigation site is within the ownership of one of the partner entities which comprises the project applicant, and as required by the RMP, will be transferred in fee title ownership to the POM, which is an entity comprised of the County of San Diego, for those areas located within the County jurisdiction, that was established to accept such offers of dedication. The POM is also responsible for management and maintenance in perpetuity of the approximately 11,375 acres of lands scheduled to be conveyed into the Otay Ranch Preserve.

## **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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# **Conceptual Vernal Pool Mitigation Plan for the Otay Ranch Resort Village**

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# **APPENDIX K**

## ***Quino Checkerspot Butterfly Management/Enhancement Plan***



# **APPENDIX K**

## **QUINO CHECKERSPOT BUTTERFLY MANAGEMENT/ENHANCEMENT PLAN**

**for the**

**Otay Ranch Resort Village**

**GPA 04-003; SPA 04-002; R04-009; TM 536 IRPL; S08-028;  
ER#04-19-005; KIVA#03-1004387**

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**JANUARY 2015**





# Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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## TABLE OF CONTENTS

<b><u>Section</u></b>	<b><u>Page No.</u></b>
<b>INTRODUCTION.....</b>	<b>1</b>
<b>1 PRESERVE COMPLEX DESCRIPTION AND HISTORY .....</b>	<b>7</b>
1.1 Geographic and Functional Setting and Regional Ecological Significance .....	7
1.1.1 NCCP Name, Name of Preserve Complex, and MU .....	7
1.1.2 Relationship to Core Areas and Linkages and Management Strategic Plan ...	7
1.1.3 Relationship to Conserved Lands .....	8
1.1.4 Preserve Complex Location within Watershed and Hydrologic Processes.....	13
1.1.5 Level of Fragmentation within Management Unit.....	13
1.1.6 Jurisdiction, Land Owners, and Management Agencies for Preserve Complex .....	13
1.1.7 Role of MU and Contributions of Preserve Complex to this MU – Relationship to Regional Goals and Objectives.....	14
1.2 Biological Resources .....	16
1.2.1 Summary of Rapid Ecological Assessment .....	16
1.2.2 Covered Species in Preserve Complex .....	22
1.2.3 Natural Communities in the Preserve Complex.....	31
1.2.4 Connectivity with Other Preserve Complexes .....	35
1.2.5 Primary Threats and Stressors for Preserve Complex .....	35
1.3 Management and Monitoring Strategy .....	36
1.3.1 Summary and Vision Statement.....	36
1.3.2 Biological Priorities and Priority Management Actions .....	36
1.3.3 Authorized Land Uses and Potential Conflicts .....	39
1.3.4 Preserve-level and Regional-level Monitoring Strategy.....	40
<b>2 AREA-SPECIFIC MANAGEMENT DIRECTIVES AND TIMELINE FOR THE PRESERVE COMPLEX .....</b>	<b>41</b>
2.1 Vegetation Communities .....	41
2.1.1 Vegetation Goals.....	41
2.1.2 Vegetation Objectives .....	42
2.1.3 Vegetation Implementation Tasks .....	43
2.2 Quino Checkerspot Butterfly .....	45
2.2.1 Quino Checkerspot Butterfly Goals.....	46
2.2.2 Quino Checkerspot Butterfly Objectives .....	46
2.2.3 Quino Checkerspot Butterfly Implementation Tasks .....	49

# Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

---

## TABLE OF CONTENTS (CONTINUED)

<b><u>Section</u></b>	<b><u>Page No.</u></b>
2.3 Coordination .....	53
2.3.1 Coordination Goals .....	53
2.3.2 Coordination Objectives .....	54
2.3.3 Coordination Implementation Tasks .....	54
2.4 Property Stewardship .....	54
2.4.1 Property Stewardship Goals .....	54
2.4.2 Stewardship Objectives .....	54
2.4.3 Stewardship Implementation Tasks .....	54
2.5 Fire Management .....	56
2.5.1 Fire Management Goals .....	56
2.5.2 Fire Objectives .....	56
2.5.3 Fire Implementation Tasks .....	56
<b>3 STAFFING, MANAGEMENT COSTS AND FUNDING .....</b>	<b>57</b>
<b>4 LITERATURE CITED .....</b>	<b>63</b>

## FIGURES

1 Regional Map .....	3
2 Vicinity Map .....	5
3a Existing Habitat Linkages/Movement Corridors .....	9
3b Proposed Habitat Linkages/Movement Corridors .....	11
4 Ultimate Preserve Vegetation .....	17
5 Quino Checkerspot Butterfly Observations and Host Plant Locations .....	27
6 Vegetation Map with Proposed Development Footprint .....	33
7 Proposed Restoration Treatment Levels for Habitat Management .....	37
8 QCB Proposed Critical Habitat .....	47

## TABLES

1 2008 Quino Checkerspot Butterfly Survey Polygons .....	20
2 Impacts and Preservation of Covered Species Present on Site .....	23
3 Proposed Preserve Lands .....	32
4 Quino Checkerspot Butterfly Monitoring Summary .....	51
5 Quino Checkerspot Butterfly Monitoring and Management Cost Estimate .....	57

# Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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## INTRODUCTION

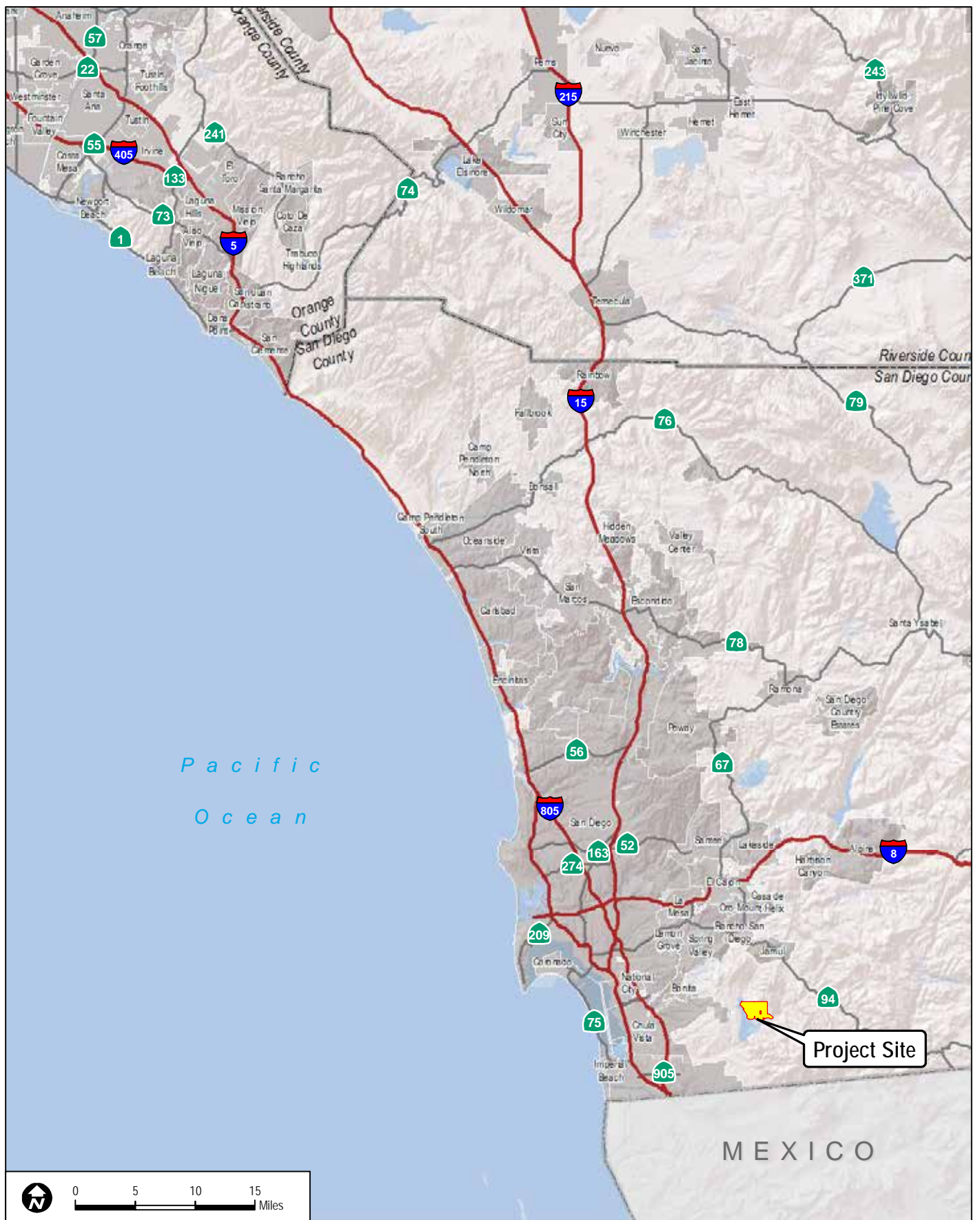
The Otay Ranch Resort Village Specific Plan area (i.e., project area) is located in southwestern San Diego County, approximately 13 miles east of the Pacific Ocean and 6 miles north of the international border with Mexico (Figure 1). The Otay Ranch Resort Village project area comprises approximately 1,869 acres and is designated for residential and resort development and open space by the Otay Subregional Plan (SRP; Otay Ranch 1993). The site is located in the Proctor Valley Parcel of Otay Ranch, approximately one-quarter mile east of the City of Chula Vista (Figure 2). As part of the planning of Otay Ranch, several villages and planning areas were designated for various types of development while other areas were reserved for preservation of multiple species and habitats. An effort was undertaken to plan development of the Otay Ranch so as to conserve sensitive/protected species and habitats in the region, connect important wildlife corridors and set up a fully funded and managed preserve system.

The purpose of this document is to provide guidance to ensure the continued occupation of the project area by the federally listed endangered Quino checkerspot butterfly (*Euphydryas editha quino*). This plan is required as mitigation for on-site impacts associated with the construction of the project area. This management plan describes the on-site preserve complex and history, biological resources, the management and monitoring strategy, area-specific management directives, including restoration, methods for conducting pre- and post- development surveys for the Quino checkerspot butterfly and associated habitat, coordination between land owners and agencies, property stewardship, and fire management. Costs and associated funding for the plan are also discussed.

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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FIGURE 1  
Regional Map

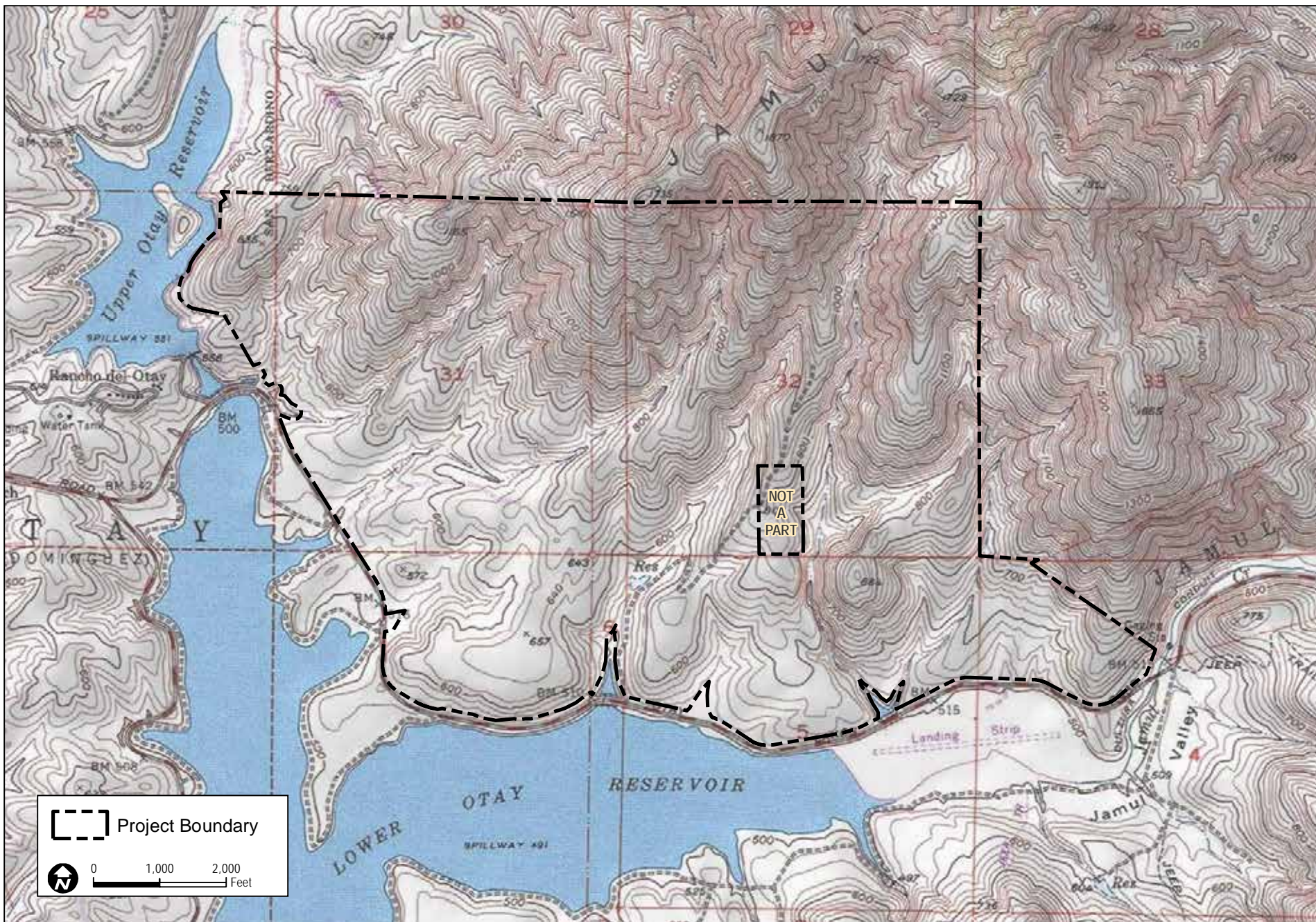
Otay Ranch Resort Village Site - Quino Checkerspot Butterfly Management/Enhancement Plan

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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SOURCE: USGS 7.5 Minute Series, Jamul Mountains Quadrangle

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Otay Ranch Resort Village Site - Quino Checkerspot Butterfly Management/Enhancement Plan

**FIGURE 2**  
**Vicinity Map**

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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# Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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## **1 PRESERVE COMPLEX DESCRIPTION AND HISTORY**

### **1.1 Geographic and Functional Setting and Regional Ecological Significance**

#### **1.1.1 NCCP Name, Name of Preserve Complex, and MU**

The project area is located within the San Diego County MSCP Subarea Plan South County Segment (South County MSCP). The proposed project includes an approximately 1,090 acre preserve (not including an approximately 10-acre parcel that is part of the proposed MSCP Boundary Line Adjustment) generally in the northern and north-eastern portions of the project site. More specifically, the proposed preserve is located within the Janal Management Unit 3 (MU3) as described in the Management Strategic Plan for Conserved Lands in Western San Diego County (SDMMP 2013a). MU3 encompasses the largest area of conserved lands within the Management Specific Plan Area (MSPA) and spans 126,253 acres over the eastern portion of San Diego County (See Figure 3-1, Map of MUs with corresponding numbers and names; SDMMP 2013a). The proposed preserve contained within the project area is not related to any existing preserve complex or Natural Community Conservation Plan (NCCP).

#### **1.1.2 Relationship to Core Areas and Linkages and Management Strategic Plan**

##### **On-Site Cores and Linkages**

The project area currently functions as part of a large habitat block and would not be considered a habitat linkage or wildlife corridor. However, a portion of the project site was previously identified as a habitat linkage or movement corridor (Ogden 1992). This linkage is situated in a north-south direction through the eastern portion of the project site and is identified as the R2 linkage. As shown in Figures 3a and b, this linkage connects the open space areas of the Jamul Mountains to the north with Lower Otay Lake. This “north-south” connection to the lake should be considered a general guideline within the context of the property and surrounding land uses.

The goal for wildlife movement on the site is to convey the focal species, including mountain lion (*Puma concolor*), mule deer (*Odocoileus hemionus*), bobcat (*Lynx rufus*), and coyote (*Canis latrans*), from the northern mountainous areas to Lower Otay Lake. Under the existing conditions, there is a two lane road (Otay Lakes Road) which restricts potential wildlife movement to and from the lake. In developing a land use plan for the project area, an effort was made to accommodate the R2 linkage by provided two wildlife corridors. These corridor areas were designed to minimize the number of potential conflicts experienced by the focal species when trying to access Lower Otay Lake. The goal is to allow the focal species to cross a limited number of internal roads and Otay Lakes Road; maintain suitable dimensions for the movement of these species; and enable movement of Quino checkerspot butterfly to resources within the project site and to off-site areas.

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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Proposed open space in the northern portion of the project site will preserve an east–west movement corridor and habitat linkage across the northern portion and ridgeline of the property, which also connect to off-site preserve areas north and east of the project area. The more easterly linkage includes the steeply sloped canyon and ridgeline west of the prominent hilltop that extends from the existing R2 corridor. This corridor includes the south face of the prominent hilltop, and steep slopes along the northeast border of the Project site. Within this proposed corridor, the steep canyon west of the prominent hilltop narrows to approximately 600 feet wide and is crossed by one proposed local two-lane roadway. The second north/south movement corridor occurs within the middle portion of the Project site and is proposed to function as a local corridor. This corridor narrows to approximately 1,200 feet and is crossed by one, two-lane local roadway. Additionally, an approximately 300-foot-wide swath along the far eastern boundary of the Project site that is partially located on-site, but also continues off-site in a large area of open space lands, is proposed for inclusion in the MSCP Preserve. This corridors narrows at the property limits; however, it is situated directly adjacent to U.S. Fish and Wildlife Service (USFWS) lands, and the rest of the length is situated adjacent to other Preserve lands such that it would contribute to the preservation of north/south wildlife movement across that portion of the site.

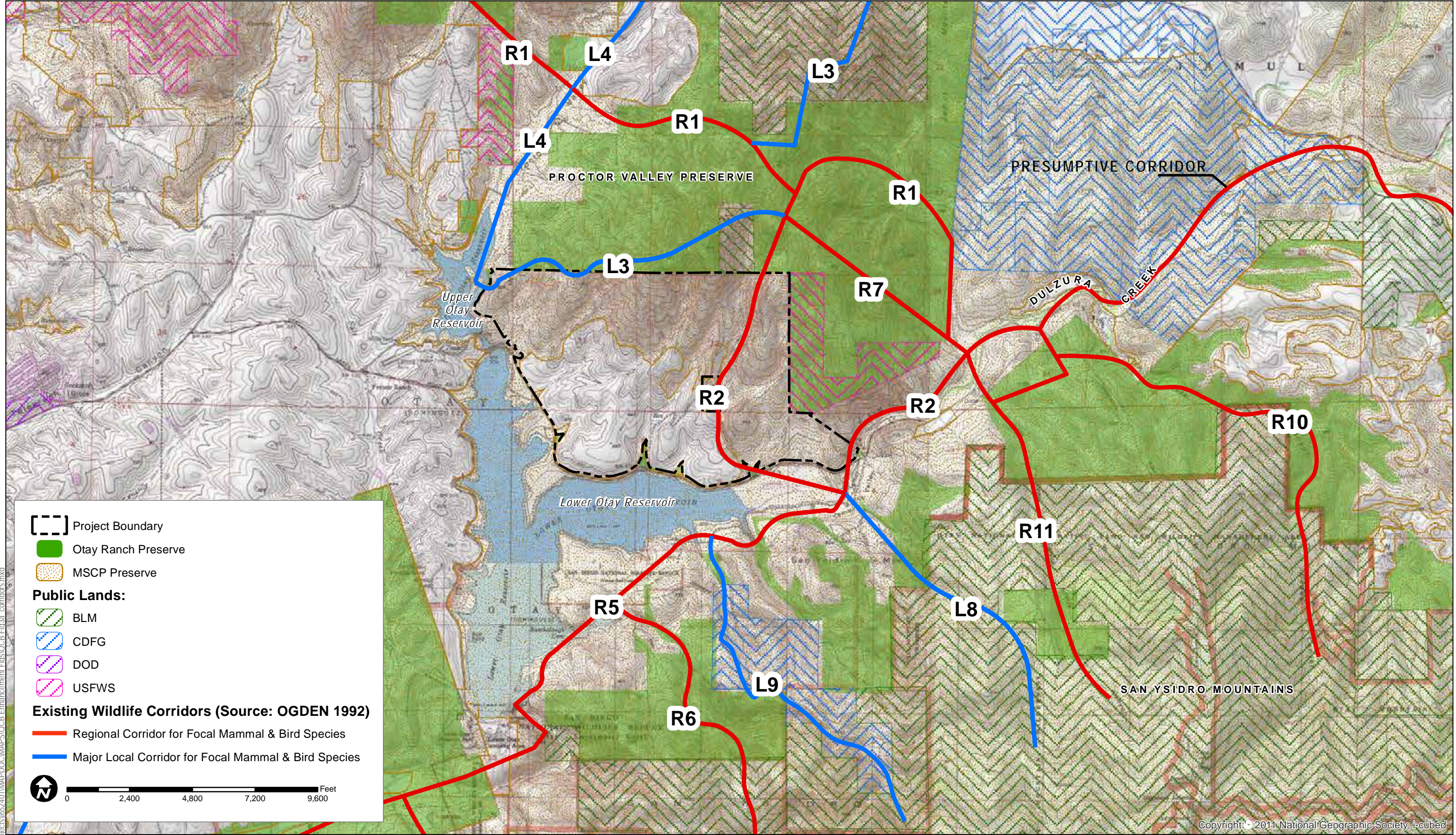
### **Project Relationship to Management Strategic Plan**

The Management Strategic Plan for Conserved Lands in Western San Diego County (MSP) identifies Quino as a species management focus group within MU3 and considers the movement corridor in the Otay Lakes/Rancho Jamul occurrence complex areas (located southwest and northeast of the project area) as critical for the dispersal of the species (SDMMP 2013a). The project site has been identified as a Quino occurrence complex and preservation of Quino within the project site is on par with the goals outlined in the MSP.

#### **1.1.3 Relationship to Conserved Lands**

As shown in Figures 3a and b, the project site is surrounded by a variety of public lands: at least 22,000 acres of the Otay Ranch Preserve, U.S. Bureau of Land Management (BLM), and USFWS lands to the north; at least 9,000 acres of the Otay Ranch Preserve, USFWS, Multiple Species Conservation Program (MSCP) Preserve, BLM, and California Department of Fish and Wildlife (CDFW) lands to the east; and at least 31,000 acres of the Otay Ranch Preserve, MSCP Preserve, CDFW, and BLM lands to the south. Combined, this is a total of 62,000 acres of open space in the form of preserves and public lands.



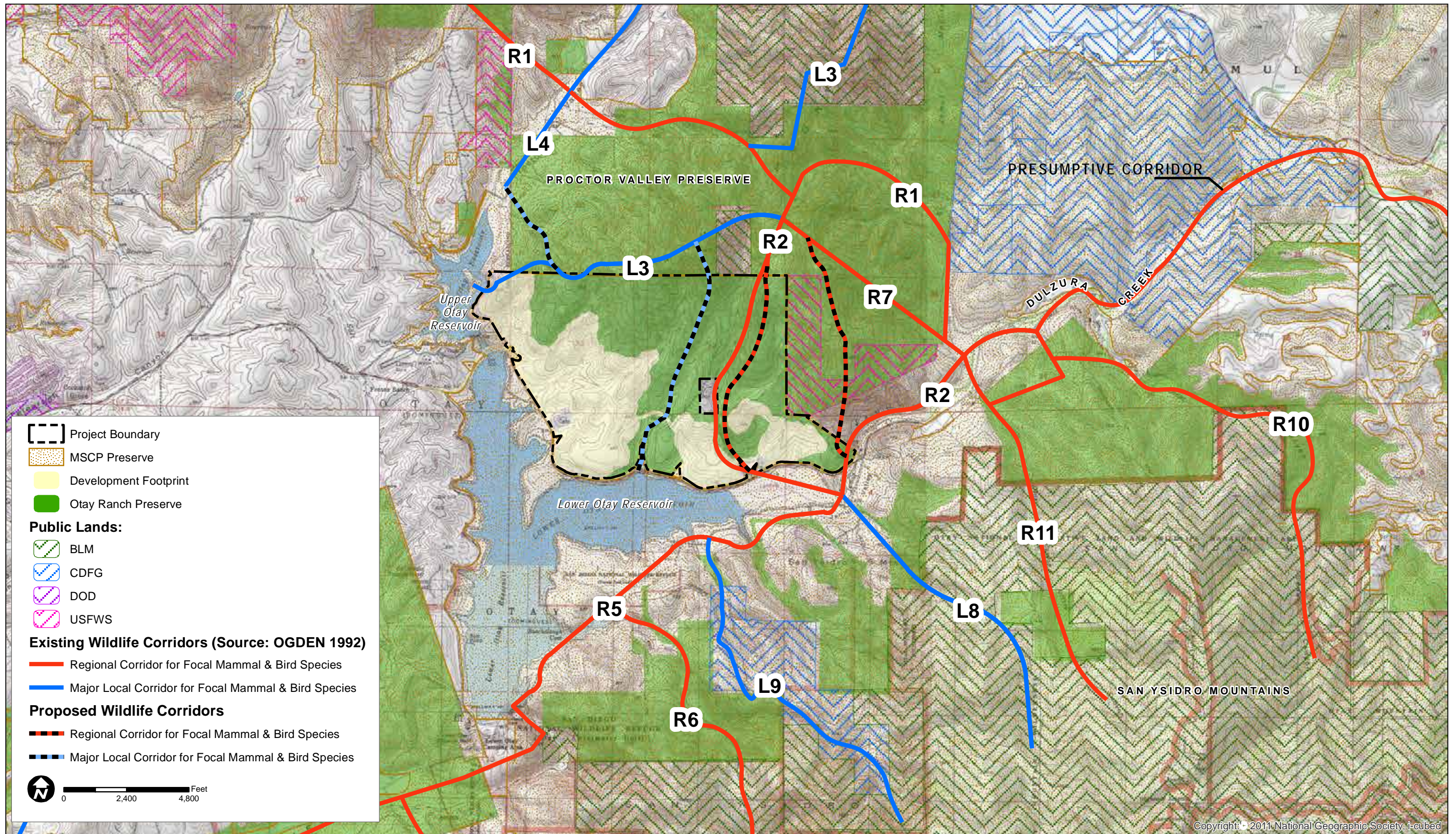




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Otay Ranch Resort Village Site - Quino Checkerspot Butterfly Management/Enhancement Plan

FIGURE 3b

Proposed Habitat Linkages/Movement Corridors



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## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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The proposed project is part of the Otay Subregional Plan (SRP; Otay Ranch 1993). The Otay SRP established the overall development program for Otay Ranch, including the Otay Ranch Preserve. The Otay Ranch Preserve was identified as an 11,375-acre, preserve which set aside the most important biological resources in a fully funded and managed system. As part of the development County of San Diego MSCP, the Otay Ranch Preserve boundaries were incorporated; thus, the Otay Ranch Preserve is generally contiguous with the County MSCP.

As part of the planning for the Resort Village project, the boundaries of the development footprint were revised based on more precise field survey data to provide for enhanced preservation of the site's more sensitive biological resources. In particular, the development footprint was pulled back in certain locations to avoid impacts to observed Quino checkerspot butter in the more northern ridgelines of the project site, such that approximately 12 additional Quino checkerspot butterfly sighting locations were converted from "Development" to "Preserve." Due to the locations of the Quino checkerspot butterfly and proximity to other conserved lands north, the on-site preserve is consolidated in the northern and north-eastern portions of the project area.

### **1.1.4 Preserve Complex Location within Watershed and Hydrologic Processes**

MU3 contains the headwaters of the Otay River and mid-regions of the Sweetwater and Tijuana Rivers (SDMMP 2013a). The project area lies within the watershed of the Otay River, a westerly flowing stream which drains an area of approximately 145 square miles. The site is upstream of Savage Dam, which creates Lower Otay Lake. Drainages bisect the mesas and generally run north to south, with the exception of one drainage which runs east to west from the center to the western edge of the property. Several stock ponds have been intentionally created along the drainages on the property.

### **1.1.5 Level of Fragmentation within Management Unit**

MU3 is comprised primarily of undeveloped lands, of which 41% is either conserved lands in preservation or open space parks (SDMMP 2013a). With the largest area of conserved lands within the MSPA, MU3 consist of large blocks of open space with little to no fragmentation. As described above in Section 1.1.3, and shown in Figures 3a and b, large contiguous areas of preserved lands abound the project site. These include the Otay Ranch Preserve and portions of the San Diego National Wildlife Refuge.

### **1.1.6 Jurisdiction, Land Owners, and Management Agencies for Preserve Complex**

The project area is currently owned by Baldwin & Sons LLC and Moller Otay Lakes, LLC and is wholly within the County of San Diego. On a region-wide basis, the project area is within the

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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boundaries of the County MSCP Subarea Plan South County Segment. More specifically, the project area is within the Otay SRP. As part of the Otay SRP, the project is subject to the requirements of the Otay Ranch Resource Management Plan (RMP), which establishes the Otay Ranch Preserve, goals and policies for Preserve management and requirements for implementation of the Otay Ranch Preserve.

Through the RMP requirement for preserve conveyance, the project will dedicate the designated Preserve land to the Otay Ranch Preserve Owner Manager (POM), which is currently made up of the County of San Diego and City of Chula Vista. In addition, the project is required to participate in preserve management funding, which provides that a Communities Facilities District (CFD) will be established on the developed portions of the project area. This CFD charges a special tax against the developed portions of the site to perpetually fund the management and maintenance of the Otay Ranch Preserve.

These requirements have resulted in offers for conveyance of preserve land of approximately 3,200 acres (as of October, 2014) within Otay Ranch and the establishment of the POM to monitor, manage and maintain these preserve areas. The conveyance and management of the preserve is being actively coordinated between the City of Chula Vista and the County of San Diego (as the POM) in consultation with the resource agencies. Relative to other portions of MU3, the other management agencies include Bureau of Land Management, California Department of Fish and Wildlife, and U.S. Fish and Wildlife Service National Wildlife Refuge lands as shown in Figures 3a and b.

### **1.1.7 Role of MU and Contributions of Preserve Complex to this MU – Relationship to Regional Goals and Objectives**

MU3 has several plant and wildlife species that are targeted for management focus, one of which is the Quino checkerspot butterfly. The SDMMMP regional and unit management goal for this species states: “Within the identified USFWS Recovery Units (USFWS 2003) or ‘Possible Future’ Recovery Units in the MSPA, protect, restore, and enhance Quino checkerspot habitat within currently occupied and historically occupied sites and the landscape connections between them to create resilient occurrences and to allow for potential reintroduction to ensure persistence over the long-term (>100 years)” (SDMMMP 20113b). Specific goals related to MU3 include the following:

- Prepare five year implementation plan for management of multiple sites in MU3 that have diverse array of microclimates and are within 1 km of areas with larval host plants and that enhance connectivity between the Otay Lakes/Rancho Jamul occurrence and occurrences to the north in MU3;



## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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- Support South County Grassland project development and testing of best management techniques to restore Quino checkerspot habitat;
- Establish seed bank for host and larval food plants and bulk as necessary for occurrence enhancement;
- Implement applicable pre-fire strategic plan actions;
- Implement high priority actions in implementation plan to maintain landscape connectivity between Otay Lakes/Rancho Jamul occurrence and complexes to the north in MU3 (SDMMP 2013b).

Preservation of habitat within the project area will conserve important habitat values within the region, and enhance connectivity to other preserves and open space areas within the vicinity, as shown in Figure 4.

The MSCP Subarea Plan identifies a “hard line” preserve/development boundary for the Otay Ranch Resort Village that reflects an agreement reached among the wildlife agencies and the Baldwin Company (the applicants’ predecessor in interest) at the time that the MSCP Subarea Plan was approved. In recent years, the wildlife agencies suggested the preserve boundaries should be modified to provide conservation of resources that were not previously identified; particularly Quino checkerspot butterfly and San Diego fairy shrimp (*Branchinecta sandiegonensis*) species locations and sensitive habitat resources including vernal pools. The project applicants have developed a revised preserve/development boundary to reflect more precise field survey data and recent discussions with the Wildlife Agencies regarding these resources (Figure 4).

The modifications to the preserve boundaries provide for an improved preserve configuration. The proposed boundary adjustment would result in a net gain of 13 identified Quino locations (17 locations placed into the preserve, 4 locations removed from the preserve) along with areas that are composed of ridgelines which include expanses of host plant populations. The current preserve design will help meet the overall MU3 management goal of protecting, restoring and enhancing Quino checkerspot habitat within currently occupied sites. In addition, the preserve design will also assist in maintaining connectivity between Otay Lakes and Rancho Jamul occurrences to the north. Area-specific management directives described in Section 2.0 outline more detailed actions scheduled to take place within the preserve that are designed to help achieve the specific goals for MU3.

# **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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## **1.2 Biological Resources**

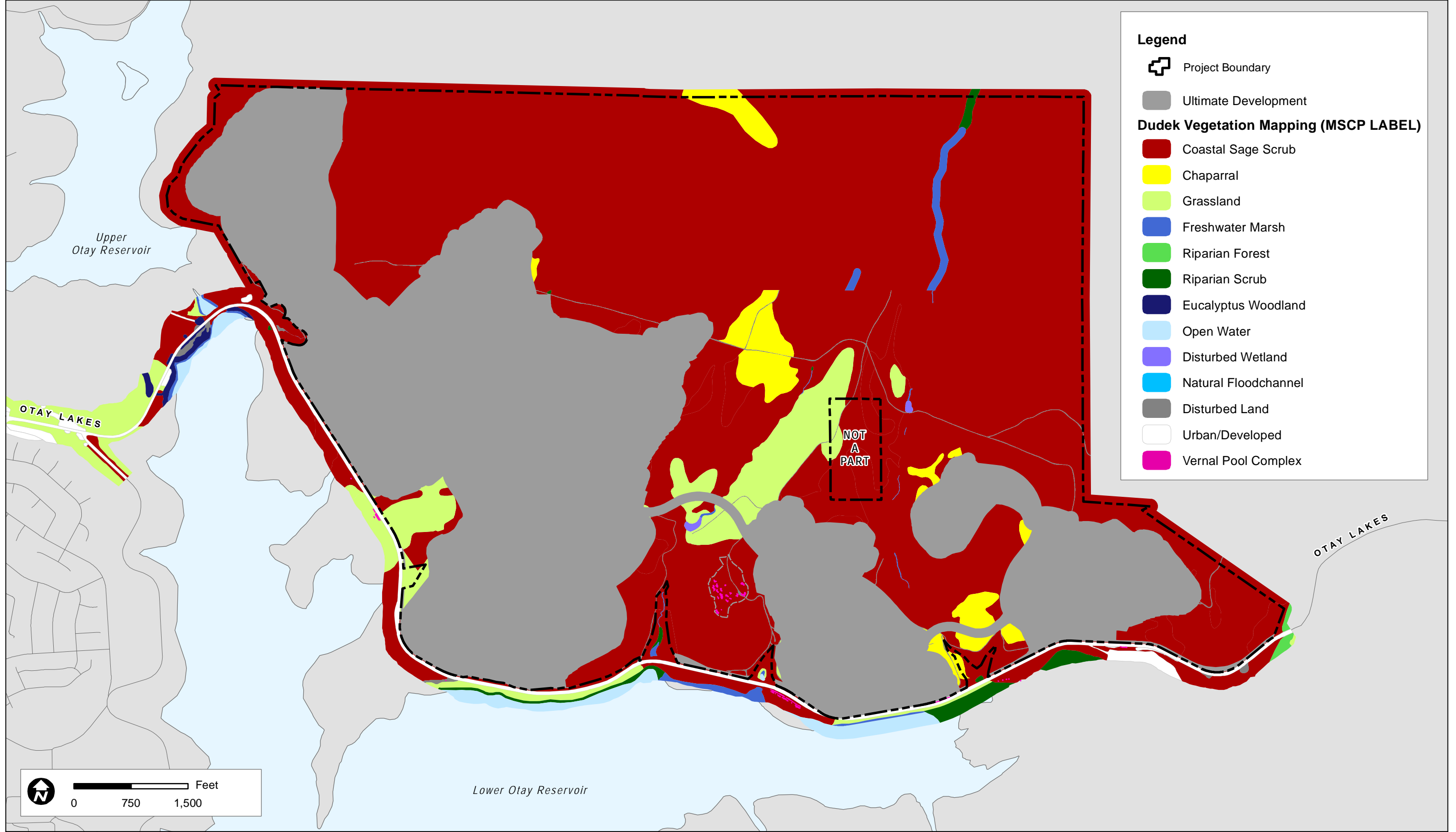
The Otay Ranch Resort Village consists of a broad mesa sloping to the south, broken by several steep canyons draining from north to south. Portions of the relatively flat mesa extend north into the Jamul Mountains, becoming part of steeper slopes. Site elevations range from approximately 500 feet above mean sea level (AMSL) at the southern end of the property to approximately 1,500 feet AMSL in the northeastern portions. The southern half of the site contains three large mesas (K6, K8, and K9 from west to east), an expansive relatively flat area in the west, and increasing elevations with steep canyons to the north.

Prior to 2001, the southern half of the project area was used for ranching, specifically cattle grazing, and possibly crop cultivation purposes. In addition, crop cultivation likely occurred on the southwestern corner of the property decades ago. The site is bounded on the west and south by Otay Lakes Road; Jamul Creek intersects the site in the eastern portion. Lower Otay Lake (which is owned by the City of San Diego) is located south of the site; open space in the Jamul Mountains is adjacent to the site in the north and east (which is owned by the UBLM and private parties).

### **1.2.1 Summary of Rapid Ecological Assessment**

Biological surveys of the project site have been conducted by Dudek biologists from spring 1998 to spring 2014 to assess the existing conditions of biological resources on site and quantify the impacts that are proposed based on the current development plan. Surveys included vegetation mapping, plant and wildlife inventories, focused surveys, and a jurisdictional wetland delineation, which was updated in 2014. This description of existing conditions summarizes the results of these surveys, which are described in greater detail in the Otay Ranch Resort Village Biological Resources Technical Report (Dudek 2014a).

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Otay Ranch Resort Village Site - Quino Checkerspot Butterfly Management/Enhancement Plan

**FIGURE 4**  
**Ultimate Preserve Vegetation**

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## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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Based on previous visits and surveys of the project area and to be conservative with the focused surveys, the entire 1,869-acre site was considered to be potentially suitable for Quino checkerspot butterfly and no exclusion areas were drawn; thus, the entire site was surveyed for Quino checkerspot butterfly during each survey effort. Based on the results of these surveys, it has been determined that there are areas that are not suitable including non-native grasslands that are fully closed canopy dense grass or are mapped as non-native grassland but are fully closed canopy with species of *Erodium*. A habitat assessment for Quino checkerspot butterfly was conducted in spring 1998 and 1999 by biologists at Dudek. These assessments were the basis for where the Phase II adult flight surveys were conducted on the site for the first time in spring 1999. The entire site was covered over a 2-year period in spring 1999 and 2000. A modified protocol survey of the preserve area was conducted in 2004 and was defined as "treasure hunt" survey with the goal of maximizing survey time within areas of highest potential for Quino checkerspot butterfly detection. The entire project area was surveyed again in 2008 to refresh the surveys and because the conditions seemed ideal for the species. In addition, in 2008, Dudek conducted surveys for a total of 30 points selected by the USFWS as part of the Quino checkerspot butterfly range-wide study. The results for both the focused presence/absence survey and the range-wide study were included in the 2008 focused survey report (Dudek 2008).

Focused surveys of the entire site in 1999 and 2000 resulted in the observation of 48 individuals. The 2004 surveys of the proposed Preserve resulted in observation of 1 individual in the northwestern corner. This resulting number of observations was low and was not surprising because the conditions were very poor for development of the host plant due to a low rainfall year.

In 2008, when environmental conditions were ideal for development of host plant and the ensuing development of the Quino checkerspot butterfly, focused protocol surveys were conducted for the entire Otay Ranch Resort Village site. The survey area again included the entire approximately 1,869 acres of the property including those areas currently proposed for development. In addition, Dudek conducted surveys for a total of 30 points selected by the USFWS as part of the Quino checkerspot butterfly range-wide study. This 2008 survey provides the baseline survey information for the pre-construction analysis of the Quino checkerspot butterfly population as well as the suitable habitat for the species. The USFWS also located range-wide survey points outside of the Otay Ranch Resort Village property. The results from these points provide information on adjacent use of the off-site areas by the species.

The focused survey for the Quino checkerspot butterfly was conducted on the project site from March 12 through April 18, 2008, by Dudek biologists Anita M. Hayworth, Ph.D. (TE-781084), Brock A. Ortega (TE-813545-5), Dave W. Flietner (TE-008031-1), Jeff D. Priest (TE-840619-2), Kam J. Muri (TE-051250-0), Jun Rong Powell (TE-006559-3), Tricia Wotipka (TE-840619-2), Paul M. Lemons (TE-051248-2), and Vipul R. Joshi (TE-019949-0).

## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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The site was divided into 23 survey polygons, each representing a single day survey effort (i.e., 4 to 6 survey hours to be in accordance with USFWS protocol) (Table 1). These survey areas were numbered and assigned to Dudek's permitted biologists. The biologists were provided with 300-scale aerial photographs for mapping Quino checkerspot butterfly and 200-scale aerial photographs for mapping host plant populations. The survey maps included previous vegetation mapping, topography lines, and survey area boundaries. Binoculars were used to aid in detecting and identifying butterfly and other wildlife species. Global Positioning System (GPS) units also were available for recording locations of Quino checkerspot butterfly and host plant populations.

**Table 1**  
**2008 Quino Checkerspot Butterfly Survey Polygons**

Survey Area Number	Acreage of Survey Area
1	85.7
2	82.7
3	81.6
4	68.4
5	80.8
6	85.0
7	95.8
8	89.0
9	81.6
10	83.7
11	84.7
12	81.4
13	88.3
14	70.3
15	57.8
16	90.6
17	93.6
18	88.0
19	85.7
20	86.3
21	75.3
22	71.7
23	81.5

The survey methodology consisted of slowly walking a meandering transect throughout all Quino checkerspot butterfly potential habitat areas within the survey assignment. The adult surveys were conducted under generally favorable weather conditions: typically between the

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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hours of 0900–1600, variable skies, 60°F–80°F, and light breezes. For each survey visit, the biologist recorded the survey conditions.

Aerial photographs of each survey area were provided to each biologist and the locations of host plants were recorded directly onto the 200-scale map. Locations were also recorded using GPS. For each location recorded as a point, attributes also were recorded that indicated if the population was dense (plants touching) or sparse (plants not touching). For patches larger than 1 acre, a polygon was drawn on the map or recorded using GPS and the same attribute was recorded.

A total of 87 Quino checkerspot butterfly were observed and recorded during the Quino checkerspot butterfly focused survey on the Otay Ranch Resort Village (Figure 5). A number of these observations took place in the same location from one week to the next, and photographs documented that the individuals were likely the same based on review of wing damage and coloration, thus a number of these observations were considered duplicate counts and the total number of unique observations was determined to be 71.

Quino checkerspot butterfly were especially observed on hilltops and along the ridgelines in the eastern and central portions of the site. Numerous observations of Quino checkerspot butterfly were recorded in weeks 1 through 3 of the focused survey. No Quino checkerspot butterfly were observed during surveys conducted in the fourth week, from April 6 through April 12, 2008. The presence/absence survey was stopped after four full survey weeks. However, the survey of the range-wide Quino checkerspot butterfly survey points was continued into the fifth week. No observations of Quino checkerspot butterfly were made in either week 4 or week 5 of the survey. Stopping the presence/absence survey after four weeks was discussed extensively with Alison Anderson, USFWS. Based on the reduced numbers observed with each succeeding week, the lack of any observations within Week 4, and the overall drying of the host plant, the USFWS concurred that stopping the survey was acceptable.

Host plant locations were recorded over much of the site as illustrated on Figure 5. Large polygons of dot-seed plantain were observed within survey areas 12, 13, 16, and 17. Smaller patches of plantain, recorded as a point location, were observed scattered throughout much of the site and were especially noted in survey areas 5, 7, 9, 10, 16, 18, and 19. The other host plant species that was recorded for the site, owl's clover, was observed in areas 11, 16, and 17 as sparse large polygons. Smaller patches of owl's clover were recorded as point locations and were observed in survey areas 11, 16, 17, 18, and 23.

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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### **1.2.2 Covered Species in Preserve Complex**

As indicated in Table 2, several covered species are present with the proposed preserve. However, most of these species are covered species under the County MSCP Subarea Plan and long term management strategies exist to ensure their continued survival. The focal point of the Village 13 preserve is the preservation and management of existing Quino locations and habitat, and the restoration of additional Quino habitat. Although Quino (and San Diego fairy shrimp) is not a covered species, it is a federally listed species and therefore included within Table 2. Since the focus of this plan is preservation and management of Quino checkerspot butterfly within the on-site preserve, Table 2 is only provided for context and these species will not be discussed further within this plan. The Otay Ranch POM, through the collection of CFD tax revenues, will continue to monitor and manage all species within the Otay Ranch Preserve.



## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

**Table 2**  
**Impacts and Preservation of Covered Species Present on Site**

Species Scientific Name	Regulatory Status <sup>1</sup> :	Basis for Impact Evaluation	Number/ Acre(s) impacted	% Impacted	Number/ Acre(s) preserved	% Preserved
<i>Plant Species</i>						
San Diego thornmint ( <i>Acanthomintha ilicifolia</i> )	Federal/State: FT/SE CRPR List: 1B.1 MSCP: Covered Narrow Endemic County: A	A total of 3.4 acres of the species have been mapped on site.	0.1 acres	3	3.3 acres	97
Variegated dudleya ( <i>Dudleya variegata</i> )	Federal/State: None/None CRPR List: 1B.2 MSCP: Covered Narrow Endemic County: A	A total of 5,833 individuals observed on site.	925 individuals	16	4,908 individuals	84
San Diego barrel cactus ( <i>Ferocactus viridescens</i> )	Federal/State: None/None CRPR List: 2.1 MSCP: Covered County: B	A total of 217 individuals observed on site.	115 individuals	53	102 individuals	47
San Diego goldenstar ( <i>Bloomeria clevelandii</i> )	Federal/State: None/None CRPR List: 1B.1 MSCP: Covered County: A	A total of 2,546 individuals observed on site.	1,497 individuals	59	1,049 individuals	41
<i>Wildlife Species</i>						
San Diego fairy shrimp ( <i>Branchinecta sandiegonensis</i> )	Federal/State: FE/None MSCP: Not Covered County: 1	A total of nine basins on K8 mesa and one basin on K6 mesa are confirmed occupied by this species.	1 basin/ 0.005 acre	3	Nine basins/ 0.145 acre	97
Quino checkerspot ( <i>Euphydryas editha quino</i> )	Federal/State: FE/None MSCP: Not Covered County: 1	Over four years of surveys, a total of 127 individuals have been observed; 71 observed in 2008. Coastal sage scrub and disturbed coastal scrub communities were considered	20 individuals (inclusive over 4 years of surveys); 12 of the 2008 survey. A total of 483 acres of	16% of observations; 33% of potential habitat	107 individuals (inclusive over 4 years of surveys); 59 of the 2008 survey. A total of 964 acres of	84% of observations; 66% of potential habitat.

## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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**Table 2**  
**Impacts and Preservation of Covered Species Present on Site**

Species Scientific Name	Regulatory Status <sup>1</sup> :	Basis for Impact Evaluation	Number/ Acre(s) impacted	% Impacted	Number/ Acre(s) preserved	% Preserved
		potential habitat. Because there are quino checkerspot observations within 0.6 mile of the entire property, no areas where quino checkerspot have not been observed can be excluded. A total of 1,470 acres of potential habitat are located on site. The entire site was included in the survey in order to provide complete information on occurrence.	potential occupied habitat		upland habitat that would be considered to be occupied is preserved.	
Southwestern pond turtle ( <i>Actinemys marmorata pallida</i> )	Federal/State: None/CSC MSCP: Covered County: 1	One observed laying eggs. No suitable open water habitat on site.	0	0	1 individual	100
Orange-throat whiptail ( <i>Aspidoscelis hyperythra</i> )	Federal/State: None/CSC MSCP: Covered County: 2	Incidental observation. Impact based on 1,656 acres of suitable habitat.	633 acres	38	1,000 acres	60
San Diego [coast] horned lizard ( <i>Phrynosoma blainvillii</i> )	Federal/State: None/CSC MSCP: Covered County: 2	Incidental observation. Impact based on 1,656 acres of suitable habitat.	633 acres	38	1,000 acres	60
Cooper's hawk ( <i>Accipiter cooperii</i> )	Federal/State: None/WL MSCP: Covered County: 1	Incidental observation. Impact based on 1.2 acres of suitable habitat.	<0.1 acre	<0.1	1.2 acres	100
Southern California rufous-crowned sparrow ( <i>Aimophila ruficeps canescens</i> )	Federal/State: None/WL MSCP: Covered County: 1	Incidental observation. Impact based on 1,653 acres of suitable habitat.	653 acres	40	1,000 acres	60

## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

**Table 2**  
**Impacts and Preservation of Covered Species Present on Site**

Species Scientific Name	Regulatory Status <sup>1</sup> :	Basis for Impact Evaluation	Number/ Acre(s) impacted	% Impacted	Number/ Acre(s) preserved	% Preserved
Golden eagle ( <i>Aquila chrysaetos</i> )	Federal/State: BCC/WL and P, Golden Eagle Protection Act MSCP: Covered County: 1	No impacts would occur to nesting habitat. Observed flying over site; likely forages on site. Impact based on 1,660 acres of suitable foraging habitat. Nests are recorded in San Diego County Bird Atlas as 3 to 6 miles away.	620 acres	37	1,015 acres	61
Ferruginous hawk ( <i>Buteo regalis</i> )	Federal/State: BCC/WL MSCP: Covered County: 1	Likely to occur on site for winter or migration but would not nest on site.	—	—	—	—
Northern harrier ( <i>Circus cyaneus</i> )	Federal/State: None/CSC MSCP: Covered County: 1	Likely to occur on site for winter or migration but would not nest on site.	—	—	—	—
Summer tanager (nesting) ( <i>Piranga rubra</i> )	Federal/State: None/CSC MSCP: Not Covered County: 2	Likely to occur on site for winter or migration but would not nest on site.	—	—	—	—
Coastal California gnatcatcher ( <i>Poliophtila californica californica</i> )	Federal/State: FT/CSC MSCP: Covered County: 1	Coastal sage scrub, coastal sage scrub–chaparral mix, coastal sage scrub–grassland ecotone, riparian in late summer; 35 locations are recorded on site and 3 additional locations are recorded for Cornerstone Land for a total of 38 locations recorded; 1,470 acres of suitable habitat.	483 acres; 14 locations	33% of acreage; 44% of point locations	964 acres; 18 locations	66% of acreage; 56% of point locations
Western bluebird ( <i>Sialia mexicana</i> )	Federal/State: None/None MSCP: Covered County: 2	Likely to occur on site for winter or migration but would not nest on site.	—	—	—	—

## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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**Table 2**  
**Impacts and Preservation of Covered Species Present on Site**

Species Scientific Name	Regulatory Status <sup>1</sup> :	Basis for Impact Evaluation	Number/ Acre(s) impacted	% Impacted	Number/ Acre(s) preserved	% Preserved
Burrowing owl ( <i>Athene cunicularia</i> )	Federal/State: BCC/ CSC MSCP: Covered County: 1	Incidental observation. Impact based on 190 acres of suitable habitat.	137 acres	72	51 acres	27
Mountain lion ( <i>Puma concolor</i> )	Federal/State: None/None MSCP: Covered County: 2	Incidental observation of tracks. No suitable denning locations would be impacted, and movement routes and corridors would be preserved.	—	—	—	—

**Federal Designations:**

BCC U.S. Fish and Wildlife Service Bird of Conservation Concern  
FE Federally listed Endangered  
FT Federally listed as Threatened

**State Designations:**

CSC California Special Concern Species  
P CDFW Protected and Fully Protected Species  
SE State-listed as Endangered  
ST State-listed as Threatened  
WL Watch List.

**MSCP Designations:**

Covered: Listed as Covered Species in Appendix B of Implementing Agreement between CDFW, USFWS, and County of San Diego (March 1998)  
Not Covered: Not Listed as Covered Species in Appendix B of Implementing Agreement between CDFW, USFWS, and County of San Diego (March 1998).

**County Designations:**

Group 1: High level of sensitivity, either because listed as threatened or endangered or because species has very specific natural history requirements that must be met  
Group 2: Species is becoming less common, but is not yet so rare that extirpation or extinction is imminent without immediate action. These species tend to be prolific within their suitable habitat types.



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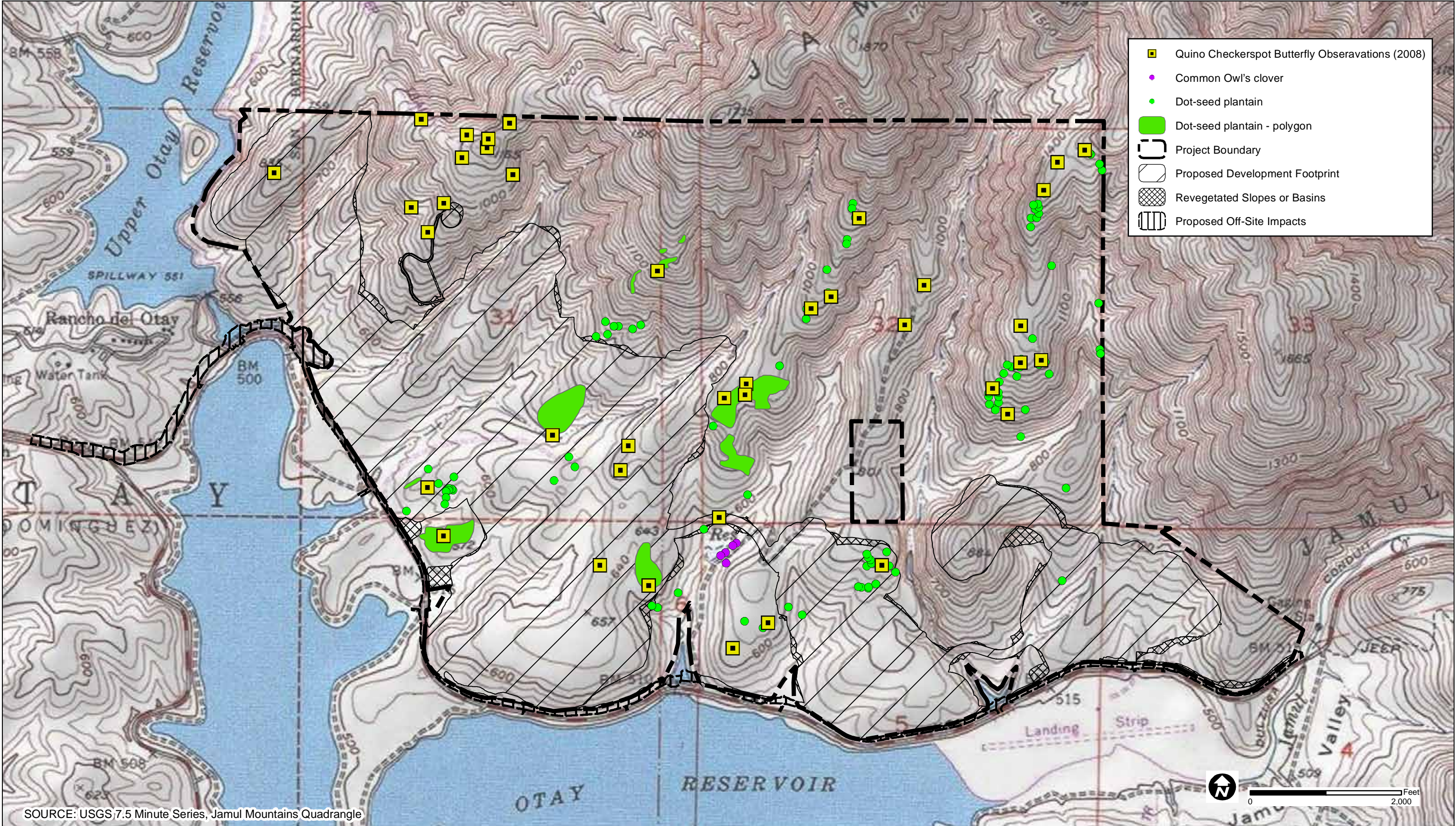


FIGURE 5  
Quino Checkerspot Butterfly Observations and Host Plant Locations



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# Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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## Quino Checkerspot Butterfly Context

The Quino checkerspot butterfly is the southernmost subspecies of a widely distributed butterfly (*Euphydryas editha*) that ranges from British Columbia to northern Baja California, Mexico (Bauer 1975). It was formerly widespread in the coastal plains and inland valleys of Southern California, including Los Angeles, Orange, Riverside, San Diego and San Bernardino counties, and northern Baja California, Mexico (Mattoni et al. 1997).

As recently as the 1950s, collectors described the Quino checkerspot butterfly as occurring on every coastal bluff, inland mesa top, and lower mountain slope in San Diego County and coastal northern Baja California (USFWS 2003). Throughout most of Southern California, the native habitats of this butterfly have disappeared incrementally as development has progressed and undeveloped areas have been invaded by non-native plant species.

Quino checkerspot butterfly show a preference for relatively open areas with cryptogamic crust and few vascular plants, surrounded by low-growing vegetation (Osborne and Redak 2000). Appropriate generalized habitat types include early and middle successional grasslands, open scrub communities, broken chaparral, and vernal pools (Murphy 1990). The host plant species for the quino checkerspot larvae includes: dot-seed plantain, desert plantain (*Plantago patagonica*), thread-leaved bird's beak (*Cordylanthus rigidus*), white snapdragon (*Antirrhinum coulterianum*), owl's clover and Chinese houses (*Collinsia* spp.). In conducting site assessments for the species, areas that should be surveyed for the species included: sage scrub, open chaparral, grasslands, and vernal pools. Within these communities Quino checkerspot butterfly are usually observed in open or sparsely vegetated areas (including trails and dirt roads), and on hilltops and ridgelines. As described in the USFWS survey protocol (USFWS 2002), the following areas are not recommended for butterfly surveys since these areas do not seem to be preferred for use by the species:

- Orchards, developed areas, or small in-fill parcels largely dominated by non-native vegetation
- Active/in-use agricultural fields without natural or remnant inclusions of native vegetation
- Closed-canopy forests or riparian areas, dense chaparral, and small openings completely enclosed within dense chaparral.

None of these habitat types occur on the project site.

Normally, larvae consume the plant on which they hatch, and then migrate in search of new plants. Due to the limited ability of larvae to move among host plants, high local host density is necessary for larval survival (Osborne and Redak 2000). If larvae have accumulated sufficient reserves by the time their host plants become inedible, they are able to enter diapause (USFWS 2003), a low-

## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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metabolic resting state that enables larvae to survive for months during the summer without feeding. While in diapause, larvae are much less sensitive to climatic extremes. Larvae are able to re-enter diapause several times before maturing, which may extend their life cycle for several years (Singer and Ehrlich 1979). Because Quino checkerspot butterfly larvae can re-enter diapause, it is possible that an adult flight period may only include a portion of the original larval population or may not occur at all in some occupied sites under adverse conditions. From the perspective of judging whether a population has been extirpated, it is important to recognize that a robust population may generate no adults at all under poor environmental conditions (USFWS 2003).

Adults are typically active during a 4- to 6-week flight period beginning between late February and May, depending on weather conditions (Emmel and Emmel 1973). Most *Euphydryas editha* subspecies exhibit generally sedentary behavior, with adults frequently remaining in the same habitat patch in which they developed as larvae (Ehrlich 1961, 1965; Boughton 1999, 2000). Data from mark-recapture studies indicate that long distance dispersal (greater than 0.6 mile) in *Euphydryas editha* is rare (USFWS 2003). Quino checkerspot butterfly generally fly close to the ground in a relatively slow, meandering flight pattern, and tend to avoid flying over trees, buildings, or other objects taller than 6 to 8 feet. Their thermodynamic requirements and natural avoidance of shaded areas deters flight in densely wooded areas and other types of closed-canopy vegetation (USFWS 2003).

Murphy (1990) suggested that the human-induced decline in the distribution and abundance of the quino checkerspot butterfly is exacerbated by the complex "metapopulation dynamics" which affect the persistence of this butterfly. In metapopulation dynamics, butterflies exist in an assemblage of individual demographic units or populations that periodically exchange individuals. Metapopulation dynamics occur when (1) patches of habitat support local breeding populations; (2) no single population is large enough to ensure long-term survival; and (3) habitat patches are not too isolated to preclude simultaneous extinction of all populations. Metapopulation stability requires a minimum number of habitat patches connected by dispersal corridors (landscape connectivity) (USFWS 2003). Some habitat areas that would not be considered essential if geographically isolated are, in fact, essential when situated in locations where they facilitate continued connectivity between surrounding populations or play a significant role in maintaining metapopulation viability (66 FR 9475).

Quino checkerspot butterfly populations have been reduced in number and size by more than 95% range wide primarily due to direct and indirect human impacts including habitat loss and fragmentation, invasion of non-native plant species, and disrupted fire regimes. Conversion from native vegetation to non-native annual grassland will be the greatest threat to Quino checkerspot butterfly reserves based on observations of the large-scale invasions throughout the range (Freudenberger et al. 1987, Minnich and Dezzani 1998, Stylinski and Allen 1999). The increased



## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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dominance of non-native species is reducing the abundance of quino checkerspot butterfly food plants, and habitat fragmentation exacerbates vegetation type conversion. Corridors of human activity through unfragmented natural areas such as unpaved roads, trails, and pipelines are also conduits of non-native seed dispersal (Zink et al. 1995).

Reserves should be designed to provide sufficient numbers of habitat patches such that (1) only a small number of habitat patches will likely be extirpated in a single year and (2) patches are close enough so that natural recolonization can occur at a rate sufficient to maintain a relatively constant number of patches occupied by larvae. Linkage areas must be free of dispersal barriers (artificial structures, dense stands of trees or tall shrubs) and mortality sinks (e.g., high-traffic roads<sup>1</sup>). Habitat networks should also be buffered (i.e., embedded in natural areas as large as possible) to reduce indirect impacts of development and the need for future or ongoing restoration in occupied habitat.

### **1.2.3 Natural Communities in the Preserve Complex**

Proposed Preserve vegetation community acreages are shown in Table 2 and include those areas not impacted by grading or fuel modification zones as well as areas proposed to be restored to native habitat and areas that allowed uses within the Preserve (i.e. – allowed infrastructure). These land uses include detention basins, the water tank, and the road that provides access to the water tank. Of the approximately 1,869 acres of the project site, a total of approximately 1,089 acres (58% of the project site) is proposed to be preserved on site. Of the preserve, a total of 1,062 would not be impacted by the project, and with restoration, a total of 1,076 of which 989 acres will be upland preserve habitat. Of this acreage, a total of 962 acres is currently suitable habitat for Quino checkerspot based on the past multiple surveys for the species. A vegetation map with the proposed development footprint is provided in Figure 6.

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<sup>1</sup> High traffic roads are defined as those greater than 10,500 average daily trips

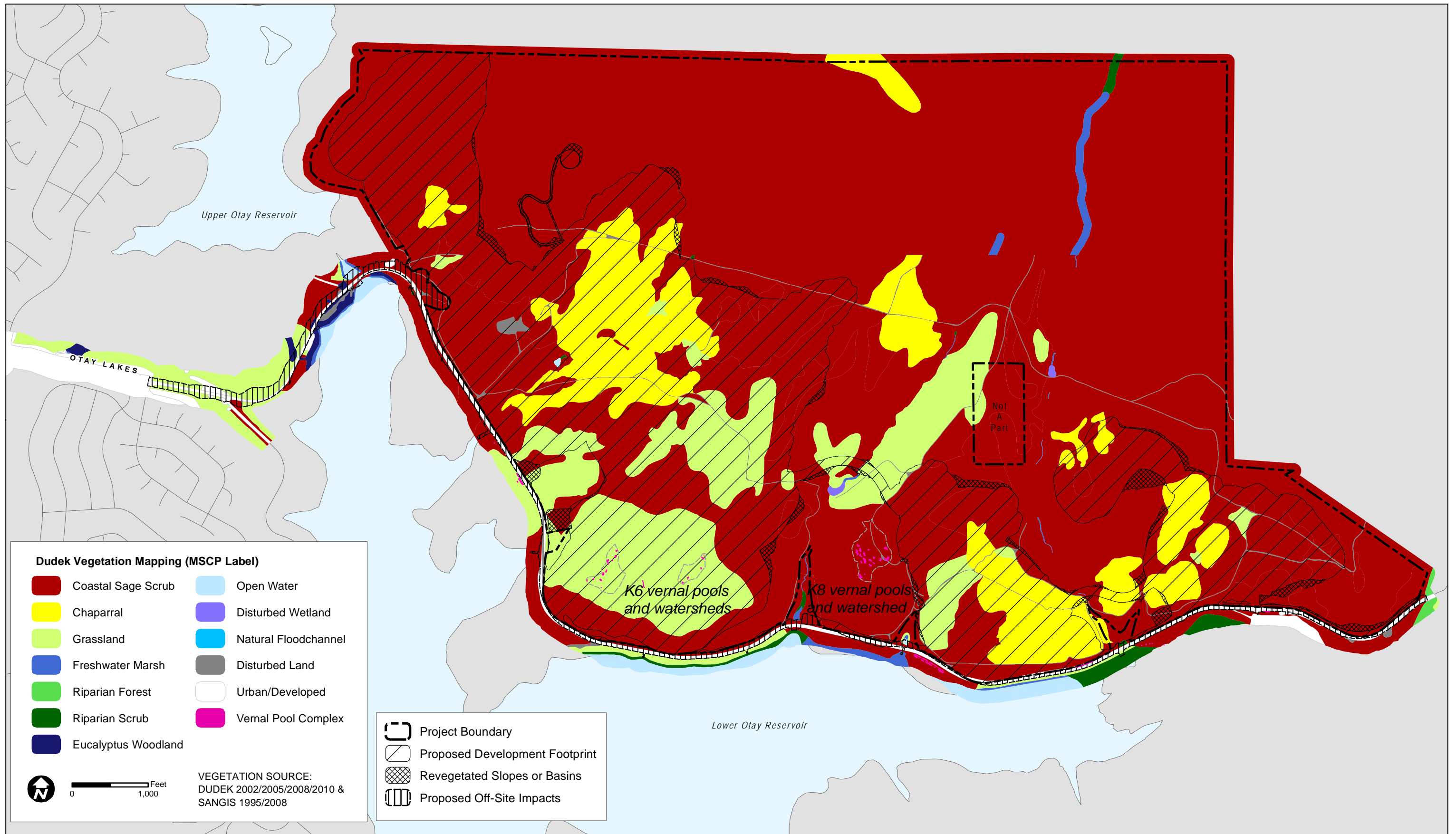
## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

**Table 3**  
**Proposed Preserve Lands**

Plant community type	Preserve (not impacted)* On Site	Preserve Purchased for Boundary Adjustment	Preserve (impacted)				Total Preserve
			Permanent Impacts		Temporary Impacts		
			Allowable Uses (Water Tank and associated road grading)	Detention Basins	Slopes	Water	
Sensitive Upland Communities							
Coastal sage scrub	828.21	3.18	2.26	1.22	13.02	0.23	848.12
Disturbed coastal sage scrub	133.91	—	0.73	2.35	4.17	—	141.16
Chamise chaparral	29.12	—	—	0.07	0.74	—	29.93
Disturbed chamise chaparral	4.31	—	—	—	—	—	4.31
Scrub oak chaparral	0.34	—	—	—	0.01	—	0.35
Southern mixed chaparral	2.09	4.28	—	—	—	—	6.37
Disturbed Valley needlegrass grassland	32.99	—	0.27	0.06	0.25	—	33.57
Non-native grassland	17.75	2.74	0.08	0.92	0.16	—	21.65
Subtotal	1,048.72	10.20	3.34	4.62	18.35	0.23	1,085.46
Sensitive Wetland Communities							
Cismontane alkali marsh	6.38	—	—	—	—	—	6.38
Disturbed cismontane alkali marsh	0.14	—	0.01	—	0.01	—	0.16
Mulefat scrub	0.05	—	—	—	—	—	0.05
Open water	—	—	—	—	—	—	—
Southern willow scrub	1.19	—	—	—	—	—	1.19
Subtotal	7.76	—	0.01	—	0.01	—	7.78
Non-Sensitive Communities and Land Covers							
Developed Land	0.01	—	0.05	—	—	—	0.06
Disturbed Habitat	5.00	—	0.03	0.06	0.25	—	5.34
Stock pond	0.79	—	—	—	—	—	0.79
Subtotal	5.80	—	0.08	0.06	0.25	—	6.19
Total	1,062.28	10.20	3.43	4.68	18.61	0.23	1,089.28

\* Mapping within the majority of open space areas is regional scale as opposed to project-level mapping, which is sufficient for purposes of this biological resources analysis since these areas are not proposed to be impacted.

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Otay Ranch Resort Village Site - Quino Checkerspot Butterfly Management/Enhancement Plan

FIGURE 6

Vegetation Map with Proposed Development Footprint

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## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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### **1.2.4 Connectivity with Other Preserve Complexes**

The preserve provides connectivity for Quino checkerspot butterfly to off-site occupied areas to the north, east, and south. As described in Section 1.1.2, provisions are included in the project design to provide for connectivity within the site as well as to off-site areas. Adjacent preserve complexes include: Otay Lakes Cornerstone lands immediately to the south, west and northwest; BLM lands, including Otay Mountain Wilderness Area to the southeast; CDFW lands to the north, south and east; USFWS lands immediately to the east; and Otay POM lands to the south in addition to those immediately to the north. Although there are still lands to the northwest which have the potential to be developed, the proposed project preserve will provide corridors which can connect on site Quino habitat and occurrences to future conserved and already conserved areas to the northeast. In addition, the proposed project preserve will extend to the north an already established contiguous block of conserved lands from the Mexico border to Otay Lakes.

### **1.2.5 Primary Threats and Stressors for Preserve Complex**

According to the draft Quino Checkerspot Butterfly Amendment to the County of San Diego Multiple Species Conservation Program Subarea Plan (i.e., County of San Diego Quino Amendment; County of San Diego 2010), conversion from native vegetation to non-native annual grassland is likely the greatest threat to Quino checkerspot butterfly within preserves. Therefore, a primary focus (at least initially) of management for the Otay Ranch Resort Village Preserve will be maintaining native vegetation communities suitable for Quino checkerspot butterfly occupancy. The Otay Ranch RMP provides the guidelines for general preserve management and will continue to be used.

Due to the metapopulation dynamics of Quino checkerspot butterfly, it will be important to maintain the quality and quantity of both occupied and unoccupied Quino checkerspot butterfly habitat. Based on the results of site-specific surveys it is assumed that Quino checkerspot butterfly use nearly the entire Preserve; however, no Quino were observed in grassland and chaparral habitats and there may be some very steep slopes in the northern part of the Preserve that are used strictly for movement of butterflies and that do not contain suitable habitat requirements for the larvae. As such, of the 1,089 acre-Preserve, approximately 962 acres are considered suitable Quino checkerspot butterfly habitat. If the coastal sage scrub on site degrades and becomes dominated by non-native weeds, maintenance may be required. Currently it is not anticipated that any action is required for areas other than the patches shown on Figure 7. Vegetation restoration and monitoring is described further in Section 2.1.

# **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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## **1.3 Management and Monitoring Strategy**

### **1.3.1 Summary and Vision Statement**

The purpose of this document is to provide guidance for the management and continued occupation of the Otay Ranch Resort Village site by the Quino checkerspot butterfly and to facilitate movement of the species to and from other off-site conserved areas. This plan is required as mitigation for on-site impacts associated with the construction of the Resort Village project area.

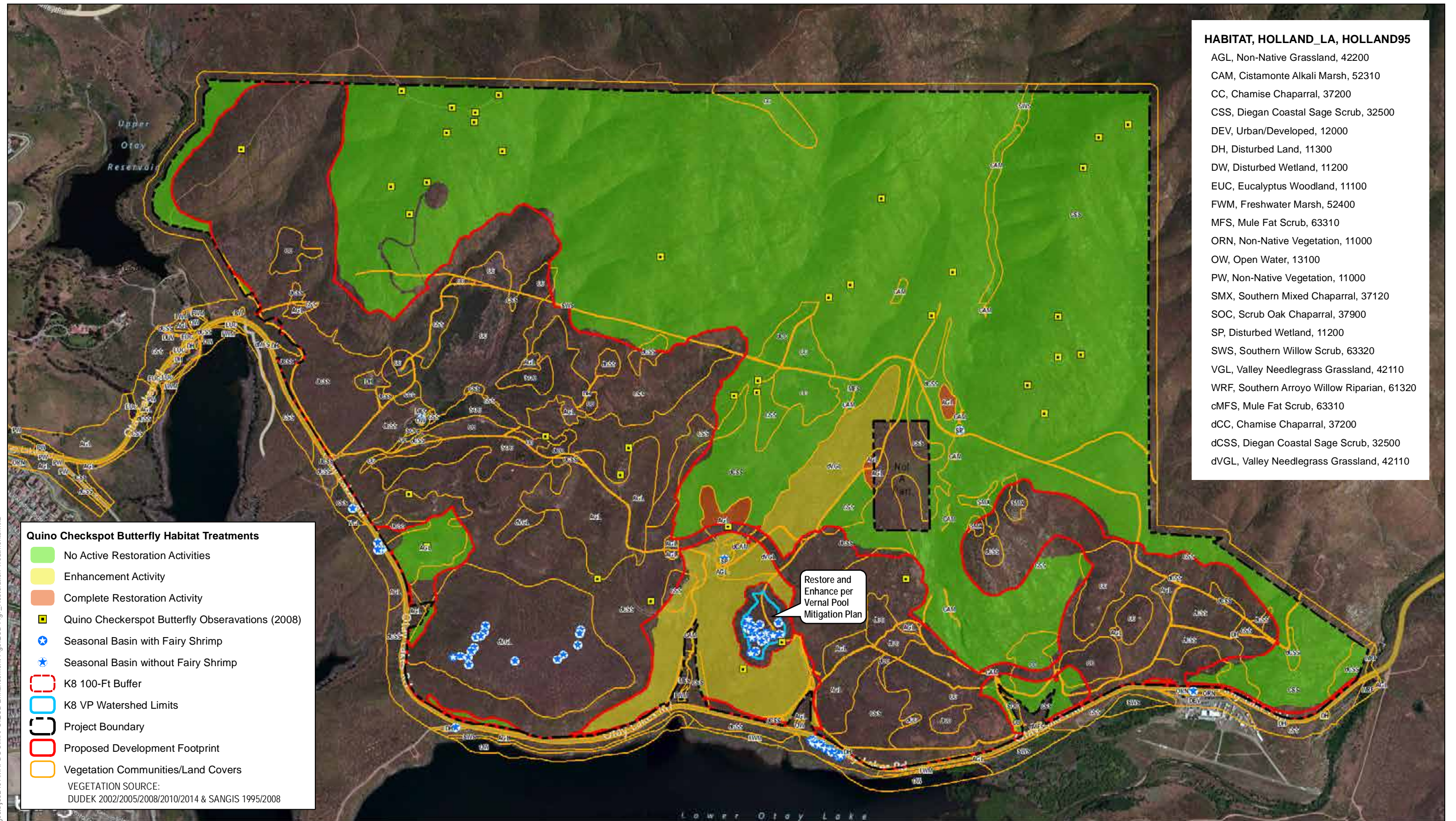
### **1.3.2 Biological Priorities and Priority Management Actions**

The goal of this plan is to document the continued persistence and conserve the population of the Quino checkerspot butterfly within the Preserve of the Resort Village through a combination of management, monitoring, and restoration actions. The analysis provided by Longcore et al (2003) on the life history features that describe the relationship between the Quino checkerspot and its environment in San Diego County was presented as an envirogram. The factors that affect the status of the Quino checkerspot are categorized as:

- availability of resources;
- direct causes of mortality;
- availability of mates; and
- impacts from predators and parasites.

The “centrum” for Quino checkerspot encompasses the proximate determinants of population dynamics and while it includes multiple features, management for the species focuses on the habitat conditions or availability of resources since the other features are either not under control of management, or are clearly handled with the designation of the Preserve. For the Resort Village Preserve, the inputs to the resources centrum focus on exotic plants and the native plant community since other inputs such as edge effects, grazing, agricultural activities, trail usage, disturbance are all controlled or curtailed with the proposed development and conditions of approval. Specifically, the project includes a Preserve Edge Plan to reduce and minimize edge effects. Grazing and agricultural activities are not permitted on the project site. And trail usage is restricted to designated trails within the development and limited open space trails which avoid the core Quino locations







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## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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To determine the management actions and the types of habitat restoration (level of effort), the site was surveyed as described in Section 1.2.1 and the various areas within the proposed preserve were generally categorized as requiring: 1) complete restoration; 2) enhancement; or 3) management (Figure 7). The total acreage of upland habitat currently present within the proposed preserve is approximately 1,049 acres (Figure 4) of which 962 would be considered to be suitable habitat for Quino checkerspot. Much of this Preserve area is high quality habitat for Quino checkerspot and has been documented to be occupied by the species. Areas that are composed of chaparral, although dense and generally not suitable, are important habitat features. The disturbed grassland areas, however, have become heavy grassland and not suitable and provide opportunities for enhancement treatment. Much of the focus of this management plan is on the maintenance of the condition of the coastal sage habitat since it is predominantly already in good condition and occupied.

### **1.3.3 Authorized Land Uses and Potential Conflicts**

Otay Ranch was organized so that several villages and planning areas were designated for various types of development while other areas were reserved for preservation of multiple species and habitats. An effort was undertaken to plan development to conserve species and habitats in the region and maintain wildlife corridors. The Otay Ranch Resort Village is designated for residential and resort development and for open space by the Otay SRP.

The proposed land uses consist of 1,881 single-family detached homes, 57 multi-family homes, 20,000 sq. ft. of retail/commercial space, a 200-room Resort with ancillary resort facilities, an elementary school, a public safety fire, nine parks ranging in size from 1.8 to 10.3 acres, internal manufactured open space and internal circulation (streets and parkway). The project includes a Boundary Adjustment to the South County Segment of the MSCP. This Boundary Adjustment includes the on-site preservation of known Quino populations and Quino habitat.

Within the preserved portion of the project, land use arising from development will be limited to a water tank and associated water line, a road to the water tank and detention basin. Limited trails are proposed within the Preserve. However, the POM has control to restrict trail access based on results of ongoing preserve monitoring and management. Indirect edge effects due to adjacent development interfacing with preserved lands are addressed through the implementation of a 100' Preserve Edge which buffers potential conflicts. This buffer is discussed in further detail in the Preserve Edge Plan (Appendix A). Lastly, a planned road crosses through the preserve area in two locations. This road carries a limited amount of project traffic and was designed with a minimal ROW to limit grading impacts. Additional information regarding land use and potential conflicts is discussed in Section 2.4, Property Stewardship.

## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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### 1.3.4 Preserve-level and Regional-level Monitoring Strategy

To determine if the management for the Quino checkerspot butterfly is providing long-term occupation of the Preserve, surveys should be conducted after the construction of the project. Previous Baseline surveys, as discussed in Section 1.2.2, delineated Quino checkerspot butterfly habitat within the proposed Preserve.

The results of pre-construction surveys have been used to develop a sampling scheme for Quino checkerspot butterfly occupancy and habitat monitoring upon completion of the project. Quino checkerspot butterfly occupancy monitoring will track Quino checkerspot butterfly population trends over time. Quino checkerspot butterfly habitat monitoring will track changes in habitat quality and quantity.

The monitoring program is a science-based program that includes the following features:

- **Population monitoring:** estimate butterfly population densities based on field counts of adults across habitat range within the Preserve;
- **Habitat characterization:** assess biotic factors (host plants, invasive species, etc.) and abiotic factors (microclimate, slope orientation, etc.) of local habitat within the Preserve;
- **Habitat modeling:** simulate population dynamics as influenced by prevailing climate, microclimate (solar exposure, temperature, etc.), slope orientation, host plant availability, and larvae development;
- **Human impacts:** assess and mitigate the impacts of human development on and near butterfly habitat and prohibit or limit these impacts to the extent practical;
- **Adaptive management:** implement site-specific management plans, with periodic review of success based on results of continued monitoring.

# **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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## **2 AREA-SPECIFIC MANAGEMENT DIRECTIVES AND TIMELINE FOR THE PRESERVE COMPLEX**

Critical environmental factors that threaten the species include those physical and biological factors that may result in population extirpations. Management and monitoring will benefit from a concrete analysis of the risks to the population and identification of the threats (Longcore et al. 2003). The dominant causes of population declines result from reduction and loss of the resources that are critical for the species. Hence the size, configuration, and distribution of habitat patches are the primary determinants of the likelihood of species persistence (Longcore et al. 2003). The Quino checkerspot butterfly is threatened primarily by urban and agricultural development, invasion by nonnative species, off-road vehicle use, grazing, and fire management practices (USFWS 2003). Other factors contributing to the species' population decline likely have been, and will continue to be, enhanced nitrogen deposition, elevated atmospheric carbon dioxide concentrations, and climate change (USFWS 2003). As a result, careful planning that ensures maintenance of existing Quino checkerspot butterfly metapopulations will be the key to long term conservation of the species. Any activity resulting in habitat fragmentation or removal of host or nectar plants from habitat reduces habitat quality and increases the probability of extinction of the Quino checkerspot butterfly.

The methods for the vegetation communities area-specific management directive is derived from the adaptive management program described in the County of San Diego Quino Amendment (2010). The success of this area-specific management directive/adaptive management program, both for the Preserve and the County in general, will depend on the development of techniques that can efficiently restore native plant species on a large scale.

### **2.1 Vegetation Communities**

A primary goal of the preserve complex will be maintaining and enhancing vegetation communities suitable for Quino occupancy through habitat restoration. This will be accomplished through the restoration, enhancement and monitoring of vegetation within the preserve. Preservation and enhancement of on-site habitat will maintain connectivity between the Otay Lake/Jamul occurrence and other occurrences to the surrounding the preserve. These efforts will prevent conversion from native vegetation to dense, non-native annual grassland with few host plants, which is one of the greatest threats to Quino.

#### **2.1.1 Vegetation Goals**

##### **Goals**

- Maintain the existing quality and quantity of occupied and unoccupied Quino habitats.

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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- Enhancing additional vegetation communities suitable for Quino occupancy through habitat restoration.

### **2.1.2 Vegetation Objectives**

#### **Objectives**

- Restore 6.3 acres which are devoid of any of the required resources (i.e. suitable coastal sage scrub) for the Quino checkerspot butterfly
- Enhance 90.2 acres where the vegetation is dominated by grasses but otherwise include sparse shrub cover and bare patches of soil
- Monitor for conversion of habitat types

Habitat restoration and enhancement should be done in the most efficient and effective method to allow for long-term implementation. Initial focus should be to enhance existing degraded habitat prior to restoration. This will provide for more immediate results. The specific design of this program will be coordinated with the Wildlife Agencies, the County, and the POM, which will be responsible for implementing this monitoring program.

Coastal sage scrub restoration, in order to provide suitable habitat for quino checkerspot butterfly, may need to focus on providing more diverse habitat, sparser vegetation with more opening for basking, suitable host and nectar plant species, and the establishment of cryptobiotic crusts. Prior to initiating a restoration program, a conceptual plan should be developed that identifies timing, species composition, site preparation, and methods of implementation. In addition, the results of the quino checkerspot butterfly habitat restoration effort will be reviewed annually to determine which methods are most effective. The design currently includes two methods, the seed ball and hand-broadcast seeding techniques (SDMMP 2013c). The results from these studies will be used to determine methods.

#### **Restoration**

Areas within the Resort Village Preserve that require complete restoration are those areas that are completely devoid of any of the required resources for the Quino checkerspot butterfly. The actions may include dethatching, herbicide treatments, mowing and or weeding, and extensive seeding. These areas include the slope grading areas that are proposed for complete restoration (see Conceptual Upland Restoration Plan; Dudek 2011) as well as the areas mapped as non-native grassland with no shrubs or forbs present. These areas are a dense and complete cover of non-native grasses with no soil exposure or potential to all Quino checkerspot host plant growth. There are a total of 6.3 acres assigned as complete restoration treatment.

# **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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## **Enhancement**

Areas within the Resort Village Preserve that require enhancement include areas with vegetation that is dominated by grasses but otherwise include sparse shrub cover and bare patches of soil. Some of these areas are mapped as disturbed valley needlegrass grassland and others are mapped as disturbed coastal sage scrub. The actions for these areas may include some dethatching and no other action or limited application of herbicide. It is important to note that the vernal pool area, while it could be designated as an enhancement area, has its own restoration plan that includes restoration of new vernal pools and enhancement of existing vernal pools and mima mounds as documented in the Conceptual Vernal Pool Mitigation Plan (Dudek 2014). There are a total of 90.2 acres assigned to enhancement treatment.

## **Monitoring**

Areas within the Resort Village Preserve that require monitoring and no other restoration/enhancement activities are those areas currently occupied by butterflies or that are occupied by host plant and nectar sources. These areas are composed of sparse shrub cover and native grasses. In some cases, butterflies have not been observed; however, this may be due to the overall steep topography and not due to the habitat condition since the habitat has not been grazed, farmed or otherwise involved in other human-related land use. No actions are proposed for these areas other than monitoring of populations of butterflies and the host plant populations. Actions to take place in these areas would be potentially triggered by the results of the monitoring (i.e. – adaptive management). There are a total of 962 acres assigned to monitoring treatment.

### **2.1.3 Vegetation Implementation Tasks**

Three different levels (high, moderate, and low intensity) of restoration/enhancement may occur within the Preserve. High-intensity restoration/enhancement involves de-thatching, weeding and spraying, as well as planting/relocation of native plant species, annually over a 5-year period. The high intensity restoration/enhancement program (described below) is based on the De-thatch and Repeat Spray Method developed by Recon and outlined in Appendix II of the Recovery Plan (USFWS 2003). It would be employed in areas that have significant numbers of native plant species present but contain moderate to high levels of non-native plants. The moderate and low intensity programs would be used for areas that have significant numbers of native plant species present, but contain moderate or low levels of non-native plants.

The moderate and low intensity program costs were developed specifically to address the individual requirements of a Quino checkerspot butterfly program in the City of Chula Vista. The moderate-intensity restoration/enhancement program, if appropriate for adaptive management,

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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would occur annually over a 5-year period with perpetual maintenance commencing in year six, while the low-intensity restoration/enhancement program would occur annually over a 4-year period with perpetual maintenance commencing in year five.

Appropriate timing of non-native plant removal should result in decreasing effort over a period of years. All areas that have been subject to restoration/enhancement will eventually be included as areas targeted for focused weeding on an appropriate rotating basis (i.e., every 2 to 6 years as needed).

### **High-Intensity Restoration/Enhancement Program**

The following outlines the high-intensity restoration/enhancement program, representing the maximum amount of effort that is expected to be undertaken. This methodology may be modified or scaled back to suit the conditions at the selected site.

Thick thatch associated with dead mustard or annual grasses can prevent native species from germinating and/or competing successfully for light and space with non-natives. In areas with this problem, dethatching will be used to enhance the areas. This will include removal of dead plant thatch using hand tools, and "weed eaters," and return visits for spraying with glyphosate. Timing of non-native plant control efforts is crucial to success. Non-native plants will be killed prior to seed set, so that removal effort and cost will decrease over time.

Another crucial component of the non-native plant removal method described below is that workers must be trained to distinguish between native and non-native plants for restoration/enhancement to be successful.

The high-intensity restoration/enhancement program is as follows:

- a. Cut thatch and dead non-native plants with "weed eaters." This cutting can be done during the summer or early fall;
- b. Rake up and collect non-native plant thatch;
- c. Remove thatch from site and dispose of it in dumpsters, a landfill, or an area where it can be composted nearby to reduce disposal costs;
- d. Return to site and spray Roundup (or more selective herbicide, or selective weed-whacking) on non-native plant seedlings after sufficient rains have fallen in winter and spring;
- e. Repeat spraying (or selective weed-whacking) as necessary to prevent seed set. Other options include the use of pre-emergent herbicide prior to the first significant rain; and
- f. Repeat spraying (or selective weed-whacking) as necessary to maintain non-native plant density to a low level.

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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Frequent site visits are necessary during the growing season to assess nonnative plant removal efforts and to determine whether changes are needed in the strategy being used or the intensity of non-native plant removal efforts. In particular, the non-native plant removal process must be carefully monitored to ensure that new, non-native plant species do not flourish as the formerly dominant non-native species are removed. Up to five herbicide (or weed eating) applications per season may initially be required. The amount of spray will be reduced as the season progresses and fewer non-native plants are present. After the first two years, weeding requirements decrease each year if the spraying program is timed to kill non-native plants before they set seed. Removal of non-native plants by hand may be required around small populations of herbaceous natives.

Populations of native annuals (larval host plants and nectar resources) may be enhanced or re-established in and between existing habitat patches by hand seeding. According to the Recovery Plan, restoration/enhancement plantings should include nectar-producing plant species with overlapping flowering periods that extend throughout the typical Southern California growing season. Seeds of native plant species used in each restoration/enhancement project should be collected within five miles of the site, or as close as possible within the same general climate zone. To ensure that adequate seed is available, seed bulking (growing seed in cultivation to increase the amount of seeds) of annuals, including host and nectar plants, may be necessary.

To support a diverse assemblage of potential pollinators and native plant species, the Recovery Plan calls for areas of open ground within associated native plant communities to be restored to support ground nesting bees and other invertebrates. The goal of having open ground for pollinators is compatible with Quino checkerspot butterfly restoration/enhancement efforts because Quino checkerspot butterfly larval food and adult nectar plants require open ground for successful reproduction and long-term persistence. Brush piles, scattered sticks, branches, and rock cobbles can be brought to the restoration/enhancement site to increase the available cover for many animals, and will provide potential diapause and pupation sites for Quino checkerspot butterfly.

### **2.2 Quino Checkerspot Butterfly**

The Quino checkerspot butterfly was federally listed as endangered on January 16, 1997 (62 FR 2313). A Quino checkerspot butterfly Recovery Team was assembled by USFWS in September 1999 to analyze existing information and new data collected from more recent surveys. On February 7, 2001, the USFWS issued a proposed Critical Habitat designation for the species and a Quino Checkerspot Butterfly Final Recovery Plan was issued by the USFWS in January 2003. On April 15, 2002, the final Critical Habitat designation was issued. The Critical Habitat designation was revised on June 17, 2009, and was reduced by approximately 110,000 acres. The proposed project is within critical habitat for Quino checkerspot butterfly (Figure 8).

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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The recovery actions are based on the recommendations contained in the Quino Checkerspot Butterfly Draft Recovery Plan (January 2003), prepared by USFWS in consultation with the Recovery Team. The Draft Recovery Plan presents the tasks necessary to ultimately reclassify the quino checkerspot butterfly to threatened and ensure the species' long-term conservation based on the best available scientific information and expert opinions. The Recovery Plan represents the best available direction on the actions required for the conservation and recovery of the species.

### **2.2.1 Quino Checkerspot Butterfly Goals**

**Goal:** Maintain viable populations of Quino checkerspot butterfly on site which will in turn expand viable and interconnected Quino local subpopulations and ultimately restore and establish connections between regional Quino populations.

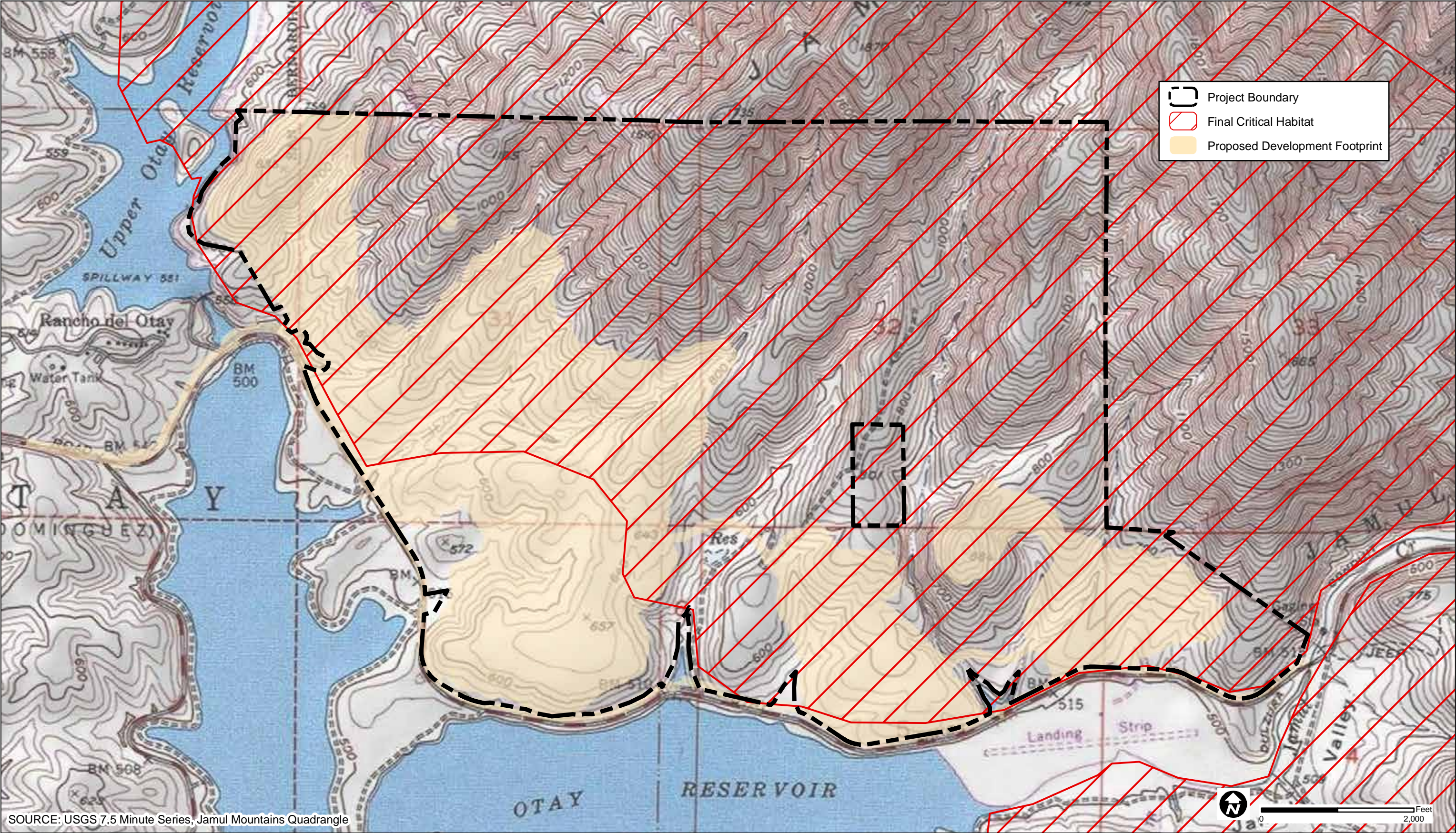
### **2.2.2 Quino Checkerspot Butterfly Objectives**

The proposed Otay Ranch Resort Village Project will contribute to implementation of the recovery actions by working towards the following objectives:

- Preserve suitable habitat and known locations of Quino checkerspot butterfly on site
- Maintain connectivity along key habitat linkages within the property
- Minimize project impacts to Quino checkerspot butterfly and their suitable habitat.
- Fund the management of the Preserve for the benefit of the Quino checkerspot butterfly (along with other special status species and sensitive habitats)
- Restore/enhance Quino checkerspot butterfly habitat where necessary; and
- Monitor areas currently occupied by butterflies or that are occupied by host plant and nectar sources



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Otay Ranch Resort Village Site - Quino Checkerspot Butterfly Management/Enhancement Plan

FIGURE 8  
QCB Proposed Critical Habitat



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## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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### **2.2.3 Quino Checkerspot Butterfly Implementation Tasks**

#### **Preservation, Connectivity, and Impacts**

The MSCP Subarea Plan identifies a “hard line” preserve/development boundary for the Otay Ranch Resort Village that reflects an agreement reached among the wildlife agencies and the Baldwin Company (the applicants’ predecessor in interest) at the time that the MSCP Subarea Plan was approved. In recent years, the wildlife agencies have suggested that the preserve boundaries should be modified to provide conservation of resources that were not previously identified; particularly Quino checkerspot butterfly and San Diego fairy shrimp species locations and sensitive habitat resources including vernal pools. The current project applicants have developed a revised preserve/development boundary to reflect recent discussions with the Wildlife Agencies regarding these resources. Thirteen Quino checkerspot locations will be added to the preserve in the boundary adjustment along with areas that are composed of ridgelines and include expanses of host plant populations. The boundary adjustment and preserve reconfiguration are focused on preserving occupied habitat and features of the site that are important for the Quino checkerspot including ridgelines, mesas, and locations where the species has been repeatedly observed over a number of years of surveys.

The project provides preservation of 962 acres of currently suitable Quino habitat. The preserve design includes significant larval host plant populations, known occurrences of the Quino checkerspot butterfly from multiple years of surveys, suitable habitat for the species, and ridgelines and hilltops where the species has been recorded (Figure 5). There also is connectivity to off-site occupied areas to the north, east, and south, and provisions are included in the project design to provide for connectivity within the site as well as to off-site areas. Thus the project includes preservation of occupied Quino checkerspot butterfly habitat within the same region and ensures connectivity to suitable off-site habitat.

#### **Funding**

Funding is discussed in Section 3.0, Staffing, Management Costs and Funding, and outlined in Table 4.

#### **Restoration/Enhancement**

Restoration and enhancement are discussed under Section 2.1, Vegetation Communities.

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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### **Quino Occupancy Monitoring**

A qualified project biologist shall be retained for the post-construction surveys and monitoring of the Quino checkerspot butterfly within the Resort Village Preserve. The purpose of the surveys is to monitor the population and habitat of the Quino checkerspot butterfly in an effort to ensure the long-term success of this management/enhancement plan. The population surveys will track Quino checkerspot butterfly population trends over time. Quino checkerspot butterfly habitat monitoring will track changes in habitat quality and quantity.

Monitoring and management for Quino checkerspot butterfly for the Resort Village is based on the information presented in the County of San Diego Quino Amendment as well as documentation on the species in San Diego County (County 2010; Longcore et al. 2003). The monitoring program includes two phases: baseline surveys and long-term monitoring for the butterfly and its habitat. Surveys conducted in 2008 serve as baseline surveys for the Resort Village. The 2008 season was exceptionally good for detecting Quino checkerspot butterfly due to the rainfall and subsequent development of the host plant.

The long-term monitoring of the Quino checkerspot butterfly and its habitat will be conducted on an annual basis within the Resort Village Preserve. General habitat monitoring will be performed to determine if changes occur in habitat quality and quantity. The population size and variation, changes in habitat condition and occupancy of the species will be monitored as required. The Resort Village Preserve is considered to be a single “macrosite”, per the Amendment, and it is composed of multiple microsites (County 2010).

The location of monitoring points will be randomly selected from potential Quino checkerspot butterfly habitat in the Preserve. Presence/absence surveys for Quino checkerspot butterfly will be done at these locations. The sampling framework will involve both sentinel sites (i.e., sites to be surveyed every year) and panel sites (i.e., sites that will be surveyed less frequently). During some years, Quino checkerspot butterfly do not exhibit an adult phase and cannot be adequately detected. In such a case, the survey schedule will be delayed until the next year when Quino checkerspot butterfly can be adequately surveyed. By conducting Quino checkerspot butterfly occupancy and habitat monitoring at the same locations, information regarding Quino checkerspot butterfly habitat requirements within the Resort Village Preserve will be generated.

As described above, the occupancy monitoring method will be used to monitor population trends for Quino checkerspot butterfly. Occupancy monitoring requires the presence or absence of the species to be determined at each sampling location. Five surveys for Quino checkerspot butterfly should detect, with a probability of 0.95, populations with more than 10 observable individuals (Zonneveld et al. 2003). Observable individuals account for search

## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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efficiency; if search efficiency is 10%, a population of 100 Quino checkerspot butterfly will have 10 observable individuals. Such survey protocol is used by the USFWS and will be applied to sentinel and panel sites.

Walking surveys that cover the sample site will be conducted. When Quino checkerspot butterfly is found, a point count system can be established. Zonneveld et al. (2003) suggest that the five presence surveys for Quino checkerspot butterfly should be completed on the last day of February, March 16, March 30, April 14, and May 1, which may be amended to reflect weather circumstances. To avoid a situation in which an individual adult Quino checkerspot butterfly that has immigrated to a site is counted as presence of the species at that location, more than one individual must be observed to be considered indicative of presence for quantitative analysis. Additionally, sites where adults have been observed for the first time should be surveyed to locate pre-diapausal larvae to confirm recruitment and presence for quantitative analysis.

Monitoring is summarized in the following table (Table 4) which is adapted from the County of San Diego Quino Amendment (County 2010).

**Table 4**  
**Quino Checkerspot Butterfly Monitoring Summary**

Site	Description	Data Collected	Frequency of Data Collection
<i>Habitat Monitoring</i>			
Macrosite	Contiguous blocks of habitat. Size can be from 25 acres to the entire preserve.	Distance to nearest occupied macrosite located off site; average elevation; topographic diversity; average climate; slope; aspect; distance to roads; distance to the development; time elapsed since fire.	Year 1 as baseline. Update as land use changes and butterfly occupancy changes.
Microsite	Points within macrosites that correspond with butterfly survey sites.	Vegetation cover, abundance of larval host plants, nectar plant populations, percent bare ground, presence of cryptogamic soils.	Year 1 as baseline. Update every four years in rotation.
<i>Butterfly Monitoring</i>			
Sentinel	3-4 occupied sites	Five visits to estimate presence and numbers.	Yearly
Panel	Up to 20 sites within the macrosite to be studied each year. They can be occupied or unoccupied.	Five visits to estimate presence	Every four years in rotation.

# Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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## Quino Habitat Monitoring

The Quino checkerspot butterfly habitat monitoring program is intended to improve the current understanding of the habitat and environmental correlations to Quino checkerspot butterfly population size and stability, and provide the basis for adaptive management strategies. Variables measured at each patch will include structure and composition of the plant community; presence and density of larval host plants, nectar plants, and other plants that co-occur with Quino checkerspot butterfly; amount of bare ground; and other correlates of Quino checkerspot butterfly occupancy, such as the presence of cryptobiotic soil crusts. Topographic analysis will also be conducted as determined after setting up a grid system over the densest population area. Features to be recorded include the azimuth and tilt. This analysis can be used to provide a stratified sampling method that is determined by the degree of insolation (Murphy and Weiss 1988). This method can be used to develop a stratified random sampling method that can correlate with the results of the butterfly population surveys. While the Murphy and Weiss (1988) method uses the results of larvae as part of the analysis, the proposed monitoring will use results from adult surveys in order to be cost effective. The habitat monitoring goal is to maintain the 966 acres of currently and potential occupied upland habitat as suitable habitat for the species. The continued condition of habitat as shown on Figure 5 is acceptable since the disturbed coastal sage scrub is generally categorized as disturbed due to low shrub cover with areas of exposed soil with some non-native cover including grasses and forbs; however, open ground is still present and Quino checkerspot butterfly has been recorded. Enhancement and restoration, as described above, will improve other habitat areas such as the non-native grassland patches and the non-native grass dominated valley needlegrass and coastal sage scrub patches.

## Adaptive Management

The following adaptive management triggers are provided (with minor revisions to apply to the specific project area) from the County of San Diego Quino Amendment (County of San Diego 2010) and will be applied to the Resort Village site:

- **Trigger 1: Significant Declining Occupancy Trend.** A logistic regression of the presence-absence data over a six year period will be analyzed. The analysis should be performed across the Resort Village Preserve. If statistically fewer sites are occupied than in the past, then the distribution of the sites should be considered to determine whether dispersal, habitat quality, or weather conditions are likely to be explanatory. These can be investigated by using appropriate dependent variables to test each explanation (e.g., distance to nearest patch, vegetation variables, and rainfall). If declines are uniform across the Resort Village Preserve, and can be attributable to low rainfall, then no action is triggered. If vegetation variables are explanatory, then active management actions will

## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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occur where Quino have been extirpated. If dispersal seems to be the key, (i.e., sites with extirpation are statistically more distant from other sites), then analyze using Trigger 2.

- **Trigger 2: Site Extirpation.** If a site has experienced a population extirpation without butterflies returning for three years during which the population size at sentinel sites was equal to or greater than the mean population size (e.g., three “good” years), then one of two actions will be considered for the site:
  - If the percent cover of larval host plants and nectar sources at the site have diminished since the site was last occupied, then the Active Management Program will focus on restoration at the site.
  - If habitat quality does not appear to be the cause of extirpation, then the POM will initiate other actions, such as performing additional research studies or reintroducing the species through translocation of wild or captive stock, in coordination with the Wildlife Agencies.
- **Trigger 3: Stability in Occupied Sites.** When occupancy remains constant through time (i.e., three sampling periods or longer), this shows that populations appear stable. In this situation, the Active Management Program will focus on restoration or creation of Quino habitat in unoccupied areas. In this manner, available resources will be directed to creation of new habitat only when declines in existing habitat have been addressed.

### 2.3 Coordination

On a region-wide basis, the Otay SRP and RMP are being implemented through the RMP requirements of preserve conveyance and preserve management funding. These requirements have resulted in offers for conveyance of preserve land within Otay Ranch and the establishment of the POM to monitor, manage and maintain these preserve areas. The conveyance and management of the preserve is being actively coordinated between the City of Chula Vista and the County of San Diego (as the POM) in consultation with the Resource Agencies.

#### 2.3.1 Coordination Goals

The POM will establish coordination goals; however, these goals should be focused around the aforementioned vegetation and species goals. Examples include:

- Coordinate with other land managers with Quino checkerspot butterfly and the SDMMP to compare enhancement and restoration successes, monitoring data and adaptive management practices;

## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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- Coordinate with US Border Patrol to limit the use of the Resort Village Preserve for potential disruptive activities.
- Coordinate with the Resource Agencies to provide results of ongoing monitoring, updates on enhancement and restoration activities and needed adaptive management.

### 2.3.2 Coordination Objectives

The POM will establish coordination objectives.

### 2.3.3 Coordination Implementation Tasks

The POM will establish coordination implementation tasks.

## 2.4 Property Stewardship

The Otay Ranch Resort Village Biological Resources Technical Report (Dudek 2014a) outlines several long-term edge effects that might occur due to project construction. Long-term edge effects could include intrusions by humans and domestic pets and possible trampling of individual plants, invasion by exotic plant and wildlife species, exposure to urban pollutants (fertilizers, pesticides, herbicides, and other hazardous materials), soil erosion, litter, fire, hydrologic changes (e.g., surface and groundwater level and quality), lighting, and noise.

### 2.4.1 Property Stewardship Goals

Goal: Reduce potential long-term edge effects on the preserve.

### 2.4.2 Stewardship Objectives

- **Objective:** Limit the ability for the proposed project to have indirect impacts on the preserve through the creation of project design features within the Specific Plan and Tentative maps.
- **Objective:** Implement the Resort Village Preserve Edge Plan

### 2.4.3 Stewardship Implementation Tasks

Currently, the entire project area is gated and fenced along west and south sides. Access from the north is through a City of San Diego gate in Proctor Valley that is currently fenced and locked. Property to the East is owned by the CDFW and there is no access to the project area from that land.



## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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As the Resort Village project is constructed, the designated preserve area which abuts proposed development will be fenced and signs will be placed along the fencing to discourage entrance into the preserve. Once the land is dedicated and the POM takes over stewardship, preserve enforcement will be tasked to the POM. Within the preserve there are existing dirt roads; however, none of these areas will be designated as trails. Border patrol currently uses these existing roads and will likely continue to do so after project completion. However, there will be no scheduled maintenance for the roads within the Preserve. One facility within the preserve, a water tank, will be fenced and will not require regular maintenance.

As stated in the Otay Ranch Resort Village Biological Resources Technical Report (Dudek 2014a), the Project applicants shall implement the following Project design features as conditions of the Specific Plan and Tentative Maps to avoid indirect impacts to natural vegetation communities and sensitive species (i.e. edge effects):

- No invasive, non-native plant species shall be introduced into areas immediately adjacent to the Preserve. All slopes immediately adjacent to the Preserve shall be planted with native species that reflect the adjacent native habitat.
- Grading and/or improvement plans shall include the requirement that a fencing and signage plan be prepared and that permanent fences or walls be placed along the open space boundaries. Placement of permanent fencing or walls is required at the conclusion of the grading activity and prior to Record Plan approval.
- Submit to the director of the Department of Planning and Development Services evidence that permanent signs have been placed to protect all open space easements in accordance with the open space signage exhibit that will be placed on file with the Department of Planning and Development Services as Environmental Review Number 04-19-005.
- A hydroseed mix that incorporates native species, is appropriate to the area, and is without invasives shall be used for slope stabilization in transitional areas.
- Peruvian pepper trees and other invasive vegetation would not be planted in streetscapes, or within 50 feet of the Preserve, where they could impact native habitat.
- Lighting of all developed areas adjacent to the Preserve shall be directed away from the preserve, wherever feasible and consistent with public safety. Where necessary, development shall provide adequate shielding with non-invasive plant materials (preferably native), berming, and/or other methods to protect the preserve and sensitive species from night lighting.
- Uses in or adjacent to the preserve shall be designed to minimize noise impacts. Berms or walls shall be constructed adjacent to commercial areas and any other use that may introduce noises that could impact or interfere with wildlife utilization of the preserve.

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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- During Project operation, all recreational areas that use chemicals or animal by-products, such as manure, that are potentially toxic or impactful to sensitive habitats or plants shall incorporate methods on-site to reduce impacts caused by the application and/or drainage of such materials into Preserve areas.

### **2.5 Fire Management**

A Fire Protection Plan has been created for the development portion of the proposed project (Dudek 2014b). That plan designates the fire risk assessment for the project area, fire safety requirements, fire and emergency services as well as a community protection and evacuation plan. A 100' fuel modification zone is included around the project site which, in addition to protecting the developed portions of the project site from potential wildland fires, serves the opposite purpose of preventing home fires from spreading to the Preserve. In addition, the Fire Protection Plan includes recommendations for fuel modification adjacent to roadways within or adjacent to the Preserve to prevent or minimize the risk of vehicle-related ignition. However, the plan does not address fire management within the preserve. Fire management within the preserve will be handled by the POM.

#### **2.5.1 Fire Management Goals**

Fire management goals will be at the discretion of the POM and in accordance with the MSCP. Examples include:

- Minimize the threat of fire through fuel management practices as permitted in the MSCP and Otay Ranch RMP.

#### **2.5.2 Fire Objectives**

The POM will designate fire objectives for the preserved portion of the project. Examples

- Coordinate with the Fire Authority Having Jurisdiction during the summer and fall months to assess annual fire threats and take appropriate actions.
- Limit the extent to which any fuel management activities occur within higher quality Quino habitat areas.
- In the event of a fire, coordinate with the Resource Agencies to develop a Post-Fire Resource Recovery Plan

#### **2.5.3 Fire Implementation Tasks**

Implementation tasks will be at the discretion of the POM and in accordance with the MSCP.

## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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### 3 STAFFING, MANAGEMENT COSTS AND FUNDING

Monitoring and maintenance cost estimates for the various actions within the Preserve are summarized in Table 5. For the purposes of this cost estimate, it is assumed that a maximum of one Sentinel B location will be selected within the Resort Village Preserve. For the Resort Village, it is assumed that four panel sites will be established for the monitoring conducted every four years.

**Table 5**  
**Quino Checkerspot Butterfly Monitoring and Management Cost Estimate**

Task	Frequency	Number of Visits	Number of Days to Cover	Method	Acreage	When	Purpose	Cost per Year
<i>Surveys</i>								
Pre-construction survey	1	5	115	USFWS protocol	1,869 (entire site)	2008	Set baseline population and host plant occurrence	Done
Completed								
<i>Habitat Restoration</i>								
Maintenance (no action)	--	--	--	No action needed		--	No action needed	--
Enhancement	As needed			Limited herbicide, mowing			Enhance areas of shrub cover that have some weed cover	\$6,600 acre/year
Complete Restoration	As needed			Dethatch, herbicide, mowing, seeding			Restore areas with no host plant and dense grass	\$8,400 acre/year
<i>Butterfly monitoring</i>								
Butterfly monitoring sentinel	yearly	5 X 0.25 day to cover	5	Standard USFWS protocol	1 occupied sites; 50 m radius	Upon dedication to County	Population trend	\$4,250

## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

**Table 5**  
**Quino Checkerspot Butterfly Monitoring and Management Cost Estimate**

Task	Frequency	Number of Visits	Number of Days to Cover	Method	Acreage	When	Purpose	Cost per Year
Butterfly monitoring Panel	yearly	5 X 1 day	5		4 sites; rotate from year to year; 50 m radius		Population trend (samples 0.2% of the site for the total of 24 points)	\$7,650
<i>Long-term Habitat Monitoring</i>								
Habitat monitoring macrosite	Year 1 of dedication of preserve, as needed based on changes in land use or population of quino; assume every 5 years	1		GIS exercise	1	Upon dedication to County	Distance to nearest occupied macrosite located off site; average elevation; topographic diversity; average climate; slope; aspect; distance to roads; distance to the development; time elapsed since fire.	\$725 / 5 = \$145
Habitat monitoring microsite	Year 1 of dedication of preserve then every 4 years	1		50 m point intercept transects; possibly a couple quadrats (0.5 m <sup>2</sup> )	5 locations	Upon dedication to County	Structure and composition of the plant community; presence and density of larval host plants, nectar plants; amount of bare ground; presence of cryptobiotic soil crusts	\$6,000 / 4 = \$1,500

## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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**Table 5**  
**Quino Checkerspot Butterfly Monitoring and Management Cost Estimate**

Task	Frequency	Number of Visits	Number of Days to Cover	Method	Acreage	When	Purpose	Cost per Year
<i>Actions based on triggers</i>								
Adaptive management	Yearly as needed	--	--	Dethatch, herbicide treatment, mowing and seeding as determined based on monitoring	1,076.5 (965.1) acres of Quino checkerspot habitat.	As indicated by monitoring	Restoration to address declines in population; if no declines then just low level restoration to improve the habitat each year.	\$6,600–\$8,400 per acre

## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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## Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village

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## **Quino Checkerspot Butterfly Management/Enhancement Plan for the Otay Ranch Resort Village**

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