
CHAPTER 4 DRAFT SOUTHERN SUBREGION PLANNING GUIDELINES

SECTION 4.1 INTRODUCTION

4.1.1 Purpose of the Guidelines

The Draft Southern Subregion Planning Guidelines (Draft Southern Planning Guidelines) are intended to provide an objective and common set of planning considerations and recommendations for use by the resource and regulatory agencies and the program participants in selecting and evaluating reserve program, restoration and management alternatives for the Southern NCCP/MSAA/HCP. The Draft Southern Planning Guidelines were prepared by the NCCP/SAMP Working Group. These guidelines represent a synthesis of the following source materials:

- The NCCP Conservation Guidelines, including the seven Tenets of Reserve Design, prepared by the SRP appointed by the CDFG (1993);
- The Principles of Reserve Design and Adaptive Management Principles for the Southern Subregion prepared by the Science Advisors convened by The Nature Conservancy to assist in the preparation of the Southern NCCP (1998); and
- Southern Subregion databases.

Using the broader NCCP Tenets as a framework and starting point, the Draft Southern Planning Guidelines provide guidance for decision-makers that is keyed to local biologic, hydrologic, and geomorphic conditions. The Draft Southern Planning Guidelines address resources at both the landscape and more detailed hydrologic/geomorphic sub-basin levels. For each sub-basin planning unit, the Draft Southern Planning Guidelines identify the important biological resources and key hydrologic/geomorphic processes. Protection recommendations also are included, providing an objective and common set of planning considerations and recommendations for use in selecting and evaluating Habitat Reserve design, restoration and adaptive management alternatives.

The Draft Southern Planning Guidelines also reflect other non-biological objectives in keeping with the purpose and need of the NCCP/MSAA/HCP to provide a subregional approach to protecting “Covered Species” and their habitats while allowing for compatible economic uses. Accordingly, application of the planning recommendations is consistent with the Science Advisors recognition that the NCCP “reserve design principles are not absolutes and . . . that it may be impractical or unrealistic to expect that every design principle will be completely fulfilled throughout the subregion” (Science Advisors 1998).

4.1.2 Relationship of Draft Southern Planning Guidelines to Other Planning Program Criteria

The participants in the SAMP process have also developed tenets and principles for the identification and evaluation of alternatives. The USACE in collaboration with CDFG set forth eight SAMP Tenets characterized as overall program goals intended to facilitate the identification of alternatives that meet the project purpose and need. As part of the NCCP/SAMP Working Group the participants also jointly collaborated on the Draft Watershed Planning Principles (see *Chapter 5* of this document). The Draft Watershed Planning Principles are intended to function in a similar manner as the NCCP Science Advisors reserve design principles. Reserve Design Tenet 7 was added by the Science Advisors in recognition of the role that hydrologic and sediment processes play in shaping the landscapes of the planning area. This tenet helps to integrate the NCCP/MSAA/HCP and SAMP processes and serves as a link between the Draft Southern Planning Guidelines and Draft Watershed Planning Principles.

The Draft Watershed Planning Principles (*Chapter 5*) and the Draft Southern Planning Guidelines described in this chapter are applied at the sub-basin scale as a response to the distinct characteristics (geomorphic, hydrologic and biologic) of each of the sub-basins. Both the Draft Watershed Planning Principles and the Draft Southern Planning Guidelines use the same sub-basin units/boundaries as the basis for addressing site-specific resource protection and management. This facilitates, and makes more effective, a comparison of the effects of the proposed respective guidelines/principles for both the NCCP/MSAA/HCP and SAMP programs. It is important to understand that the Draft Southern Planning Guidelines and Draft Watershed Planning Principles will not always treat the same biologic and hydrologic resources in the same manner. Use of common sub-basin planning units enables program participants and the public to identify and address those instances where the different approaches and priorities inherent in the NCCP/MSAA/HCP and SAMP programs create the need for reconciliation of differing protection and management recommendations.

4.1.3 Format of Chapter

Section 4.1 provides an introduction to the Draft Southern Planning Guidelines.

Section 4.2 contains materials intended to provide basic planning principles that can be used throughout the planning area and species information for listed and other selected species in the planning area, as follows:

Section 4.2.1 contains the NCCP Tenets outlined in the 1993 Conservation Guidelines.

Section 4.2.2 sets forth the Science Advisors translation of the NCCP Tenets to Subregional Design Principles.

- Section 4.3* sets forth general policies for resource protection, management and restoration that apply at the planning (landscape) area scale. These general policies also address:
- The protection and maintenance of wildlife movement corridors and habitat linkages;
 - Creation and management of urban/wildland interface areas;
 - Fuel management; and
 - Grazing management.
- Section 4.4* incorporates by reference *Appendix E* which contains Species Accounts and descriptions of key physical habitat components of listed and other selected planning species in the planning area.
- Section 4.5* identifies and discusses resource planning considerations at the sub-basin scale. This section reflects the need to identify key planning principles that both reflect and address the distinctive characteristics of each of the sub-basins. Each sub-basin description and analysis includes:
- A summary of the Existing Conditions and Biological Resources that represent important planning consideration in the sub-basin.
 - A summary of Planning Recommendations for the sub-basin. Planning Recommendations are broken down into three categories: Protection, Management and Restoration.
- Section 4.6* reviews in more detail the restoration and management recommendations for each sub-basin and explains how these recommendations could contribute to an overall Habitat Reserve design and future Adaptive Management Program (AMP) element of the overall Habitat Reserve Management Program (HRMP).

4.1.4 Relationship to Species Occurring Downstream and Outside the Planning Area in the San Mateo Creek Watershed

In addition to the listed and other selected planning species and the hydrologic/sediment resources that occur within the Southern Subregion planning area, other listed species and hydrologic resources of significance occur downstream of the planning area within the Orange County portions of the San Mateo Creek Watershed. Potential downstream impacts and mitigation measures will be addressed in the CEQA/NEPA documents for the NCCP/ MSAA/HCP and SAMP. From an NCCP/MSAA/HCP perspective, potential downstream impacts will be considered in terms of species needs, terrains, hydrology and water quality. This consideration will include information regarding watershed processes and species needs gained in formulating the Draft Southern Planning Guidelines.

SECTION 4.2 PLANNING AREA TENETS AND PRINCIPLES

4.2.1 NCCP Tenets of Reserve Design

Seven basic Tenets of Reserve Design were outlined in the NCCP Conservation Guidelines prepared by CDFG (November 1993). These tenets were elaborated upon in the Coastal/Central NCCP/MSAA/HCP and repeated here for planning purposes:

1. **Conserve target species throughout the planning area:** Species that are well distributed across their native ranges are less susceptible to extinction than are species confined to small portions of their ranges.

Reserves should represent the full range of physiographic conditions which support the three NCCP target species (coastal California gnatcatcher, coastal cactus wren and orange-throated whiptail), such as the immediate coastal terrace/frontal slopes along with more inland areas, lower along with higher elevations, and different vegetation assemblages.

2. **Larger reserves are better:** Large blocks of habitat containing large populations of the target species are superior to small blocks of habitat containing small populations.

Reserve units should include the largest practical numbers of target species, thereby minimizing the instabilities inherent in smaller populations. This objective must be balanced against the need to identify reserve boundaries which are manageable and viable in the long term.

3. **Keep reserve areas close:** Blocks of habitat that are close to one another are better than blocks of habitat far apart.

The distance between blocks of habitat should be well within the distance that can be traveled by dispersing individuals of the target species, particularly the two target birds. Because available data indicate that dispersal distances of less than a mile are usual and less than two miles are common, blocks of habitat which support target species should be no more than one or two miles apart wherever practical. The presence and type of linkages affect this objective.

Linkages which require animals to cross “gaps” should ideally consist of narrow gaps with broad “landing zones” on either side. Organisms which “jump” from one are thus much more likely to successfully land on the other side of the linkage. Gaps at the ends of long narrow fingers of habitat pointing toward each other are less likely to be successfully transited, and are less desirable.

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4. **Keep habitat contiguous:** Habitat that occurs in less fragmented, continuous blocks is preferable to habitat that is fragmented or isolated by urban lands.

To the degree possible, reserve blocks of core habitat should be on the order of 1,000 or more acres. In this community and setting, reserve habitat blocks in the 100 or more acre range may require special management efforts to remain viable, and reserve habitats in the 10-acre range will often not be viable in the long run. (Note that these numerical targets should be interpreted according to the specifics of habitat blocks: for example, a well-connected and nearly round block in the high 100's of acres may function better in the reserve than a long and narrow "dead end" block in the low thousands of acres, and an archipelago of smaller blocks may remain viable under some circumstances). This objective applies to the blocks of habitat making up the core of the reserve, but it may sometimes be necessary and desirable to include small blocks of habitat at strategic locations for habitat linkages.

5. **Link reserves with corridors:** Interconnected blocks of habitat serve conservation purposes better than isolated blocks of habitat.

Linkages allow for genetic exchange, re-colonization of habitat following perturbations, and operation of the "rescue effect" for small populations. Linkages within subareas are more important in terms of the latter two functions, while linkages between subregions are more important for genetic exchange. A linkage functions if enough animals transit the linkage often enough for these functions to occur; and a linkage does not have to allow completely unimpeded movement of individual organisms to function. The important individuals are those which are actively dispersing, most often juveniles.

Corridors which are large enough to include habitat sufficient for several home ranges (*i.e.*, "live-in" habitat) may not require an organism to successfully transit the entire linkage when dispersing, and thus are more likely to allow flow of individuals between populations. For this reason, they are preferable to smaller corridors. Similarly, they may be somewhat longer than the distance most individual organisms disperse. These habitat linkages, which represent linear patches of native habitat connecting large blocks, may function as both corridor (for larger animals) and habitat (for smaller, less fragile species).

Corridors function best when they contain native vegetation (*e.g.*, coastal scrub, chaparral, riparian) or non-native vegetation readily crossed by target species (*e.g.*, annual grassland, ruderal vegetation dominated by mustard). Non-habitat linkages function best when the land cover within them physically resembles the habitat preferred by target species. Culverts, agricultural fields, golf courses, and other non-native

landscape features that lack barriers to dispersal may function as corridors, especially for important non-target species such as coyote.

Linkages are more likely to function if individual animals can see (or otherwise sense) suitable habitat within or beyond the corridor. Linkages which cross canyons or road cuts (where elevation allows animals to see across) are thus preferable to corridors obscured by topography, development, and/or ornamental vegetation.

Multiple, or redundant corridors are preferable where linkages are longer than normal dispersal distances, include gaps which much be “jumped,” include visual barriers, and/or include significant non-habitat components (*e.g.*, golf course, fuel modification zones).

6. **Reserves should be biologically diverse:** Blocks of habitat should contain a diverse representation of physical and environmental conditions.

The reserves should include other vegetation communities that may occur in a mosaic pattern with coastal sage scrub and contribute to the long-term protection and management of the coastal sage scrub reserve system. Reserve boundaries should be drawn to include other vegetation communities which occur within a manageable physiographic unit (*e.g.*, a canyon or ridge system) containing coastal sage scrub. Small exclusions of other vegetation communities which produce a highly interdigitated boundary or pockets of development should be avoided.

Larger areas typically support a greater species richness owing to increased habitat heterogeneity in larger patches.

7. **Protect reserves from encroachment:** Blocks of habitat that are roadless or otherwise are inaccessible to human disturbance better serve target species than accessible habitat blocks.

In the Southern Subregion, the greatest potential for encroachment is from urban edges surrounding reserve lands. Encroachment by non-native species (*e.g.*, non-native grasses and exotic weeds) may reduce the habitat quality and value of reserve lands and thereby lower their carrying capacity. Edges are also the most likely ignition points for wildfire. For these reasons, the reserve boundary should minimize perimeter to area (P/A) ratio and avoid highly interdigitated configurations. (A circle has the smallest P/A ratio.)

The above objective must be balanced against needs for firebreaks or other features to inhibit large-scale spread of ecological catastrophes and infrastructure/access for reserve management and passive recreation uses.

4.2.2 Science Advisors Translation of Tenets to Subregional Reserve Design Principles

The NCCP Science Advisors elaborated upon the general NCCP Tenets of Reserve Design set forth in *Section 4.2.1* with a series of reserve design principles and recommendations developed specifically for the Southern Subregion. For ease of use, these principles and recommendations are summarized in this section, and are set forth in their entirety in *Appendix B*:

- Potential reserve sites should be prioritized based on the presence or potential presence of species or other ecological phenomena in the following five categories:
 1. Legally protected species;
 2. Rare plant or habitat associations;
 3. Upper trophic level or generalist species;
 4. Locally rare species; and
 5. Species indicative of select habitat types.
- Reserves should capture the environmental gradient, both within and among habitat types. This includes the elevation gradient, the coast/inland gradient, and variability among soils, vegetation and habitat types.
- Reserve design should seek, in order of priority:
 1. Continuity within habitat;
 2. Connectedness; and
 3. Proximity.
- Reserve design should strive to maintain the contiguity of large intact habitat blocks and not fragment them internally.
- Reserve design should attempt to minimize physical and visual barriers between reserves, particularly those reserves that are close together.
- Development around reserves should be directed to existing disturbed areas everywhere possible and away from native communities.
- Linkages should follow landscape features and respond to patterns of dispersal exhibited by species considered in reserve design. These linkages should be designed to serve the widest array of species by providing characteristics required for dispersal by the most wide-ranging organisms (mountain lion, bobcat, coyote, red-diamond rattlesnake).

The Science Advisors also specifically identified important vegetation communities and specific uplands and riparian areas within the subregion.

- Several important grassland areas occur within the subregion. They are valuable for a variety of vertebrate species of concern, including badger, burrowing owl, spadefoot toad

and horned lark. Also the ecotone between coastal sage scrub and grassland is important for California gnatcatchers. Important grassland areas are Gobernadora, Chiquita, upper Gabino, and Cristianitos.

- Reserve selection should favor increasing open space and *de facto* permanent natural areas, or reserves should be in close proximity to those areas. They include:
 - Donna O’Neill Land Conservancy at Rancho Mission Viejo;
 - Caspers Wilderness Park;
 - O’Neill Regional Park;
 - Open Space in Upper Trabuco;
 - General Thomas F. Riley Wilderness Park (Wagon Wheel Park);
 - Camp Pendleton; and
 - Cleveland National Forest.
- Ridgetop connectivity between Canada Gobernadora and Bell Canyon is important.
- Several key riparian systems occur within the subregion, including along San Juan Creek, Trabuco Creek, and the San Mateo Creek drainage (Gabino and Cristianitos creeks). Maintaining the integrity of these systems is important for a wide variety of species.
- Several canyons are important for nesting raptors, including Gabino, La Paz, Cristianitos and Talega canyons.
- Maintaining the integrity of riparian systems (including major stream courses and their tributaries) is very important for both vertebrates and invertebrates in:
 - San Mateo Drainage (Cristianitos and Gabino creeks);
 - San Juan Creek;
 - Trabuco Creek; and
 - Gobernadora Creek.

To address the importance of hydrologic and erosion process, the Science Advisors combined two previous tenets and added this seventh tenet to ensure that reserve design planning would account for the hydrologic and erosion processes that shape the landscapes of the planning area:

- The reserve system should protect intact hydrologic and erosion processes, including both normal function and extreme events (flooding, earthflow). Reserve design should protect to the maximum extent possible the hydrology and erosion regimes of riparian systems, especially in Cristianitos, San Juan and Trabuco drainages.
- This tenet is more fully addressed in the Draft Watershed Planning Principles (see *Chapter 5*).

SECTION 4.3 GENERAL POLICIES FOR PROTECTING, MANAGING AND RESTORING HABITAT THAT SUPPORTS SELECTED SPECIES

The goal of the Southern NCCP/MSAA/HCP is to fashion a habitat conservation planning and implementation program that addresses coastal sage scrub and other natural vegetation communities on an ecosystem basis at a subregional level, pursuant to the State of California NCCP coastal sage scrub program and within the framework of the 1993 NCCP Conservation Guidelines. According to the NCCP Conservation Guidelines:

. . .subregional NCCPs will designate a system of interconnected reserves designed to: 1) promote biodiversity, 2) provide for high likelihoods for persistence of target species in the subregion, and 3) provide for no net loss of habitat value from the present, taking into account management and enhancement. No net loss of habitat value means no net reduction in the ability of the subregion to maintain viable populations of target species over the long-term.

To achieve the above goals, the NCCP Conservation Guidelines set forth seven tenets of reserve design previously discussed in *Section 4.2.1*.

As discussed in *Chapter 2* of this document, alternative “Habitat Reserve designs” have been formulated to achieve the goals and objectives of the state and federal ESAs. Four planning elements comprise a typical “Conservation Strategy” and serve as programmatic vehicles for carrying out the statewide NCCP Tenets of Reserve Design at the subregional level:

- ***Creation of a Permanent Subregional Habitat Reserve:*** This programmatic element focuses on the creation of a subregional Habitat Reserve capable of protecting and maintaining populations of planning species over the long term, including land areas necessary for the dispersal of planning species and the ability to maintain genetic flow within and between areas. The Habitat Reserve includes current public lands and lands identified for future dedication/acquisition. The Habitat Reserve is intended to relate functionally to federal lands such as the Cleveland National Forest and the San Mateo Wilderness.
- ***Regulatory Coverage for Covered Species:*** Species intended to be protected and managed by creating the Habitat Reserve and implementing the HRMP are designated as Covered Species. The extent of any authorized impacts on Covered Species is set forth in *Chapter 13* and the IA.
- ***Habitat Reserve Management Program (HRMP):*** As discussed in *Chapter 7*, the HRMP) element provides for two kinds of management of Habitat Reserve lands. The first management approach involves the continuation of pre-existing habitat management measures on specified County-owned parklands within the future Habitat Reserve,

termed Ongoing Management Programs (OMP) (see *Appendix F*). On existing parklands, stressors affecting species and vegetation communities are limited because no new residential, commercial or active recreation development is being proposed and no regulatory coverage is being requested. The second management approach involves the implementation of an Adaptive Management Program (AMP) on privately- and County-owned future Habitat Reserve lands located adjacent to areas where Participating Landowners are requesting regulatory coverage for Covered Species. For such Habitat Reserve lands, the Habitat Reserve AMP focuses on the creation of the technical and institutional capability for undertaking management actions necessary or helpful to sustain populations over the long term to respond to stressors related to development with impacts sufficient to require regulatory coverage. On these latter lands, management actions that respond to new information and changing vegetation conditions will be implemented as part of the “stressor-based” AMP. If appropriate, the AMP also may specify “interim management” measures on lands identified for future inclusion in the Habitat Reserve as dedications and/or acquisitions.

- **Implementation Agreement and Funding:** The Implementation Agreement (IA) identifies the rights and obligations of all signatory parties to the approved NCCP/MSAA/HCP and provides for funding mechanisms adequate to assure the implementation of the NCCP/MSAA/HCP consistent with the terms of the approved IA and FESA, CESA and the NCCP Act. The IA provides for any mutual assurances required for the long-term implementation of the NCCP/MSAA/HCP.

The combination of a properly formulated Habitat Reserve and a comprehensive HRMP will allow the NCCP/MSAA/HCP program to maintain *net habitat value* on a *long-term basis* for species ultimately receiving regulatory coverage under the program. As broadly defined in the 1993 NCCP Conservation Guidelines, “no net loss of habitat value means no net reduction in the ability of the subregion to maintain viable populations of target species over the long-term.” (Conservation Guidelines, page 9). Specifically defined, *net habitat value* takes into account habitat gains and losses due to a particular activity, such as reductions in habitat area (impact) and increases in habitat quality (mitigation through restoration and management). The Habitat Reserve and AMP component of the HRMP will allow for the mitigation of impacts such that the *net habitat value* of the subregion for Covered Species will be maintained on a long-term basis.

The following general policies address the first two planning elements of the Conservation Strategy for the Southern NCCP/MSAA/HCP – creation of a Habitat Reserve and assurances of connectivity. Included are policies concerning the urban/wildland interface, fuel management areas, and grazing management designed to be applied throughout the planning area such that the goals of the NCCP/MSAA/HCP will be met. This planning area guidance is intended to be supplemented by the more specific sub-basin recommendations and policies set forth in *Section 4.5* that are designed to guide protection, management and restoration of vegetation

communities and species at the sub-basin scale. With the exception of habitat linkage/corridor recommendations, policies within these topical areas are not generally addressed at the sub-basin scale.

The AMP element of the HRMP component is described in *Chapter 7*.

a. GENERAL POLICY 1: Maintain net habitat value over the long term, site and design new development to conserve and manage major habitat types and major and important populations in key locations through the following policies

- Create a Habitat Reserve that includes all *major vegetation communities* currently existing within the planning area in a manner that conserves blocks of habitat that constitute a diverse representation of the existing range of physical and environmental conditions within the subregion. *Major vegetation communities* are the generalized natural vegetation communities and include coastal sage scrub, chaparral, grassland, alkali meadow, riparian, streamcourses, woodland, forest, lakes and reservoirs, freshwater marsh, vernal pools, and rock & cliff.
- Create a Habitat Reserve that protects habitat supporting listed and selected planning species (see discussion in General Policy 2).
- Create a Habitat Reserve that can be managed by Reserve Owner/Managers, with overall coordination by an Administrative Coordinator, as recommended by the State’s NCCP Conservation Guidelines and the NCCP Science Advisors (see *Chapter 10* for description of the Administrative Coordinators).

b. GENERAL POLICY 2: Identify habitat areas necessary for the conservation and management of NCCP/MSAA/HCP “planning species.” Species ultimately selected as Covered Species shall be designated based on the extent to which the Habitat Reserve provides for the conservation and management of the species consistent with applicable regulatory requirements.

Because the NCCP/MSAA/HCP addresses a broad range of vegetation communities, the suite of “planning species” has been expanded from the original suite of three NCCP target species: coastal California gnatcatcher, coastal cactus wren and orange-throated whiptail. These planning species, which include both listed and unlisted species, serve as the conservation planning surrogates for identifying habitat areas that should be considered for inclusion in the Habitat Reserve. The planning species selected for the Southern NCCP/MSAA/HCP are the California gnatcatcher, least Bell’s vireo, southwestern willow flycatcher, arroyo toad, Riverside fairy

shrimp, San Diego fairy shrimp, thread-leaved brodiaea, cactus wren, tricolored blackbird, yellow-breasted chat, yellow warbler, grasshopper sparrow, white tailed kite, Cooper's hawk, merlin (foraging areas), western spadefoot toad, southwestern pond turtle, San Diego horned lizard, orange-throated whiptail, golden eagle, mountain lion, mule deer, and all California Native Plant Society (CNPS) List 1B and List 2 sensitive species known from the planning area, including many-stemmed dudleya, intermediate mariposa lily, southern tarplant, Coulter's saltbush, chaparral beargrass, Salt Spring checkerbloom, and mud nama.¹ In addition, all historic raptor nest sites will be considered in the reserve design process.

In order to prepare and implement sub-basin guidelines for NCCP/MSAA/HCP planning species, it is necessary to gain an understanding of each of the species' regional and subregional distribution, specific habitat affinities (including edaphic requirements) and the life history characteristic of each species. In this context, the following issues need to be addressed:

- The species' regional and subregional distribution;
- The relative importance of the Southern Subregion for the continued survival or recovery of the species;
- Key and important habitat characteristics of the species;
- Key and important life history characteristics (e.g., plant pollinators, dispersal, response to fire); and
- Response to management (including enhancement and restoration).

With the above information, *major populations* and *important populations* of the planning species are identified. *Major populations* are those considered sufficiently large to be self-sustaining with a minimum of active or intensive management intervention or that at least support enough breeding individuals to contribute reliably to the overall metapopulation stability of the species. *Important populations* may not meet the relative size standards of *major populations*, but may nonetheless be important to the species' long-term survival. For example, a smaller population in a key habitat linkage may be important for breeding success and exchange of genetic material and thus would be considered to be an *important population*, even though it would not be considered a *major population*.

¹ Intermediate mariposa lily (*Calochortus weedii* var. *intermedius*) was originally included as a planning species because it is a CNPS List 1B special status species. Since the time it was identified as a planning species, new field information has raised some taxonomic issues regarding the distribution of intermediate mariposa lily in relation to the common Weed's mariposa lily (*C. w. weedii*) and potential areas of intergrade and hybridization. Analyses of the two varieties of *C. weedii* by GLA (unpublished data) indicate that they intergrade and hybridize in the planning area on a north-south gradient, with a stronger influence of *C. weedii* var. *intermedius* in the foothill and coastal areas in the north and west portions of the planning area and a stronger influence of *C. w. var. weedii* to the south and east towards Camp Pendleton and the CNF. Areas of hybridization generally occur in four main areas: Chiquita Canyon/Chiquadora Ridge, Gobernadora east of the creek/northern Central San Juan Creek, Cristianitos Canyon/southern Trampas Canyon, and La Paz Canyon. Because of this taxonomic uncertainty, regulatory coverage for intermediate mariposa lily is not being sought at this time. However, in this *Chapter 4* it is retained in the discussion as a planning species. If the taxonomic issues are resolved regulatory coverage may be sought in the future.

To facilitate reserve design, *key locations* are defined for some planning species. For planning purposes, *key locations* are those locations that are deemed necessary for the conservation of the species in the subregion. For example, populations of a species that are concentrated in a single or few locations would be *key locations*. *Key locations* may not be identifiable for some species that are widely scattered and lack population concentrations. *Major populations*, or some portion thereof, may be *key locations*, but not all *major populations*, or portions thereof, are necessarily *key locations*. With respect to *important populations*, most *important populations* would also be in *key locations*. An *important population* may not be a *key location* where, for example, more than one *important population* can fulfill a desired reserve design and species sustainability function (e.g., connectivity). The identification of a *key location* within a *major* or *important population* defines that portion of the population that is necessary for conservation of the species in the subregion. Portions of *major* or *important populations* that are not identified as *key locations* may be impacted consistent with the conservation of the species within the subregion.

With regard to federally-listed species and other species ultimately designated as Covered Species in the final Southern NCCP/MSAA/HCP, a main purpose of the final Conservation Strategy is to provide for the protection of those physical and biological features essential to the conservation of Covered Species in a manner consistent with the definitions set forth in FESA Section 3(5)(A)(i) and (ii). As indicated above, the Draft Southern Planning Guidelines have been formulated to identify *key locations* for listed and other species that are deemed necessary for the conservation of the species in the Subregion. These *key location* determinations, as well as specific connectivity, management and restoration recommendations, are provided for each planning area sub-basin, as well as for the overall planning area. In relation to FESA critical habitat considerations, the Southern NCCP/MSAA/HCP thus provides the opportunity for a more focused analysis of species protection needs, including a more detailed analysis of special management considerations and habitat protection, consistent with FESA Section 3(5)(A)(i), than that which can be undertaken on a species-wide critical habitat designation (see discussion in footnote one below).²

Accordingly, the EIR/EIS for the Southern NCCP/MSAA/HCP will evaluate the extent to which the proposed Conservation Strategy (including Habitat Reserve Alternatives) will provide protection for occupied habitat of the gnatcatcher on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection; and unoccupied habitat that is essential for the conservation of the

² The USFWS stated that "The HCP development process provides an opportunity for more intensive data collection and analyses regarding the use of particular habitat areas by the gnatcatcher. The process also enables us to conduct detailed evaluations of the importance of such lands to the long-term survival of the species in the context of constructing a biologically configured system of interlinked habitat blocks. We will provide technical assistance and work closely with applicants throughout the development of future HCPs to identify lands essential for the long-term conservation of the gnatcatcher and appropriate management for those lands. By definition, if the gnatcatcher is a covered species under future HCPs, the plans should provide for the long-term conservation of the species." (Federal Register Vol. 65, No. 206, 10/24/00, 63693)

species, consistent with FESA Section 3(5)(A)(i) and (ii). To the extent the recommended final Conservation Strategy differs from the existing and proposed critical habitat designation for the gnatcatcher, USFWS will consider all available information, including information from the final EIR/EIS, in developing the final rule for designating critical habitat for coastal California gnatcatcher. For all other federally listed species found in the Subregion and other Covered Species for which Species Accounts have been finalized pursuant to this NCCP/MSAA/HCP, the EIR/EIS for the Southern NCCP/MSAA/HCP will evaluate the extent to which the proposed Conservation Strategy (including Habitat Reserve Alternatives) will provide protection for occupied habitat of the species on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection; and unoccupied habitat that is essential for the conservation of the species, consistent with FESA Section 3(5)(A)(i) and (ii).

The subregional guidelines set forth in *Section 4.5* should reflect an overall planning area assessment for each of the planning species using the above criteria. The geographic application of the subregional guidelines should result in a preliminary reserve design alternative. In turn, the preliminary reserve design should be reviewed from the perspective of the NCCP tenets of reserve design and overall program purposes. The planning area habitats required for the protection of planning species serve as the primary indicator of habitats to be considered for inclusion in the Habitat Reserve. The needs of other species considered to be “sensitive species” pursuant to CEQA that are not planning species will be reviewed in conjunction with the reserve design process.

Once a preliminary proposed Habitat Reserve design is identified and a proposed long-term HRMP has been formulated, species proposed for regulatory coverage will be designated as proposed Covered Species. The basis for regulatory coverage for each Covered Species will be derived from applicable state and federal regulatory requirements.

c. GENERAL POLICY 3: Assure wildlife and habitat connectivity within the subregion and to other subregions. Site and design new development to assure wildlife and habitat connectivity between major and important populations in key locations, within the subregion and between those populations and major populations in other contiguous subregions

Habitat linkages and wildlife corridors were discussed in *Chapter 3* in *Section 3.5*. This discussion is restated here because of its importance in reserve design and evaluation. The planning area is partially urbanized and partially open space. In urbanized areas, there are varying opportunities for wildlife movement, ranging from highly constrained settings such as Mission Viejo where wildlife movement may be restricted to a man-made culvert, to more expansive areas, such as the Arroyo Trabuco, that afford “live-in” habitat (sometimes also called

“survival” habitat) for some species while conveying movement between surrounding development for a broader suite of species. Areas presently in open space generally facilitate wildlife movement in multiple directions and provide “live-in” habitat for many species, but can show constrained movement (*e.g.*, along narrow vectors) where the open space is contiguous with already urbanized areas. The identification of the most important wildlife movement corridors and habitat linkages, as defined below, which will continue to support effective movement in a future environment that supports development depends on animal behavior, habitat affinities and local geography.

For broad wildlife movement areas that presently allow for unconstrained movement, future development scenarios will restrict movement patterns to some extent. To weigh the merits of alternative development configurations/reserve designs, there is a need to preliminarily identify wildlife movement opportunities that are likely important to retain for ecosystem function. Identification of the areas most important for retaining effective wildlife movement in a future environment with development requires consideration of available wildlife movement data, existing species distributions, habitat affinities, animal behavior and local geography. To provide guidance for the planning process, these factors were considered to identify the areas discussed below that are considered important for maintaining wildlife movement functions under any reserve alternative.

To the extent feasible, important broad wildlife movement areas will be retained in the Habitat Reserve. Where conservation of an entire wildlife movement area within the Habitat Reserve is not feasible, a reduced or more constrained habitat linkage or wildlife corridor would still be conserved and managed. In addition, the function of habitat linkages will be conserved and managed to facilitate wildlife movement in multiple directions. The linkages will be managed to provide “live-in” habitat for a variety of species such that the overall function of the wildlife movement area is maintained.

In order to provide guidance for the planning process, important areas for maintaining wildlife movement functions under any reserve designs were described in *Chapter 3, Section 3.5*. For purposes of General Policy 3, a distinction is drawn between habitat linkages and wildlife corridors:

- ***Habitat linkages:*** Following Soule and Terborgh’s (1999) use of the term “landscape linkage,” habitat linkages are areas of natural vegetation that function to join two larger blocks of habitat. They serve as connections between habitat blocks and help reduce the adverse effects of habitat fragmentation by providing a potential route for gene flow and long-term dispersal. Habitat linkages may serve both as “live-in” habitat and avenues of gene flow for small animals such as reptiles, amphibians, and rodents. Habitat linkages also provide for the transit of larger species, but as contrasted with wildlife corridors, as

defined below, also may be “live-in” habitat for larger species (*i.e.*, support breeding sites, frequent use areas, etc.). Habitat linkages also may be represented by continuous habitat or by closely spaced habitat “islands” that function as stepping stones for dispersal and movement (especially for birds and flying insects).

- **Wildlife corridors:** As defined here, wildlife corridors tend to be linear features that connect large blocks of habitat and provide avenues for frequent movement, dispersal or migration of larger animals. Because of their more narrow configuration, wildlife corridors generally serve a more limited function than habitat linkages and primarily are used for transit of larger species rather than as live-in habitat for a broader suite of species. Wildlife corridors may also contain “choke-points” (*e.g.*, hourglass or funnel shapes) or man-made structures such as culverts and flood control channels that wildlife quickly move through.

The effective width of a habitat linkage or wildlife corridor is species-specific and dependent on many factors, including but not limited to: (1) the length of the linkage or corridor in relation to width; (2) vegetative cover; (3) topography; and (4) adjacent land uses. For example, Harrison (1992) recommended that the minimum width of a linkage or corridor designed to provide “live-in” habitat be at least the diameter of the typical territory of a target species. Considering other factors, Soule and Gilpin (1991) state that “Optimum width, depends on the strength of the edge effect; so, a small, predation prone bird or mammal may require a wider corridor in relation to species territory size than a large predator or herbivore.” Consequently, there is no “one size fits all” standard width for habitat linkages or wildlife corridors.

For the purpose of Habitat Reserve design and evaluation, a width of 2,000 feet was set as a Planning goal for linkages between large habitat blocks under the assumption that a 2,000-foot wide linkage would provide more than adequate “live-habitat” for the vast majority of small avian, mammal, reptile and amphibian species in the Planning area both in terms of providing adequate habitat to accommodate territories and to accommodate some level of urban edge effects. However, because one size does not fit all, it is necessary to identify which species need “live-in” habitat in a particular linkage and which can use a linkage as “transit” habitat between “live-in” habitat areas. It is also necessary to identify the functions provided by each of the habitat linkages and corridors in terms of what species are present within or likely to use a particular linkage. In principle, sedentary species that do not disperse long distances or across unsuitable habitat landscapes will be more likely to require suitable “live-in” habitat in a linkage or corridor.

As an example, assuming a typical 10-acre circular gnatcatcher territory in southern Orange County, the typical diameter of a territory would be about 745 feet. Thus for gnatcatchers, a 2,000-foot wide linkage probably could accommodate up to two gnatcatcher territories, assuming an adequate amount of coastal sage scrub (*e.g.*, at least 20 contiguous acres), and still provide more than 250 feet on either side of the territories as buffers against edge effects. Thus, while 2,000 feet was set as the goal width for reserve design and analysis purposes, even a 1,000-foot wide linkage would provide more than adequate “live-in” habitat for the gnatcatcher. Furthermore, effective dispersal corridors for gnatcatchers are not limited to continuous “live-in” habitat as long as visually accessible “stepping stones” are available (*e.g.*, Bailey and Mock 1998), so a linkage or corridor may function for the gnatcatcher even if it does not contain adequate breeding habitat. For reserve design and analysis purposes, a conservative approach is taken and the working principle for gnatcatcher habitat connectivity is that all local populations should be directly connected by continuous open space/vegetation with opportunities for “live-in” habitat as appropriate.

As another example of the species-specific nature of effective linkages and corridors, mountain lions will use habitat linkages and wildlife corridors substantially narrower than 2,000 feet as long as suitable habitat is present and the span of the corridor is not too long in relation to its width. Beier (1995) recommended that corridors for mountain lions should be at least 328 feet (100 m) wide if the total distance spanned is less than 2,600 feet (800 m) and that widths should be greater than 1,300 feet (400 m) for spans of 3,280 feet to 22,955 feet (1 to 7 km). In this case, movement corridors do not require all the constituents of “live-in” habitat, including prey, but rather have essential features that facilitate wildlife movement, such as an absence of physical barriers, connectivity between “live-in” habitat areas, adequate vegetative and/or topographic cover (*e.g.*, canyons), and low ambient noise and human activity levels during the time when movement is most likely, *etc.* (see Ogden 1992 for a discussion of wildlife corridor characteristics).

Although much of RMV still provides unconstrained movement habitat, some existing identified habitat linkages and wildlife corridors in the Planning area are less than 2,000 feet wide; *e.g.*, the existing linkage B between Arroyo Trabuco and Chiquita Ridge north of Ladera Ranch and south of Las Flores is about 1,500 feet wide at its most narrow point. Likewise, existing linkage F around the Coto de Caza “horseshoe” is substantially less than 2,000 feet wide but has vegetation and topography features that provide “live-in” linkage habitat for both California gnatcatchers and cactus wrens. Regarding potential linkages within currently unconstrained areas on RMV, linkage D at the “Narrows” in Chiquita Canyon is substantially less than 1,000 feet wide but has vegetation and topography (*i.e.*, the narrowing of the canyon flanked by hills on the west

and east) that allow it to function as natural habitat linkage. Additionally, recent Section 7 consultations for Whispering Hills, Tonner Hills, and Saddleback Meadows (see discussion at pp. 21-22 of the Saddleback Meadows Biological Opinion involving a key habitat linkage between two NCCP subregions) reflect a wide range of latitude in applying habitat linkage criteria. Thus, existing habitat linkages and recent Section 7 consultations demonstrate the need for case-by-case analysis and indicate that the 2,000-foot dimension is to be considered a broad Planning goal rather than a design standard.

In cases where an existing or planned linkage is less than 2,000 feet wide, a more detailed analysis of the efficacy of the linkage is provided in *Chapter 13* in terms of its dimensions (length and width), available habitats, the planning species likely or unlikely to use it as “live-in” or “transit” habitat, and other features relevant to its function, such as availability of water, topography (*e.g.*, a drainage or ridgeline) and adjacent existing or planned land uses.

Identification of the linkage and corridor functions described in *Chapter 3* was based on field studies of wildlife movement in the planning area (*e.g.*, Beier and Barrett 1993; Dudek 1995; MBA 1996; Padley 1992), input from the Science Advisors and the Wildlife Agencies, and the consultant team’s review and analysis of the species, vegetation, and physiographic information for the subregion. Habitat linkages and wildlife corridors in the planning area are shown on *Figure 41-M*.

d. GENERAL POLICY 4: Roads and infrastructure should be located outside the Habitat Reserve to the maximum extent feasible. The siting and design of roads and infrastructure should provide for protection of habitat linkages and movement corridors.

- To the maximum extent feasible, roads and infrastructure should be located outside the Habitat Reserve.
- Roads that are necessary to serve approved land and water uses located inside or outside the Habitat Reserve shall be designed and sited to minimize impacts on designated Covered Species and non-covered planning species, to accommodate wildlife movement to the maximum extent feasible, and to minimize impacts to habitat and associated species. Where roads are necessary, under the approved NCCP/MSAA/HCP, they will be designed consistent with safety, roadway design criteria that are appropriate for the setting and desired roadway function. Roadway design shall include bridges and/or culverts large enough to accommodate fish and wildlife movement and, where appropriate and feasible, wildlife over crossings. In addition, bridges and culverts should maintain appropriate sediment movement for existing streams. As appropriate, fencing, grading and plant cover will be provided to serve wildlife crossings consistent with

conservation principles and the AMP element of the HRMP. Where feasible and safe, lighting along roadways within the Habitat Reserve should be avoided. Where roadway lighting within the Habitat Reserve is necessary for public safety reasons, it should be low-sodium or similar low intensity lighting that is directed away or shielded from the Habitat Reserve.

- Other infrastructure facilities (*e.g.*, pipelines, transmission lines, etc.) that are necessary to serve approved uses or regional needs also shall be sited and designed to accommodate wildlife movement and, to the extent feasible, to minimize impacts to habitats and designated Covered Species and non-covered planning species located inside and outside the Habitat Reserve. To the extent feasible, infrastructure facilities within the Habitat Reserve should be located within or immediately adjacent to existing roadways or other developed landscapes.

e. GENERAL POLICY 5: Long-term indirect impacts to the Habitat Reserve and other areas being preserved for species protection shall be managed through creation of an urban/wildlands interface zone separating the Habitat Reserve and the non-reserve/urban areas. Management within the interface zone would:

- Create fuel management zones combining irrigated and non-irrigated native plantings separating the Habitat Reserve from adjacent urban uses.
- To the extent that fuel management zones are composed of native vegetation and can support Covered Species and other species, or be enhanced or managed to support Covered Species and other species, this should be encouraged. For example, using prickly-pear in the fuel management zone may provide habitat for the cactus wren, as well as enhance the buffering effect between the Habitat Reserve and developed areas.
- Fuel management zones and practices will be set forth in a “fuel management plan” as part of the NCCP/MSAA/HCP and aquatic resources protection program.
- Prohibit plants identified by the California Exotic Pest Plant Council as an invasive risk in Southern California from development and fuel management zones adjoining the Habitat Reserve.
- Manage pesticide and herbicide use and fertilizer application techniques in landscaped areas, including golf courses, located adjacent to the Habitat Reserve or preserved wetlands and provide comprehensive water quality treatment, which may include, but not be limited to, the use of natural treatment systems, prior to discharge of urban runoff into the Habitat Reserve.

- Shield and/or direct lighting away from habitat areas through the use of low-sodium or similar intensity lights, light shields, native shrubs, berms, and other shielding methods.
- Provide barriers, fencing, signs, walls, etc. to manage and direct access by the public and domestic animals (*e.g.*, pets) to protect sensitive habitat and species.

f. GENERAL POLICY 6: Cattle grazing shall be permitted within the Rancho Mission Viejo portion of the Habitat Reserve provided that grazing activities are consistent with a “grazing management plan” approved as part of the certified NCCP/MSAA/HCP.

- The Grazing Management Plan (*Appendix G*) approved as part of the NCCP/MSAA/HCP shall identify suitable grazing areas and allowable grazing practices that are consistent with certified NCCP/MSAA/HCP policies and the aquatic resource management program. The Grazing Management Plan will address grazing practices following approval of the NCCP/MSAA/HCP and prior to transfer of lands to the Habitat Reserve.
- The Grazing Management Plan will incorporate grazing management techniques that are consistent with the needs of species and habitat identified for protection, promote perennial grasses including native grasses, allow for continued cattle grazing sufficient to support cattle operations and, where appropriate, reduce fuel loads for fire.

SECTION 4.4 SPECIES ACCOUNTS FOR LISTED AND SELECTED PLANNING SPECIES

Appendix E to this document provides detailed Species Accounts and key habitat components for listed and other selected planning species in the planning area, as identified in *Section 4.3* (General Policy 2). The planning species are intended to serve as conservation planning surrogates for identifying habitat areas that should be considered for inclusion in the Habitat Reserve.

SECTION 4.5 SUB-BASIN SCALE PLANNING CONSIDERATIONS

The Planning Considerations identified in this *Section 4.5* are intended to be used at the sub-basin scale. The Planning Considerations are separated into two sub-groups: (1) those that apply to sub-basins within the San Juan Creek Watershed; and (2) those that apply to sub-basins in the San Mateo Creek Watershed. Each sub-basin description includes:

- A summary of the Planning Considerations – Existing Conditions and Biological Resources for each sub-basin. Planning Considerations relating to soils and hydrology

should be related to the more extensive review set forth in the Draft Watershed Planning Principles.

- A summary of Planning Recommendations for each sub-basin. The Planning Recommendations are broken down into three general categories: Protection, Management and Restoration. Appropriate goals, performance standards and reporting requirements associated with management and restoration recommendations are described in detail in the Habitat Restoration Plan (*Appendix H*). Not all sub-basins have management and/or restoration recommendations.
- Maps illustrating important biological resources, including listed species and other selected planning species.
- Maps identifying areas recommended for both upland and creek restoration, revegetation, and/or enhancement.

With regard to Sub-Basin Scale Planning Considerations and Planning Recommendations for individual planning species, it is strongly recommended that the reader review the Species Accounts in *Appendix E* prior to reviewing the sub-basin Planning Considerations and Recommendations. The Species Accounts in *Appendix E* provide an overview of each planning species and provide a full set of recommendations for each species on an area-wide basis. These recommendations are carried forward into the Planning Considerations and Planning Recommendations for each sub-basin set forth in this *Section 4.5*. Accordingly, the sub-basin Planning Considerations and Planning Recommendations for each species derive from the overall Species Accounts and are presented, along with other sub-basin planning Considerations and Recommendations, to provide a complete picture of all of the planning species Considerations and Recommendations for a particular sub-basin.

Species recommendations are presented for planning purposes to assist in selecting and evaluating Habitat Reserve design alternatives and the preliminary and draft Conservation Strategies. Specific mitigation requirements for individual species, including performance standards, will be prepared in conjunction with subsequent determinations regarding those species that will be proposed for regulatory coverage upon final approval of the Southern Subregion NCCP/MSAA/HCP. Finally, it should be noted that management and restoration recommendations will continue to be amplified as further information is obtained.

4.5.1 San Juan Creek Watershed

Figures 25-R through *29-R* provide planning species maps for coastal sage scrub, riparian/aquatic resources, historic raptor nest sites, grassland, and plants, respectively, for the San Juan Creek Watershed.

a. Chiquita Canyon Sub-basin

The Chiquita Canyon sub-basin is divided into three geographic areas: upper Chiquita Canyon, defined as the portion of the sub-basin north of Oso Parkway, middle Chiquita, defined as the portion of the sub-basin south of Oso Parkway to the “Narrows” and lower Chiquita Canyon defined as the portion of the sub-basin from the “Narrows” to the sub-basin boundary south of San Juan Creek and Ortega Highway. Upper Chiquita Canyon is protected by a conservation easement. Middle and lower Chiquita Canyon would be subject to the sub-basin planning considerations and recommendations described below. To distinguish the two ridges bordering Chiquita Canyon, this document refers to the east ridge as Chiquadora Ridge and the west ridge as Chiquita Ridge. The eastern portion of Chiquadora Ridge is in the Gobernadora sub-basin.

1. Planning Considerations - Existing Conditions and Biological Resources

- Soils in the main canyon and eastern side canyons primarily are sandy. Soils on the western side are primarily silty sand. Ridges on the east side of the valley are characterized by rock outcroppings and areas of clay hardpans that are eroded remnants of claypans.
- Elevations in the sub-basin range from approximately 200 feet above mean sea level at the confluence with San Juan Creek to 1,200 feet in the north end of the sub-basin.
- The sub-basin is approximately 5.7 miles from the Pacific Coast.
- Upland vegetation communities/land covers mostly are comprised of coastal sage scrub, agriculture, patches of native and annual grassland and patches of chaparral.
- The Chiquita Canyon area north of San Juan Creek, including Chiquadora Ridge and Wagon Wheel Canyon adjacent to the Chiquita sub-basin, supports a *major population* of the California gnatcatcher, both within the Southern Subregion, and within the range of the gnatcatcher in southern California. This area, which extends from the “horseshoe” in northern Coto de Caza south to San Juan Creek, includes 404 mapped locations of the gnatcatcher and accounts for 55 percent of the mapped gnatcatcher locations in the subregion. This is the *major population* in the subregion. A substantial portion of this population is a *key location*.
- The portion of the sub-basin south of San Juan Creek supports 5-6 California gnatcatcher locations in habitat linkage K (*Figure 41-M*). This small concentration of gnatcatcher locations, which overlaps with the Trampas Canyon subunit, as described below, is an *important population* in a *key location* because it provides north-south connection for the species.
- The mainstem creek supports herbaceous riparian, southern willow scrub, arroyo willow riparian forest, and coast live oak riparian forest that support the least Bell’s vireo and

several other sensitive riparian and aquatic species, including yellow-breasted chat, yellow warbler, southwestern pond turtle (near the confluence with San Juan Creek), western spadefoot toad, and two-striped garter snake.

- The portion of San Juan Creek within the Chiquita sub-basin supports the westernmost extent of the San Juan Creek *major population* of arroyo toad (Bloom [1998; cited in Dudek 1998] mapped potential habitat to an area about 3,000 feet downstream of Antonio Parkway bridge, but toads have not been observed farther west than about the confluence with Chiquita Creek.) This extension of the San Juan Creek *major population* is not considered a *key location* for at least three reasons: **(1)** the viability of the upstream *key locations* in Upper San Juan Creek and Bell Canyon are not reliant on this small downstream population; **(2)** recent breeding has been limited to an area just downstream of Trampas Canyon supported by an artificial runoff source; and **(3)** the proliferation of giant reed in this reach of San Juan Creek is contributing to ongoing degradation of toad habitat.
- In addition to the perennial Chiquita Creek, several slope wetlands are present in lower Chiquita Canyon and the portion of the sub-basin south of San Juan Creek. These wetland features have varying conditions and support Salt Spring checkerbloom in the two southernmost slope wetland locations.
- The riparian and woodland in the mainstem creek and side canyons provides nest sites for several raptor species, including Cooper's hawk, white-tailed kite, red-shouldered hawk, great horned owl and barn owl.
- The sub-basin provides breeding and/or foraging habitat for a variety of the other sensitive wildlife species, including coastal cactus wren, ferruginous hawk, prairie falcon, merlin, northern harrier, wintering burrowing owls, loggerhead shrike, grasshopper sparrow, rufous-crowned sparrow, California horned lark, tricolored blackbird (nomadic colonies), orange-throated whiptail, coastal western whiptail, San Diego horned lizard, northern red-diamond rattlesnake, mule deer and mountain lion.
- A tricolored blackbird breeding colony has been observed on slopes south of San Juan Creek behind an RMV residence in the recent past (300+ pairs in 2001; P. Bloom, pers. comm. 2002).
- Vernal pools along Radio Tower Road south of Ortega Highway appear to be associated with localized bedrock landslides from the San Onofre and Monterey formations and support both the federally-listed Riverside fairy shrimp (vernal pool 2) and San Diego fairy shrimp (vernal pools 1 and 2), and the western spadefoot toad.
- Vernal pools (4 and 6) on Chiquita Ridge support San Diego fairy shrimp. The largest pool (4) also supports Riverside fairy shrimp and mud nama. A third vernal pool (5) was created as mitigation for Antonio Parkway and currently does not support either species of fairy shrimp.

- The state/federally-listed thread-leaved brodiaea is found in five locations on Chiquadora Ridge southeast of the wastewater treatment plant, including the eastern portion of the Chiquita sub-basin and the western portion of the Gobernadora sub-basin. The easternmost population on Chiquadora Ridge has about 2,000 flowering stalks. Together these five locations comprise a *major population*, substantial portions of which are a *key location*.
- The sub-basin, including Chiquadora Ridge, supports four general areas of many-stemmed dudleya (CNPS List 1B):
- Chiquadora Ridge supports 47 locations numbering about 8,623 individuals and comprises a *major population* in a *key location*.

Approximately 18 locations on Chiquita Ridge comprise a total of about 1,349 individuals and are an *important population* in a *key location*. This *important population* includes four locations totaling 100 to 420 individuals each.

- Lower Chiquita Canyon east of the creek and south of treatment plant supports 41 locations totaling about 6,686 individuals. This is a *major population* in a *key location*. This population was originally considered an *important population* and potential *key location*, but 2003 survey data showed a four-fold increase in the population size and this location is now considered a *major population* and *key location*.
- The ridgeline east of the “Narrows” in middle Chiquita supports four locations of dudleya, with one numbering about 370 individuals and the other three numbering from 46 to 75 individuals. Because these locations are small and isolated from other locations, these individuals are not considered an *important population*.
- The sub-basin, including Chiquadora Ridge, supports four general areas of intermediate mariposa lily (CNPS List 1B).
 - Lower Chiquita Ridge west of the creek supports three locations of intermediate mariposa lily numbering about 21, 47, and 625 individuals. Although these locations do not support large populations, together they may be considered to be an *important population* in a *key location* because Chiquita Ridge is a key landscape feature and habitat linkage in the subregion.
 - Lower Chiquita Canyon east of the creek and south of the treatment plant supports about 18 locations, with most uncounted, but one relatively large population of 660 individuals. These scattered locations, along with the location numbering 660 individuals, may be considered an *important population*. Whether

- this population is also in a *key location* depends of the long-term status of the Chiquita Ridge and Chiquadora Ridge populations.
- Middle Chiquita Canyon supports five scattered locations north of the “Narrows” and both east and west of the creek. The largest of the five locations is west of the creek and has about 260 individuals. Another location west of the creek only supports two individuals and the three locations east of the creek support four, 12, and 70 individuals. Two locations also occur north of Oso Parkway in the Upper Chiquita Conservation Easement, with one location supporting only one individual and the other supporting ten individuals. Because of the few number of locations and the small number of individuals at each site, these locations probably are not *important populations* or in *key locations*.
 - Chiquadora Ridge supports about 12 locations totaling about 1,580 individuals. These locations overlap the Chiquita and Gobernadora sub-basins and constitute a *major population* in a *key location*. The Chiquadora Ridge population is important for maintaining the landscape connection between the intermediate mariposa lily population on Chiquita Ridge and the populations in the San Mateo Watershed.
 - The sub-basin supports four general locations for southern tarplant (CNPS List 1B) totaling more than 135,000 individuals:
 - Middle Chiquita supports about 35 mapped locations ranging up to about 30,000 individuals in the largest. Estimated discrete locations numbering 7,000, 7,500, 10,000, 20,000, and 30,000 individuals, respectively, are located west of the creek. Locations east of the creek are more disparate and smaller, with the largest numbering about 750 individuals. These 35 locations comprise a *major population* and the portion of the population west of the creek is a *key location*.
 - The Tesoro High School Mitigation site in Lower Chiquita supported approximately 1,100 individual in 2000, 6,000 individuals in 2001 and 11,000 individuals in 2002 as determined during monitoring of the population. This population was introduced to the site in Fall of 1999 as mitigation for impacts to the tarplant at the High School site. This population appears to be self-sustaining and has increased for three consecutive years and should now be considered a *major population* in a *key location*
 - Further south in Lower Chiquita Canyon there is one population numbering about 400 individuals. This population is relatively small for this species, but should be considered functionally part of the Tesoro *major population*.
 - A wetland seep between the Gobernadora and Chiquita sub-basins supports a few hundred individuals during optimal years. While not large enough to be considered a major population, this population may potentially be an *important population* in a *key location*.

- The sub-basin supports five general locations of Coulter’s saltbush (CNPS List 1B):
 - Lower Chiquita Canyon west of the creek supports two locations numbering 200 and 400 individuals, respectively. These two locations are an *important population* and comprise a *key location* because of the rarity of the species in the region.
 - Middle Chiquita just above and below the “Narrows” supports numerous locations ranging from the 10s to 600 individuals. The location with 600 individuals is east and adjacent to the creek about midway between the “Narrows” and Tesoro High School. Locations with 150, 150 and 200 individuals are west of the creek. These locations overlap substantially with the largest southern tarplant population. This group of locations east and west of the creek is a *major population* in a *key location*.
 - Middle Chiquita just to the northwest of the treatment plant supports five locations, of which four are west of the creek. The locations west of the creek number 25, 50, 150 and 360 individuals and the location east of the creek has 100 individuals. These five locations constitute an *important population*. The locations west of the creek constitute a *key location*.
 - Two small locations are located in a major side canyon southeast of the Narrows. These locations number six and 10 individuals, respectively.
 - One small population of less than 20 individuals occurs with southern tarplant (noted above) at a wetland seep between the Gobernadora and Chiquita sub-basins.
- Salt Spring checkerbloom (CNPS List 1B) occurs in the two slope wetlands in lower Chiquita Canyon. These are *important populations* in *key locations* because at 1,200 and 300 individuals, respectively, they are by far the two largest of three locations known from the subregion. The third location in the Gobernadora sub-basin supported only three individuals in 2003.
- The sub-basin also supports populations of Palmer’s grapplinghook (CNPS List 4) and Catalina mariposa lily (CNPS List 4). The grapplinghook occurs in approximately 35 scattered locations (no population estimates) on Chiquadora Ridge southeast of the wastewater treatment plant and at a location supporting about 300 individuals east of the “Narrows.” The Catalina mariposa lily is more widely distributed in the sub-basin, with clusters of individuals on Chiquadora Ridge southeast of the wastewater treatment plant, on Chiquita Ridge west of the “Narrows” and on a ridgeline east of the “Narrows.”
- The sub-basin provides both north-south and east-west movement opportunities for mountain lion, mule deer, bobcat, coyote and gray fox. Coastal sage scrub along Chiquita Ridge provides north-south movement opportunities for California gnatcatchers, cactus wrens, and

other sensitive sage scrub species. A known important east-west movement route includes a wildlife corridor from Arroyo Trabuco situated between the Ladera Ranch and Las Flores developments. Based on existing landscape features, potential habitat linkages from Chiquita Ridge to Sulphur Canyon are located just north of the wastewater treatment plant and through the “Narrows” area south of Tesoro High School.

2. Planning Recommendations

(a) Protection Recommendations

- Protect the major north-south connection to Central San Juan Creek by providing a habitat linkage between Chiquita Creek and the eastern edge of the Ladera Open Space and by restricting new impervious surfaces west of Chiquita Creek in order to maintain habitat integrity between the creek and Chiquita Ridge.
- Maintain east-west biological connectivity by protecting habitat linkages and wildlife corridors between Arroyo Trabuco, Chiquita Canyon, and Gobernadora Canyon. Biological connectivity should be maintained between Chiquita, Gobernadora and Arroyo Trabuco by protecting habitat linkages at minimum of three locations within the sub-basin: **(1)** via rim-to-rim preservation of Sulphur Canyon (approximately 2,000 to 2,500 feet wide); **(2)** at the “Narrows” where the canyon is only 700-800 feet wide (approximately 3,000 feet south of Tesoro High School) and connects to Sulphur Canyon; and **(3)** in contiguous patches of coastal sage scrub through the major canyon north and east of the wastewater treatment plant.
- Protect breeding and foraging habitat for the least Bell’s vireo within Chiquita Canyon by focusing on protection of riparian vegetation in Chiquita Creek.
- Protect breeding habitat and, to the extent feasible, protect foraging habitat for raptors and other species along Chiquita Creek.
- Protect riparian vegetation in Chiquita Canyon by recognizing the influences of terrains and hydrology on the Chiquita Creek riparian system (see Watershed and Sub-basin Planning Principles).
- Protect the two vernal pools and their contributing hydrologic sources along Radio Tower Road that support the Riverside fairy shrimp, San Diego fairy shrimp and western spadefoot toad. The vernal pools located on Chiquita Ridge are within the existing protected Ladera Open Space.
- Protect slope wetlands and maintain their primary sub-surface water supply recharge characteristics and, where avoidance is infeasible, minimize and mitigate impacts.
- In conjunction with the large population of 2,000 thread-leaved brodiaea flowering stalks on Chiquadora Ridge in the Gobernadora sub-basin, protect two of the four small locations of

thread-leaved brodiaea in Chiquita Canyon. Combined with the large population on Chiquadora Ridge, protection of these *key locations* would contribute to protection of a *major population*.

- Protect the lower Chiquita Canyon *major population* and *key location* of many-stemmed dudleya, totaling more than 6,686 individuals in 41 locations. The locations in this population range from 1 to 1,330 individuals, with four locations supporting at least 500 individuals.
- Protect the Chiquita Ridge *important population* and *key location* of many-stemmed dudleya totaling about 1,349 individuals in approximately 18 discrete locations. This population includes four locations totaling 100 to 420 individuals each.
- Protect approximately six locations of intermediate mariposa lily along Chiquita Ridge together with the location south of the treatment plant that supports 660 individuals, totaling protection of about 1,600 individuals. Although these locations are scattered, together they comprise an *important population* in a *key location*
- Protect the 14 locations of intermediate mariposa lily comprising the major population on Chiquadora Ridge that overlaps the Chiquita and Gobernadora sub-basins, for a total protection of 2,000 individuals.
- Minimize impacts to the *key location* of southern tarplant west of Chiquita Creek in Middle Chiquita Canyon to the maximum extent feasible. Minimize impacts to the remainder of the *major population* in Middle Chiquita Canyon. Mitigate impacts to southern tarplant in a manner similar to the successful Tesoro mitigation project (ongoing mitigation projects in Chiquita Canyon have demonstrated over three successive years that this plant can be readily propagated from seed).
- Protect *major population* of southern tarplant in a *key location* in Lower Chiquita Canyon.
- Protect the *key locations* of Coulter's saltbush in Middle and Lower Chiquita Canyon. Minimize impacts to *important populations* within the sub-basin and mitigate unavoidable impacts in Chiquita Canyon.
- Protect the two *key locations* of Salt Spring checkerbloom in the slope wetlands in lower Chiquita Canyon.
- Protect the *important population* of the California gnatcatcher and coastal sage scrub in the portion of the sub-basin south of San Juan Creek to maintain resident and dispersal habitat for the gnatcatcher between Chiquita Ridge and San Juan Capistrano and San Clemente.
- Based on the application of the above connectivity protection recommendations and the Species Accounts recommendations, the goal is to protect at least 80 percent of the existing coastal sage scrub and gnatcatcher locations within the *major population* (including those sites within the Chiquita sub-basin and the Chiquadora Ridge portion of the Gobernadora

sub-basin). Additional conservation of gnatcatcher habitat will be achieved by implementation of the restoration recommendations described briefly in *Section 4.6* and in detail in the Habitat Restoration Plan (*Appendix H*).

(b) Management Recommendations

- Implement a cowbird trapping program to mitigate for impacts to existing habitat within the sub-basin and for potential impacts associated with future development. The cowbird trapping program will be evaluated on an annual basis and trap locations and trapping effort will be adjusted as part of the overall AMP element of the HRMP (*e.g.*, if the number of trapped cowbirds drops to a prescribed threshold, the trapping program may be terminated or otherwise modified).
- Implement a management program for protected sensitive plant locations in the sub-basin, including control of non-native invasive species, management of grazing and minimization of human access and disturbance as part of the AMP element of the HRMP. The reader is directed to the Translocation, Propagation and Management Plan for Special-status Plants (*Appendix I*), Invasive Species Control Plan (*Appendix J*), and Grazing Management Plan (*Appendix G*) for more information regarding the long-term management of sensitive plant species referred to here and for other sub-basin Management Recommendations in this *Section 4.5*.

(c) Restoration Recommendations

- Implement a coastal sage scrub (CSS)/valley needlegrass grassland (VGL) restoration program to enhance habitat connectivity and mitigate for impacts to existing vegetation associated with future development (*Figure 42-M*). The CSS/VGL restoration program is fully discussed in the Habitat Restoration Plan (*Appendix H*).
- Translocate salvaged thread-leaved brodiaea and many-stemmed dudleya to CSS/VGL restoration and enhancement areas where feasible and appropriate. Potential restoration and enhancement areas in the sub-basin include Chiquita Ridge and Chiquadora Ridge. Receiver areas should support clay soils suitable for brodiaea and many-stemmed dudleya, and should be placed in locations that maximize connectivity and genetic exchange.
- Salvage clay topsoils from development areas where feasible and appropriate and transport to restoration areas. Salvaged topsoils may be used to create additional suitable brodiaea and dudleya habitat and may contain seedbank.
- Translocate salvaged intermediate mariposa lily bulbs to areas where suitable soil conditions occur. Specific translocation areas have not been identified, but based on the

existing distribution potential general translocation areas in the sub-basin area include Chiquita Ridge and Chiquadora Ridge.

- Translocate salvaged southern tarplant and Coulter's saltbush to suitable restoration and enhancement areas in the sub-basin. Receiver areas should support alkali soils suitable for both species and should be placed in locations that maximize connectivity and genetic exchange.
- Implement restoration efforts to address localized headcuts within the sub-basin as further described in the Draft Watershed Planning Principles – Chiquita Sub-basin (*Figure 42-M*).

b. Gobernadora Canyon Sub-basin

The Gobernadora Canyon sub-basin is divided into two main geographic areas: upper Gobernadora Canyon, which includes the Coto de Caza residential development; and lower Gobernadora Canyon, which is under RMV ownership. The discussion herein is limited to lower Gobernadora Canyon within RMV ownership.

1. Planning Considerations - Existing Conditions and Biological Resources

- Soils in the valley floor of the sub-basin are characterized by deep alluvial sandy deposits with interbedded clay lenses. The hill slopes and ridges exhibit areas of exhumed hardpan overlying sandy and silty substrates (the remnants of claypans formed in the geologic past) and also include exposed rock outcrops or other areas of steep slopes.
- Elevations in the sub-basin range from approximately 260 feet above sea level at the confluence with San Juan Creek to 780 feet at the head of Sulphur Canyon west of the main valley.
- The sub-basin is approximately 6.5 miles from the Pacific Coast.
- Uplands are comprised of coastal sage scrub, chaparral, grassland, agriculture, and patches of oak woodlands. The more rugged uplands on the western side of the creek are dominated by coastal sage scrub, grassland and agriculture. The flat to rolling terrain on the east side of the creek supports a mixture of agriculture, coastal sage scrub, chaparral and oak woodlands. Sulphur Canyon, located west of the mainstem creek and below Chiquadora Ridge, is bordered by agriculture (grazing pasture and barley fields) and coastal sage scrub.
- Chiquadora Ridge west of the creek includes a part of the *major population* of the California gnatcatcher in the Chiquita Canyon area described above. The slopes east of the creek support a smaller population of the California gnatcatcher, probably due to the higher percentage of chaparral.

- Southern willow scrub in the revegetated wetland mitigation area (GERA) provides nesting habitat for least Bell's vireo, southwestern willow flycatcher, yellow-breasted chat, Cooper's hawk, red-shouldered hawk, and barn owl.
- A large colony of tricolored blackbirds periodically occurs in lower Gobernadora Canyon at the boundary on RMV property just south of the boundary with Coto de Caza. The birds nest in wetland areas within Coto de Caza just north of the RMV boundary and likely forage in the grassland and agricultural areas on RMV land.
- Other wildlife species in lower Gobernadora Canyon include white-tailed kite, long-eared owl, rufous-crowned sparrow, coast patch-nosed snake, northern red-diamond rattlesnake, western whiptail, San Diego horned lizard, Coronado skink and mule deer.
- Raptors using the grasslands and agriculture areas in the sub-basin for foraging include ferruginous hawk and merlin.
- Chiquadora Ridge within the Gobernadora sub-basin supports *major populations* of thread-leaved brodiaea (the location with 2,000 flowering stalks), many-stemmed dudleya (8,623 individuals), and intermediate mariposa lily (1,580 individuals in about 12 locations) described above for the Chiquita sub-basin.
- Central Gobernadora sub-basin east of the creek and the Central San Juan subunit north of the creek comprises a single, large population of many-stemmed dudleya supporting about 61 scattered locations ranging from 1 to 2,000 individuals. Although there is one location with 2,000 individuals, the remaining 60 locations number 225 or fewer individuals each. Combined, however, these locations total about 5,678 individuals and comprise a *major population*.
- Upper Gobernadora sub-basin supports 13 locations of many-stemmed dudleya ranging from 5 to 513 individuals, and totaling 1,622 individuals. This population is considered an *important population* in a *key location* because it contributes to the geographic diversity and potentially is connected to any populations in Caspers Wilderness Park.
- Intermediate mariposa lily occurs in the Gobernadora sub-basin east of the creek and the northern portion of the Central San Juan Creek sub-basin in more than 50 locations, with eight locations numbering more than 200 individuals and the two largest locations 775 and 1,300 individuals each. This area supports a total of about 6,600 individuals. The location supporting 1,300 individuals is the single largest population in the subregion. These locations comprise a *major population* in a *key location*.
- Portions of the Ladera Ranch Mitigation site in GERA, on the west side of the Gobernadora Creek "spur" that enters the mitigation area, supports an estimated 10,000+ individuals of southern tarplant that have colonized the mitigation area. This population is a *major population* in a *key location*.

- Other sensitive plants known from the sub-basin include Catalina mariposa lily and Palmer's grapplinghook in the uplands and paniculate tarplant (CNPS List 4) in the valley bottom. A cluster of about 27 Catalina mariposa lily locations are on Chiquadora ridge associated with the cluster in the Chiquita sub-basin southeast of the wastewater treatment plant. Only three locations of Catalina mariposa lily are located east of Gobernadora Creek. There are about 23 locations of Palmer's grapplinghook in the sub-basin, with almost all east of the creek in association with the large population of many-stemmed dudleya. The paniculate tarplant is known from the along the creek near the boundary with Coto de Caza.
- The sensitive arroyo chub is known from the mouth of Gobernadora Creek at the confluence with San Juan Creek.
- Lower Gobernadora Canyon, including Sulphur Canyon, provides an important east-west connection between Chiquita and Wagon Wheel canyons to Bell Canyon and Caspers Wilderness Park. The riparian spine along the mainstem Gobernadora Creek, combined with the adjacent uplands along Chiquadora Ridge, provide a north-south habitat connection for mountain lions and other large mammals. The uplands along Chiquadora Ridge also provide habitat and a north-south connection for California gnatcatcher, cactus wren and a variety of other birds, reptiles and small mammals.
- Historic photographs indicate that Gobernadora Creek meandered freely across the valley floor over most of the length of the valley downstream from the mouth of Wagon Wheel Canyon.
- Potentially excessive surface and groundwater originates in the upstream portion of the sub-basin. These sources of water have contributed to erosion and incision of the mainstem and downstream deposition of sediments.

2. Planning Recommendations

(a) Protection Recommendations

- Maintain a continuous upland habitat linkage along the east-facing slopes of Chiquadora Ridge between San Juan Creek and Sulphur Canyon.
- Protect Sulphur Canyon rim-to-rim to maintain a functional biological connection from Gobernadora to Gen. Thomas F. Riley Regional Park in Wagon Wheel Canyon and upper Chiquita Canyon.
- Protect a 2,000- to 2,500-foot area along the southern boundary of Coto de Caza to provide for functional east-west wildlife movement from Sulphur Canyon to Bell Canyon.

- Minimize impacts to native grasslands. Any impacts resulting from future land uses will be addressed through an overall native grasslands restoration program, described briefly in *Section 4.6* and in detail in the Habitat Restoration Plan (*Appendix J*).
- Protect the southern willow scrub in GERA that provides nesting habitat for least Bell's vireo, southwestern willow flycatcher, yellow-breasted chat, Cooper's hawk, red-shouldered hawk, and barn owl.
- Avoid and minimize impacts to oak woodlands in northern Gobernadora along the ridgelines between the Gobernadora and Bell Canyon sub-basins.
- Keep open sufficient valley bottom south of Coto de Caza and above the knickpoint to allow creek meander for floodplain connection. Refer also to the Watershed and Sub-basin Planning Principles – Gobernadora Sub-basin.
- Protect sufficient grassland in the valley bottom in the northern portion of lower Gobernadora on RMV property to support a nesting population of the tricolored blackbird. (The existing nesting ponds are located within Coto de Caza.)
- Protect the thread-leaved brodiaea *major population* in a *key location* supporting approximately 2,000 flowering stalks on Chiquadora Ridge.
- Protect the 12 locations of intermediate mariposa lily comprising the *major population* on Chiquadora Ridge that overlaps the Chiquita and Gobernadora sub-basins, for total protection of about 1,580 individuals.
- Protect the Chiquadora Ridge *major population* of many-stemmed dudleya totaling about 8,623 individuals in approximately 47 discrete locations. This population includes 21 locations totaling 100 to 750 individuals each, with eight of these locations numbering more than 500 individuals.
- Protect the upper Gobernadora *important population* and a *key location* of many-stemmed dudleya, totaling 1,622 individuals in 13 locations.
- Protect the *major population* of southern tarplant totaling 10,000+ individuals located in GERA.
- Consistent with the Species Accounts recommendations and the Planning Recommendations for the Chiquita Sub-Basin, protect at least 80 percent of the coastal sage scrub and gnatcatcher sites along the eastern slopes of Chiquadora Ridge to contribute to achieving the overall goal of protecting at least 80 percent of the major population of gnatcatchers extending from Chiquita Canyon across to Gobernadora Creek. A further goal is the maintenance of connectivity between the protected coastal sage scrub patches to allow for dispersal of gnatcatchers between patches.

(b) Management Recommendations

- Implement a cowbird trapping program to mitigate for potential impacts to native bird species associated with any proposed residential development in the sub-basin. The cowbird trapping program will be evaluated on an annual basis and trap locations and trapping effort will be adjusted as part of the AMP element of the overall HRMP (*e.g.*, if the number of trapped cowbirds drops to a prescribed threshold, the trapping program may be terminated or otherwise modified).
- Protect existing riparian vegetation downstream of the knickpoint in GERA for the least Bell's vireo, southwestern willow flycatcher and other riparian nesting bird species.
- Protect downstream habitat for the arroyo toad, least Bell's vireo, arroyo chub, and other sensitive riparian and aquatic species by maintaining hydrology, water quality and sediment delivery in San Juan Creek and minimizing additional loadings of nutrients or toxics.
- Implement a management program for protected sensitive plant locations in the sub-basin, including control of non-native invasive species, management of grazing as part of the AMP element of the HRMP, and prevention of human disturbance.

(c) Restoration Recommendations

- Implement a coastal sage scrub restoration program in Sulphur Canyon to enhance habitat connectivity and mitigate for impacts to existing vegetation associated with future development (see *Figure 42-M* and Habitat Restoration Plan, *Appendix H*).
- Translocate salvaged many-stemmed dudleya to CSS/VGL restoration and enhancement areas where feasible and appropriate. Potential restoration and enhancement areas in the sub-basin include Chiquadora Ridge. Receiver areas should support clay soils suitable for dudleya and should be placed in locations that maximize connectivity and genetic exchange.
- Salvage clay topsoils from development areas where feasible and appropriate and transport to restoration areas. Salvaged topsoils may be used to create additional suitable dudleya habitat and may contain seedbank.
- Translocate salvaged intermediate mariposa lily bulbs to areas where suitable soil conditions occur. Specific translocation areas have not been identified, but based on the existing distribution, potential general translocation areas in the sub-basin area include Chiquadora Ridge.
- Initiate an intermediate mariposa lily seed collection program in 2003 if sufficient rain falls to warrant the collection program. Receiver sites should be identified in the winter

of 2003 and a pilot planting program should be implemented to determine the effectiveness of propagation from seed.

- Implement a restoration program in Gobernadora Creek which addresses (1) the historic creek meander above the knickpoint; and (2) upstream land use induced channel incision and erosion, including potentially excessive surface and groundwater originating upstream (*Figure 42-M*).
- Identify likely causes of erosion and potential measures to rectify causes of headcutting in the lower portion of the creek.

c. Central San Juan & Trampas Canyon Sub-basin

The Central San Juan & Trampas Canyon sub-basin is divided into two main geographic areas: the Central San Juan subunit and the Trampas Canyon subunit. The Central San Juan subunit includes the reach of San Juan Creek from just south of the confluence with Bell Creek to the east and the confluence with Gobernadora Creek to the west. The Central San Juan subunit extends north from San Juan Creek approximately 1.6 miles and encompasses a large north-south trending canyon through the center of the subunit. The Trampas Canyon subunit is characterized by the silica sand mining operation that dominates the canyon and the rugged terrain between Cristianitos Canyon and San Juan Creek.

d. Central San Juan Subunit

1. Planning Considerations - Existing Conditions and Biological Resources

- Soils in the subunit generally include erodable silts and erodable clays on the uplands north of San Juan Creek and alluvial deposits in San Juan Creek.
- Elevations in the subunit range from approximately 200 feet above sea level in San Juan Creek to about 870 feet at the boundary with Caspers Wilderness Park.
- The subunit is approximately 5.5 miles from the Pacific Coast.
- Upland vegetation communities/land covers include coastal sage scrub, chaparral, oak woodlands, grassland, agriculture and disturbed areas (Colorspot Nursery).
- Approximately 13-14 California gnatcatcher locations occur in the coastal sage scrub north of the nursery.
- Gnatcatchers may use coastal sage scrub adjacent to San Juan Creek, and this vegetation probably is important for dispersal.
- Upland terraces immediately adjacent to the creek provide foraging and estivation habitat for the arroyo toad.

- Other sensitive species in uplands include cactus wren, rufous-crowned sparrow, grasshopper sparrow, San Diego desert woodrat, orange-throated whiptail, coastal western whiptail, northern red-diamond rattlesnake, San Diego ringneck snake, California glossy snake, and western skink. Sandy soils in and adjacent to San Juan Creek provide suitable habitat for the silvery legless lizard.
- A breeding colony of tricolored blackbirds has been observed in the past in San Juan Creek east of the intersection of Ortega Highway and Cristianitos Road.
- Uplands support locations of many-stemmed dudleya, intermediate mariposa lily, Catalina mariposa lily and Palmer's grapplehook. As described above, the many-stemmed dudleya and intermediate mariposa lily locations, in combination with the Gobernadora sub-basin locations, comprise *major populations* of these species.
- A small portion of the San Juan Creek *major population* of the arroyo toad occurs in central San Juan Creek extending from about 1,600 feet south of the confluence of Bell, Verdugo and San Juan creeks to about 1,000 feet east of the Antonio Parkway bridge (in the Chiquita Canyon sub-basin). Surveys in this reach have yielded persistent, but relatively small, population counts for the toad. (Note: Bloom [1998; cited in Dudek 1998] mapped potential habitat to an area about 3,000 feet downstream of Antonio Parkway bridge, but toads have not been observed farther west than about the confluence with Chiquita Creek.) This portion of the San Juan Creek *major population* is not considered a *key location* for at least three reasons: **(1)** the viability of the upstream *key locations* in Upper San Juan Creek and Bell Canyon are not reliant on this small downstream population, **(2)** recent breeding has been limited to an area just downstream of Trampas Canyon supported by an artificial runoff source; and **(3)** the proliferation of giant reed in this reach of San Juan Creek has contributed to the ongoing degradation of toad habitat.
- Riparian and aquatic resources within the creek provide breeding habitat for least Bell's vireo as well as yellow-breasted chat, yellow warbler, white-tailed kite, Cooper's hawk, red-shouldered hawk, great-horned owl, barn owl, red-tailed hawk, great blue heron, southwestern pond turtle, two-striped garter snake, western spadefoot toad, arroyo chub and threespine stickleback.
- The subunit is a key connection, especially for movement between the northern and southern portions of the subregion. It provides continuous upland habitat linkage connections, particularly along the southern side of the creek, for species such as the California gnatcatcher, cactus wren, rufous-crowned sparrow, and a variety of reptiles and small mammals. Large- and medium-sized mammals known or expected to use the riparian vegetation as "live-in" habitat and for movement include mountain lion, mule deer, bobcat, coyote, and gray fox.

- North-south movement of large wildlife between San Juan Creek and Trampas Canyon and Cristianitos Canyon currently is constrained by Ortega Highway. High traffic volumes on Ortega Highway contribute to wildlife mortality. Wildlife have been documented to use two wildlife corridors that cross under the highway; a corrugated steel pipe culvert near Radio Tower Road and a concrete box culvert west of Cristianitos Road connecting to Trampas Canyon.

2. Planning Recommendations

(a) Protection Recommendations

- Maintain and manage riparian and aquatic resources along San Juan Creek for breeding populations of the arroyo toad, least Bell's vireo, and other sensitive species such as yellow warbler, yellow-breasted chat, raptors, southwestern pond turtle, two-striped garter snake, western spadefoot toad, silvery legless lizard, arroyo chub and threespine stickleback.
- Provide upland foraging and estivation habitat within the upland terraces in the floodplain of San Juan Creek, with a particular focus on the south side of the creek, to maintain existing population levels of the arroyo toad.
- Protect upland vegetation adjoining riparian and aquatic resources to support nesting sites of southwestern pond turtle.
- Protect upland vegetation adjoining riparian and aquatic resources to support all life stages of western spadefoot toad.
- Protect breeding habitat and, to the extent feasible, protect foraging habitat for raptors adjacent to San Juan Creek.
- Provide floodplain and upland habitat linkages adjacent to San Juan Creek for east-west and north-south dispersal by the California gnatcatcher between the Chiquita Canyon and Cristianitos sub-basins.
- Provide a habitat linkage at the confluences of Verdugo Canyon and Bell Canyon with San Juan Creek. Maintain an adequate habitat linkage along central San Juan Creek for "live-in" dispersal and movement habitat for terrestrial species, including mountain lion, bobcat, coyote and mule deer between sub-basins and especially between Chiquita Ridge, Canada Gobernadora, Bell Canyon, upper San Juan Creek, Verdugo Canyon, Trampas Canyon and Cristianitos Canyon.
- Address the potential to improve north-south movement of large wildlife between San Juan Creek and Trampas Canyon and Cristianitos Canyon by assessing the benefits and feasibility of relocating Ortega Highway to the north side of San Juan Creek.

(b) Management Recommendations

- Implement a bullfrog eradication program for the CalMat Lake within San Juan Creek to help protect arroyo toads.
- Implement a management program for protected sensitive plant locations in the sub-basin, including control of non-native invasive species, management of grazing as part of the AMP element of the HRMP, and prevention of human disturbance.

(c) Restoration Recommendations

- In coordination with upstream eradication efforts, implement a giant reed removal program for San Juan Creek within RMV boundaries to protect arroyo toad habitat and other riparian areas.
- Translocate salvaged many-stemmed dudleya to CSS/VGL restoration and enhancement areas where feasible and appropriate. Potential restoration and enhancement areas in the sub-basin include Chiquadora Ridge (*Figure 42-M*). Receiver areas should support clay soils suitable for many-stemmed dudleya and should be placed in locations that maximize connectivity and genetic exchange.
- Salvage clay topsoils from development areas where feasible and appropriate and transport to restoration areas. Salvaged topsoils may be used to create additional suitable dudleya habitat and may contain seedbank.
- Translocate salvaged intermediate mariposa lily bulbs to areas where suitable soil conditions occur. Specific translocation areas have not been identified, but based on the existing distribution, potential general translocation areas in the sub-basin area include Chiquadora Ridge.

e Trampas Canyon Subunit

1. Planning Considerations - Existing Conditions and Resources

- Sand, hard rock and minerals have been mined from Trampas Canyon over the past 50 years. An artificial lake dominates this sub-basin. The lake is steep-sided, relatively deep and the uplands surrounding it are dominated by ruderal vegetation.
- The Trampas Canyon silica mining activities have resulted in the creation of an 88-acre temporary storage facility/artificial wetland. Cessation of mining activity will result in the elimination of the hydrologic conditions that created this feature.

- Soils in the subunit are comprised of mainly silty-sandy soils similar to those found in the Chiquita Canyon and Gobernadora sub-basins. Smaller areas in the eastern portion of the subunit are underlain by clayey silts and sands.
- Elevations in the subunit range from approximately 300 feet above sea level at Ortega Highway to more than 1,000 feet along Radio Tower Road at the western boundary of the subunit.
- The western boundary of the subunit is approximately 5.5 miles from the Pacific Coast.
- The subunit supports a mosaic of upland vegetation communities, including coastal sage scrub, chaparral, grassland, and patches of oak woodland.
- The subunit supports approximately four California gnatcatcher locations and approximately 20 cactus wren locations. Two of the four gnatcatcher locations are in the western portion of the subunit adjacent to the Chiquita Canyon sub-basin and the other two are in the southeastern portion of the subunit adjacent to the Cristianitos sub-basin. Both sets of gnatcatcher locations are a part of *important populations in key locations* and provide important connectivity function.
- The subunit is used by mule deer and mountain lions.
- Raptors nesting in oak woodlands in the subunit include turkey vulture, white-tailed kite, Cooper's hawk, red-shouldered hawk, red-tailed hawk, and great horned owl.
- Vernal pools along Radio Tower Road south of Ortega Highway (pools 7 and 8) appear to be associated with localized bedrock landslides from the San Onofre and Monterey formations. Vernal pool 7 supports both the Riverside fairy shrimp and San Diego fairy shrimp. The spadefoot toad also breeds in these vernal pools.
- The subunit also supports slope wetlands along Radio Tower Road that also appear to be associated with localized bedrock landslides from the San Onofre and Monterey formations.
- Other sensitive wildlife species known from the subunit include orange-throated whiptail, red-diamond rattlesnake, and San Diego desert woodrat near the mouth of the canyon.
- One location of about 250 flowering stalks of the thread-leaved brodiaea occurs in the southeastern portion of the subunit. This location is an *important population* because it contributes to the geographic diversity of the species in the subregion.
- The southern portion of the subunit, in conjunction with the Cristianitos sub-basin, supports a *major population* of the many-stemmed dudleya in a *key location*. The Trampas Canyon subunit itself supports about eight locations of 20-700 individuals each.
- The southern portion of the Trampas Canyon subunit supports eight locations of intermediate mariposa lily, with one population numbering 640 individuals, and the others numbering less than 50 individuals. These locations may be considered an

important population because they contribute to the geographic diversity of the species in the subregion.

- Although the riparian vegetation in the subunit does not provide high value breeding habitat for species such as the least Bell's vireo and other sensitive, non-raptor riparian birds, the reservoir provides resting and foraging habitat for common water fowl and other birds associated with open water and wetland vegetation such as pied-billed grebe, western grebe, mallard, ruddy duck, ring-necked duck, double-crested cormorant, herons, and American coot.
- Coastal sage scrub in the central portion of the subunit provides a nearly continuous north-south connection between San Juan Creek and the upper portion of the Cristianitos sub-basin for bird species such as the California gnatcatcher and cactus wren. This portion of the subunit east of Trampas Creek, along with the Cristianitos Canyon sub-basin, connects populations to the north in Chiquita Canyon with the Camp Pendleton population south of the subregion.
- The central portion of the subunit east of the mine and Cristianitos Road is also a habitat linkage between San Juan Creek and Cristianitos, Blind, La Paz, and Gabino canyons used by mountain lion, mule deer, coyote, and bobcat. A concrete box culvert crossing of Ortega Highway just west of Cristianitos Road is a key crossing point for wildlife between San Juan Creek and Trampas Canyon.
- North-south movement of large wildlife between San Juan Creek and Trampas Canyon and Cristianitos Canyon currently is constrained by Ortega Highway. High traffic volumes on Ortega Highway contribute to wildlife mortality. Wildlife have been documented to use two wildlife corridors that cross under the highway; a corrugated steel pipe culvert near Radio Tower Road and a concrete box culvert west of Cristianitos Road connecting to Trampas Canyon.

2. Planning Recommendations

(a) Protection Recommendations

- Protect the vernal pools and their contributing hydrologic sources, Riverside fairy shrimp and San Diego fairy shrimp, as well as the slope wetlands and their primary sub-surface water supply recharge characteristics along Radio Tower Road.
- Avoid impacts to the *important populations* of California gnatcatchers and coastal sage scrub to the maximum extent feasible to maintain resident and dispersal habitat for the gnatcatcher between San Juan Creek and Cristianitos Canyon and populations on Camp Pendleton.

- Maintain upland north-south habitat linkages through the central and western portions of the Trampas Canyon subunit to convey wildlife movement and dispersal (especially gnatcatchers) between San Juan Creek, San Juan Capistrano, San Clemente, Cristianitos Canyon, the Donna O’Neill Conservancy at Rancho Mission Viejo and Camp Pendleton.
- Maintain upland east-west habitat linkage/wildlife corridor south of the artificial lake to link Prima Deshecha, Talega Open Space and other habitat to the west in San Juan Capistrano and San Clemente with the Donna O’Neill Conservancy and the Gabino, La Paz and Talega movement corridors. This habitat linkage should allow for dispersal of gnatcatchers and other avian species, as well as provide a movement corridor for large mammals such as bobcat, coyote, and mule deer.
- Address the potential to improve north-south movement of large wildlife between San Juan Creek and Trampas Canyon and Cristianitos Canyon by assessing the benefits and feasibility of relocating Ortega Highway to the north side of San Juan Creek.
- Maintain and manage riparian and aquatic resources along San Juan Creek for arroyo toad, least Bell’s vireo, and other sensitive species such as yellow warbler, yellow-breasted chat, raptors, southwestern pond turtle, two-striped garter snake, western spadefoot toad, silvery legless lizard, arroyo chub and threespine stickleback.
- Protect upland terraces and habitat adjoining San Juan Creek to support arroyo toad foraging and estivation.
- Protect the location of approximately 250 thread-leaved brodiaea flowering stalks in the southeastern portion of the subunit. This location is considered an *important population* because it contributes to the geographic diversity of the species in the subregion.
- Protect the Trampas Canyon subunit component (approximately eight discrete locations) of the *major population* of many-stemmed dudleya that extends from the southern portion of the Trampas Canyon in the north, through the Cristianitos Canyon sub-basin south to the Talega development open space located in the San Clemente Watershed.
- Protect the eight known locations of intermediate mariposa lily comprising an *important population* in the subunit.

(b) Management Recommendations

- Maintain stormwater flow characteristics comparable to existing conditions from Trampas Canyon into San Juan Creek to preserve breeding habitat for the arroyo toad population and other aquatic species in San Juan Creek.
- Implement a management program for protected sensitive plant locations in the sub-basin, including control of non-native invasive species, management of grazing as part of the Adaptive Management Program, and prevention of human disturbance.

f. Verdugo Canyon Sub-basin

1. Planning Considerations - Existing Conditions and Resources

- Soils in the sub-basin are characterized by highly erodable silts and clays, with a coarse substrate in the streambed.
- Elevations range from approximately 400 feet above sea level at the confluence with San Juan Creek to approximately 1,800 feet at the Riverside County boundary.
- The sub-basin is approximately 8.5 miles from the Pacific Coast.
- The sub-basin is bordered by grasslands, coastal sage scrub, and small patches of oak woodland. Coastal sage scrub and chaparral are the predominant vegetation communities, with the grasslands more prominent toward the canyon's confluence with San Juan Creek.
- The sub-basin supports sycamore riparian woodland and southern coast live oak riparian forest, with small patches of mule fat scrub. Southern willow scrub is present in tributaries to Verdugo Canyon.
- One California gnatcatcher and approximately 16 cactus wren locations occur in the coastal sage scrub along the canyon.
- The yellow-breasted chat occurs in riparian vegetation in the sub-basin.
- Riparian vegetation in the sub-basin supports nest sites for Cooper's hawk, red-shouldered hawk, red-tailed hawk, and barn owl.
- There is an historic record of a small breeding colony of the tricolored blackbird at the mouth of the canyon under the Ortega Highway Bridge.
- The sub-basin provides a habitat connection for large- and medium-sized mammals. Mule deer are common in the canyon, and it provides habitat for mountain lion, coyote, bobcat, and gray fox.
- The sub-basin is central to the large block of relatively undisturbed habitat in the eastern part of the subregion.

2. Planning Recommendations

(a) Protection Recommendations

- Protect, to the extent feasible, patches of coastal sage scrub and patches of southern cactus scrub that support cactus wren with a focus on maintaining contiguous habitat patches that provide north-south dispersal opportunities for the cactus wren and other

species between the Lucas Canyon sub-basin to the north, and the Gabino Canyon/Blind Canyon and La Paz sub-basins to the south.

- Maintain habitat connectivity for movement of large mammals such as mountain lion, bobcat, coyote and mule deer between San Juan Creek and Cleveland National Forest; and between upper Verdugo Canyon and the headwaters of Gabino Creek.
- Protect riparian vegetation that provides nest sites for Cooper's hawk, red-tailed hawk, red-shouldered hawk and barn owl.
- Protect grassland and wetland/riparian resources at the mouth of Verdugo Canyon near Ortega Highway to retain tricolored blackbird habitat and to provide for wildlife movement to San Juan Creek.
- Protect Verdugo Canyon hydrology to maintain sources of coarse sediment that are important for arroyo toad breeding habitat in downstream areas.

4.5.2 San Mateo Creek Watershed

Figures 34-R through 38-R provide planning species maps for coastal sage scrub, riparian/aquatic resources, historic raptor nest sites, grassland, and plants, respectively, for the San Mateo Creek Watershed.

a. Cristianitos Canyon Sub-basin

1. Planning Considerations - Existing Conditions and Resources

- Soils west of the creek are characterized by erodible silty sands while soils east of the creek generally are clays.
- Elevations in the sub-basin range from approximately 280 feet above sea level at the confluence of Cristianitos and Gabino creeks to 1,000 feet at the head of Cristianitos Canyon.
- The sub-basin is approximately 5 miles from the Pacific Coast.
- The sub-basin is dominated by grasslands, a large component of which is native grassland (330 acres), and coastal sage scrub. The grassland is predominant in upper Cristianitos and along the eastern side of the canyon, while coastal sage scrub and chaparral dominate the east-facing slopes on the western side of the canyon within the Donna O'Neill Land Conservancy.
- Riparian vegetation communities in the sub-basin include coast live oak riparian woodland, southern willow scrub and mule fat. Mule fat is a predominant component in

the upper portion of the sub-basin. Tributaries to Cristianitos Creek from the Donna O'Neill Land Conservancy support coast live oak woodland and riparian woodland.

- The sub-basin supports approximately 12 California gnatcatcher locations and approximately 67 cactus wren locations. The 12 gnatcatcher locations, in combination with the two adjacent locations in the Trampas Canyon subunit, comprise an *important population in a key location*.
- Other upland sensitive species in the sub-basin include grasshopper sparrow, rufous-crowned sparrow, California horned lark, San Diego horned lizard, coastal western whiptail, orange-throated whiptail, western patch-nosed snake, northern red-diamond rattlesnake, and San Diego desert woodrat.
- The segment of Cristianitos Creek upstream of the confluence with Gabino Creek is part of the Lower Cristianitos Creek/Lower Gabino Creek arroyo toad *important population*. The segment of Cristianitos Creek north of the confluence with Gabino Creek is the transition zone between clay terrains that typify the substrate of the streamcourse in Upper Cristianitos Creek and sandy terrains that typify the substrate of the streamcourse below its confluence with Gabino Creek (*i.e.* Lower Cristianitos Creek). The creek in this reach is considered marginal for breeding because of the fine sediments in the streamcourse and is peripheral to considerably more suitable breeding habitat downstream of the confluence with Gabino Canyon and within lower Gabino Canyon. Several surveys have only five documented toads in 2001 in this segment of Cristianitos Creek and they were only observed adjacent to the creek. There was no evidence that the toads were breeding in this segment of the creek. For these reasons, the segment of Cristianitos Creek upstream of the confluence with Gabino Creek is not considered part of the *key location* within the Lower Cristianitos Creek/Lower Gabino Creek *important population*.
- Riparian and aquatic sensitive species in the sub-basin include white-tailed kite, Cooper's hawk, red-shouldered hawk, red-tailed hawk, great horned owl, barn owl, southwestern pond turtle, and western spadefoot toad. The pond turtle and spadefoot toad both occur in the stockpond along Cristianitos Creek in the upper portion of the sub-basin. The spadefoot toad also occurs in the southern part of the sub-basin just north of the confluence of Cristianitos and Gabino creeks.
- The grasslands provide foraging habitat for sensitive wintering raptors such as the ferruginous hawk and Swainson's hawk. Wintering burrowing owls also have been recorded in Cristianitos Canyon.
- A large complex of six discrete locations of thread-leaved brodiaea totaling approximately 6,100 flowering stalks occurs on the hill outcrop adjacent to the mine pits in the southern portion of Cristianitos Canyon on the boundary between the Cristianitos

and Gabino and Blind Canyons sub-basins. As one of the two largest populations on RMV, this is a *major population* in a *key location*.

- About 13 other separate, scattered locations of thread-leaved brodiaea occur in the Cristianitos sub-basin, ranging from one to 120 flowering stalks. These locations comprise an *important population* because they potentially provide connectivity between offsite locations to the south in San Onofre State Park and Camp Pendleton to the south with planning area locations to the north (e.g., Chiquadora Ridge).
- A *major population* and *key location* of many-stemmed dudleya with 164 locations and 34,137 individuals is located in the Cristianitos sub-basin and the southern portion of the Trampas Canyon subunit, extending south to the Talega development in the San Clemente Watershed and eastward into the western portion of the Lower Gabino and Blind Canyons sub-basin. This population, which is by far the largest contiguous population in the Planning area, occurs on both RMV land and the Donna O’Neill Conservancy and extends into Talega Open Space.
- Cristianitos Canyon within the Donna O’Neill Conservancy supports five locations of intermediate mariposa lily of unknown size (database has population size of 1). These locations may be considered *important populations* because they contribute to the geographic diversity of the species in the subregion.
- Upper Cristianitos Creek supports two small locations of Coulter’s saltbush numbering three and 12 individuals, respectively. This is an *important population* because of the rarity of this species in the region.
- The sub-basin contains clay soils that support other sensitive plants including the Palmer’s grapplinghook and western dichondra.
- The sub-basin supports Catalina mariposa lily within clay and non-clay soils.
- The sub-basin probably serves as a primary north-south dispersal area for the California gnatcatcher between the large populations in Chiquita Canyon and Camp Pendleton.
- In combination with Talega, Gabino and La Paz canyons, the Cristianitos Canyon sub-basin provides a habitat connection for the mountain lion, mule deer, bobcat, coyote and gray fox to adjoining sub-basins.

2. Planning Recommendations

(a) Protection Recommendations

- Protect a habitat linkage, averaging 500 feet in width, consisting of the Donna O’Neill Land Conservancy and an area along the east side of Cristianitos Creek, to provide connectivity for gnatcatchers in the upper portion of the sub-basin with other populations

in lower Gabino Creek and Camp Pendleton along lower Cristianitos/San Mateo Creek, and to maintain habitat integrity through connectivity within the Donna O’Neill Land Conservancy at Mission Rancho Mission Viejo.

- Protect appropriate wetland and upland vegetation to support a nesting population of the southwestern pond turtle, which occurs in the upper portion of the watershed in a small stockpond along Cristianitos Creek.
- Protect wetlands and adjoining upland vegetation to support all life stages of western spadefoot toad.
- Avoid riparian/wetland resources, including alkali wetlands, to the maximum extent feasible.
- Protect the majority of native grasslands in the sub-basin.
- Protect breeding habitat and, to the extent feasible, foraging habitat for resident and wintering raptor species.
- Protect the majority of the cactus wren locations within the sub-basin.
- Maintain a north-south habitat linkage along Cristianitos Creek between San Juan Creek and lower San Mateo Creek for dispersal and movement of gnatcatchers and other avian species, as well as large mammals such as mountain lion, bobcat, coyote, and mule deer, and, in particular, avoid occupied coastal sage scrub in upper Cristianitos Canyon.
- Maintain an east-west habitat linkage from Gabino Creek to the confluence with Cristianitos Creek for wildlife movement between Gabino Canyon and the Donna O’Neill Conservancy at Rancho Mission Viejo.
- Protect the location supporting approximately 6,100 thread-leaved brodiaea flowering stalks on the hill outcrop adjacent to the clay mine pits in the southern portion of Cristianitos Canyon. This location is the largest contiguous thread-leaved brodiaea population in the Planning area and comprises a *major population* in a *key location*.
- Protect 10 of the 13 small, scattered locations of thread-leaved brodiaea in Cristianitos Canyon, totaling approximately 300 flowering stalks. Maintain a continuous habitat connection between these scattered populations to allow for interactions and genetic exchange between the populations. These locations meet the criteria of *important populations* in *key locations* because they provide a linkage between brodiaea locations in the area and because the area has good potential for enhancement and restoration.
- Protect the *major population* of many-stemmed dudleya extending from the southern portion of the Trampas Canyon subunit in the north, through the Cristianitos Canyon sub-basin south to the Talega development open space located in the San Clemente

Watershed. This area supports the largest *major population* in the subregion with approximately 34,137 individuals in about 164 discrete locations.

- Protect the two known *important populations* of Coulter's saltbush in the sub-basin.

(b) Management Recommendations

- Pursuant to the Grazing Management Plan (*Appendix G*), implement grazing management techniques to help protect listed and other selected species and habitat, promote perennial grasses including native grasses, allow for continued cattle grazing sufficient to support cattle ranching operations, and, where appropriate reduce fuel loads for fire.
- Implement a management program for protected sensitive plant locations in the sub-basin, including control of non-native invasive species, management of grazing as part of the AMP, and prevention of human disturbance.

(c) Restoration Recommendations

- Implement a native grasslands restoration program (see *Appendix H*), which will likely include grazing grassland restoration techniques set forth in the Grazing Management Plan (*Appendix G*), for the upper portion of the sub-basin (*Figure 42-M*).
- Translocate salvaged thread-leaved brodiaea and many-stemmed dudleya to CSS/VGL restoration and enhancement areas where feasible and appropriate. Potential restoration and enhancement areas in the sub-basin include upper Cristianitos Canyon and the southern portion of the Trampas Canyon subunit. Receiver areas should support clay soils suitable for brodiaea and dudleya, and should be placed in locations that maximize connectivity and genetic exchange.
- Salvage clay topsoils from development areas where feasible and appropriate and transport to restoration areas. Salvaged topsoils may be used to create additional suitable brodiaea and dudleya habitat and may contain seedbank.
- Translocate salvaged intermediate mariposa lily bulbs to areas where suitable soil conditions occur. Specific translocation areas have not been identified, but based on the existing distribution, potential general translocation areas in the sub-basin area include upper Cristianitos Canyon and the southern portion of the Trampas Canyon subunit.
- Protect the upper watershed headwaters, address erosion from the clay pits and implement creek stabilization actions to address localized erosion presently causing increases in fine sediment yields in Upper Cristianitos Creek per the Draft Watershed Planning Principles (*Figure 42-M*).

b. Gabino and Blind Canyons Sub-basin

The Gabino and Blind Canyons sub-basin is divided into three main planning subunits: the upper Gabino Canyon subunit, the middle Gabino Canyon subunit and the lower Gabino Canyon subunit including Blind Canyon. The upper Gabino Canyon subunit encompasses the open grasslands at the headwaters of Gabino Creek. The middle Gabino Canyon subunit is defined by the narrow, steep-sided canyon between upper Gabino Canyon and the confluence of Gabino and La Paz creeks. The lower Gabino Canyon subunit includes the portion of Gabino Canyon below its confluence with La Paz Creek and its confluence with Cristianitos Creek.

c. Upper Gabino Subunit***1. Planning Considerations - Existing Conditions and Resources***

- Soils in the subunit are dominated by erodable clays, with smaller areas of erodable silts.
- Elevations in the subunit range from approximately 600 feet in the valley floor to 1,500 feet at the Riverside County boundary.
- The subunit is approximately 10 miles from the Pacific Coast.
- The open “bowl-shaped” portion of the subunit adjacent to upper Gabino Creek is characterized by predominantly native grasslands on the gentle slopes leading away from the creek, with coastal sage scrub and chaparral dominating the surrounding rugged canyons and hills.
- The riparian communities in the subunit include relatively open coast live oak riparian woodland, sycamore riparian woodland, and mule fat.
- While the population is not as dense as other areas within the planning area, numerous cactus wren locations are present in the subunit.
- The grassland in the subunit is high quality raptor foraging habitat and also provides habitat for the badger, burrowing owl, spadefoot toad and horned lark.
- The riparian vegetation in the subunit supports a few raptor nest sites for white-tailed kite, red-shouldered hawk and red-tailed hawk, but not at the density of the downstream riparian vegetation in middle Gabino Canyon where the canyon is narrow and closely bounded by rugged terrain.
- Aquatic resources (Jerome’s Lake) in the subunit supports the southwestern pond turtle and two-striped garter snake.
- Upper Gabino, in association with middle Gabino and upper La Paz canyons, supports 12 locations of many-stemmed dudleya ranging from about five individuals to about 1,500

individuals, and cumulatively totaling more than 4,100 individuals. These locations comprise a *major population in a key location*.

- A small population of about 100 individuals of Coulter’s saltbush occurs west of and adjacent to the creek. This is an *important population* because of the rarity of this species in the region.
- The subunit supports a large population of western dichondra.

2. Planning Recommendations

(a) Protection Recommendations

- Protect a habitat linkage along Upper Gabino to allow dispersal of large mammals.
- Maintain contiguity and connectivity of coastal sage scrub to provide dispersal habitat for the cactus wren and other sensitive coastal sage scrub species.
- Minimize, to the extent feasible, impacts to grassland foraging habitat for resident and wintering raptors, as well as “live-in” habitat for several other wildlife species that potentially occur in the subunit, including grasshopper sparrow, wintering burrowing owls, badger, spadefoot toad and horned lark.
- Protect Jerome Lake and surrounding uplands to maintain nesting habitat for the southwestern pond turtle.
- Protect the majority of native grasslands within the subunit. Manage and restore protected native grasslands in accordance with the management and restoration recommendations described below, including grazing management techniques .
- Protect the approximately six known discrete locations of many-stemmed dudleya in the subunit that are part of the *major population in a key location*.
- Protect the *important population* of Coulter’s saltbush in the subunit.

(b) Management Recommendations

- Implement a management program for protected sensitive plant locations in the sub-basin, including control of non-native invasive species, management of grazing as part of the AMP element of the HRMP, and prevention of human disturbance.
- Pursuant to the Grazing Management Plan (*Appendix G*), implement grazing management techniques to help protect listed and other selected species and habitat, promote perennial grasses including native grasses, allow for continued cattle grazing

sufficient to support cattle ranching operations, and, where appropriate reduce fuel loads for fire.

(c) Restoration Recommendations

- Implement a CSS/VGL restoration and enhancement program, which will likely include grazing grassland restoration techniques set forth in the Grazing Management Plan (*Appendix G*).
- Translocate any impacted many-stemmed dudleya to CSS/VGL restoration and enhancement areas in upper Gabino where feasible and appropriate. Receiver areas should support clay soils suitable for dudleya.
- Salvage clay topsoils from development areas where feasible and transport to restoration areas. Salvaged topsoils may be used to create additional suitable dudleya habitat and may contain seedbank.
- Implement a creek restoration program in the subunit to address erosion that is generating increases in fine sediment yields in Upper Gabino (*Figure 42-M*).

d. Middle Gabino Canyon Subunit

1. Planning Considerations- Existing Conditions and Resources

- Soils in the middle Gabino segment of the subunit include erodible silts on very steep slopes, with sand and cobble in the creek.
- Elevations in the subunit range from approximately 400 feet at the confluence with La Paz Creek and 1,000 feet on the ridges above the canyon.
- The western portion of the subunit is approximately 7 miles from the Pacific Coast.
- The northern two-thirds of the subunit is a narrow canyon bounded by steep, rugged slopes dominated by chaparral and smaller patches of coastal sage scrub. The lower one-third of the subunit broadens somewhat with flat benches supporting small patches of grassland.
- The riparian communities in the subunit include coast live oak riparian woodland, sycamore riparian woodlands, and smaller areas of coast live oak woodland and mule fat scrub. Some portions of the canyon also support floodplain (alluvial) scrub.
- Breeding sites for a small population of the arroyo toad (2 toads in 1998) extend approximately 3,000 above the confluence with La Paz Creek. This toad population is considered to be part of the *important population* in lower Gabino Creek.

- The riparian vegetation supports several nest sites for raptors, including white-tailed kite, Cooper’s hawk, long-eared owl, great horned owl, barn owl, and red-tailed hawk.
- The western portion of the subunit includes numerous cactus wren locations, although the population is not as dense as other areas of the planning area
- Other sensitive wildlife species in the subunit include rufous-crowned sparrow and orange-throated whiptail.
- One location of about 183 thread-leaved brodiaea flowering stalks occurs in the western portion of the subunit. This location is an *important population* because it contributes to the geographic diversity of the species in the subregion.
- Many-stemmed dudleya occurs in several small populations in the subunit, but in conjunction with the upper Gabino subunit and upper La Paz Canyon locations, comprise a *major population in a key location*.

2. Planning Recommendations

(a) Protection Recommendations

- Limit impacts to ridgelines to the extent feasible in order to protect coarse sediments.
- Protect a north-south habitat linkage through Middle Gabino, with particular focus on maintaining uninterrupted riparian woodland through Middle Gabino and along the western tributary into Middle Gabino.
- Protect the arroyo toad population upstream from the confluence with La Paz Creek by avoiding impacts to breeding, foraging and estivation habitat and protect canyons to avoid downstream impacts to the toad.
- Protect the diversity of raptor nesting habitat with particular focus on retaining documented nesting habitat for white-tailed kites and long-eared owls within the subunit.
- Protect the location of approximately 183 thread-leaved brodiaea flowering stalks in the western portion of the subunit. This location is considered an *important population* because it contributes to the geographic diversity of the species in the subregion.
- Protect the four known discrete locations of many-stemmed dudleya in the subunit that are part of the Cristianitos Canyon *major population in a key location*.

(b) Management Recommendations

- Implement a management program for protected sensitive plant locations in the sub-basin, including control of non-native invasive species, management of grazing as part of

the AMP element of the HRMP, and prevention of human disturbance. The management recommendations for plants are described more fully in the Plant Species Translocation, Propagation and Management Plan (*Appendix I*).

- Pursuant to the Grazing Management Plan (*Appendix G*), implement grazing management techniques that provide for long-term protection of selected species and habitat within designated reserve areas.
- Implement a management program for protected raptor nesting habitat in the sub-basin, including the prevention minimization of human disturbance during the breeding season.

e. Lower Gabino Subunit including Blind Subunit

1. Planning Considerations - Existing Conditions and Resources

- Soils along the lower reaches of Gabino Creek and in Blind Canyon primarily are clays which generate fine sediments.
- Elevations in the subunit range from approximately 280 feet at the confluence of Gabino and Cristianitos creeks and 400 feet at the confluence with La Paz Creek.
- The subunit is approximately 5 miles from the Pacific Coast.
- The subunit is dominated by native and annual grasslands, with smaller patches of coastal sage scrub and oak woodlands.
- The riparian vegetation communities in the subunit consist of southern sycamore riparian woodland, coast live oak riparian forest and woodlands, mule fat scrub and smaller areas of southern arroyo willow forest, coast live oak forest and coast live oak woodland.
- Lower Gabino Canyon supports a moderate size arroyo toad breeding population (~40 adults in 1998) between Cristianitos and La Paz creeks. This population is considered to be an *important population in a key location* because of its link via Cristianitos Creek with the Talega *major population*.
- The grasslands adjacent to lower Gabino Canyon provide potential upland foraging and estivation habitat for the arroyo toad.
- The subunit supports approximately five California gnatcatcher locations and numerous cactus wren locations, although the cactus wren population is not as dense as other areas of the planning area.
- Riparian vegetation provides nesting sites for several raptors, including white-tailed kite, Cooper's hawk, red-tailed hawk, and great horned owl, as well as the yellow-breasted chat.

- Other sensitive wildlife species occurring in upland vegetation communities in the subunit include grasshopper sparrow, rufous-crowned sparrow, San Diego horned lizard, orange-throated whiptail, and red-diamond rattlesnake.
- As described above for the Cristianitos sub-basin, a large complex of thread-leaved brodiaea comprised of six discrete locations totaling approximately 6,100 flowering stalks occurs on the hill outcrop adjacent to the mine pits in the southern portion of Cristianitos Canyon on the boundary between the Cristianitos and Gabino and Blind Canyons sub-basins. As one of the two largest populations on RMV, this is a *major population in a key location*.
- The western portion of lower Gabino and Blind Canyons supports several small locations of many-stemmed dudleya, with one location numbering about 400 individuals. These locations are physically associated with the Cristianitos sub-basin population and together with these locations form a *major population and key location*.
- Lower Gabino and Blind Canyons support two locations of intermediate mariposa lily of about 12 and 305 individuals, respectively. These locations are on the southern boundary with Cristianitos Canyon. These locations may be considered *important populations* because they contribute to the geographic diversity of the species in the subregion.

2. Planning Recommendations

(a) Protection Recommendations

- Protect breeding and foraging habitat and movement opportunities within the streamcourse and adjacent alluvial terraces for the arroyo toad. Address potential upland estivation habitat needs in the context of best scientific information regarding the influence of topography, soils and other factors that appear to influence arroyo toad lateral movement and frequency of use in upland areas away from streamcourse habitat areas.
- Protect riparian vegetation for nesting yellow-breasted chat within the subunit.
- Minimize impacts to California gnatcatcher locations.
- Minimize impacts to cactus wren locations.
- Minimize impacts to native grasslands within the subunit
- Protect breeding habitat, and to the extent feasible, protect raptor foraging habitat for resident and wintering species.
- Maintain an east-west habitat linkage from Gabino Creek to the confluence with Cristianitos Creek for wildlife movement between Gabino Canyon and the Donna O'Neill Conservancy at Rancho Mission Viejo.

- Protect approximately 80 percent of the discrete many-stemmed dudleya locations in lower Gabino and Blind Canyons such that the integrity of the *major population* in this area (*i.e.*, the combined Cristianitos and Gabino and Blind Canyons) is preserved.
- Protect the two known locations of intermediate mariposa lily in lower Gabino Canyon.
- Protect the *major population* of brodiaea in a *key location* bordering the lower Gabino Canyon sub-unit and Cristianitos Canyon sub-basin supporting approximately 6,100 flowering stalks of thread-leaved brodiaea on the hill outcrop adjacent to the clay mine pits in the southern portion of Cristianitos Canyon.

(b) Management Recommendations

- Implement a management program for protected sensitive plant locations in the sub-basin, including control of non-native invasive species, management of grazing and minimization of human access and disturbance as part of the AMP element of the HRMP. The management recommendations for plants are described more fully in the Translocation, Propagation and Management Plan for Special-status Plants (*Appendix I*).
- Protect the integrity of the arroyo toad population in lower Gabino and Cristianitos creeks, as well as San Mateo Creek, by maintaining hydrologic and sediment delivery processes, including maintaining the flow characteristics of episodic events in the sub-basin.
- Implement an invasive plant species eradication effort in Cristianitos Creek between Gabino Creek and Talega Creek, as described in the Invasive Species Control Plan (*Appendix J*).

(c) Restoration Recommendations

- Implement a VGL restoration and enhancement program (see *Appendix H*), which will likely include grazing grassland restoration techniques set forth in the Grazing Management Plan (*Appendix G*).

f. La Paz Canyon Sub-basin

1. Planning Considerations - Existing Conditions and Resources

- Soils in the sub-basin primarily are erodable silts on steep slopes, with cobbles and boulders in the creek.
- Elevations in the sub-basin range from approximately 400 feet above sea level at the confluence with Gabino Creek to 1,000 feet at the Riverside County boundary.

- The sub-basin is approximately 7.4 miles from the Pacific Coast.
- The predominant vegetation communities in the sub-basin are coastal sage scrub and chaparral.
- Riparian communities in the canyon include southern sycamore riparian woodland, coast live oak woodland, and mule fat scrub. The canyon bottom also supports alluvial fan (floodplain) scrub.
- Sensitive wildlife species in the sub-basin include one location for the California gnatcatcher, 13 locations for the cactus wren, and records for the San Diego horned lizard, grasshopper sparrow, rufous-crowned sparrow and yellow-breasted chat.
- Riparian vegetation in the sub-basin supports nest sites for the long-eared owl, white-tailed kite, Cooper's hawk, red-tailed hawk, and red-shouldered hawk.
- Sensitive plants in uplands adjacent to the creek include many-stemmed dudleya (forms part of the *major population* in upper Gabino Canyon) and two locations of intermediate mariposa lily, which comprise an *important population* because of their geographic separation from other locations.
- La Paz Canyon provides movement opportunities for wildlife including mountain lion, bob cat, coyote and mule deer among the Talega and Gabino and Blind Canyon subunits and Camp Pendleton.

2. Planning Recommendations

(a) Protection Recommendations

- Maintain a habitat linkage along La Paz Canyon to convey movement and dispersal by mountain lion, bobcat, coyote and mule deer.
- Maintain contiguity and connectivity of coastal sage scrub to provide dispersal habitat for the cactus wren and other sensitive coastal sage scrub species.
- Maintain riparian vegetation supporting nesting raptors.
- Protect alluvial fan scrub and hydrological conditions that support this plant community.
- Protect the locations of many-stemmed dudleya in the upper portion of the sub-basin.
- Protect the two discrete locations of intermediate mariposa lily in the middle portion of the sub-basin.
- Protect the integrity of arroyo toad populations in lower Gabino Creek, as well as downstream populations in Cristianitos and San Mateo creeks, by protecting the generation and transport of coarse sediments to downstream areas.

g. Talega Canyon Sub-basin

1. Planning Considerations - Existing Conditions and Resources

- Soils in the Talega sub-basin include erodable silts in steep slopes in the eastern portion and erodable clays in the western portion.
- Elevations in the sub-basin range from approximately 180 feet above sea level at the confluence of Talega and Cristianitos creeks to 800 feet in the eastern portion.
- The sub-basin is approximately 5 miles from the Pacific Coast.
- Upland vegetation communities in the Talega Canyon sub-basin include coastal sage scrub, chaparral and grassland, with a mixture of sage scrub and chaparral in the upper portion of the canyon, and grassland and sage scrub in the lower part of the canyon south of the Northrop Grumman facility.
- Riparian vegetation communities in Talega Creek include sycamore riparian woodland and coast live oak riparian woodland. Substrate in Talega Creek is rock/cobble dominated with sandbars forming in depositional areas. The riparian vegetation consists of dense stands of structurally diverse, mature coast live oak and southern sycamore riparian woodlands. Center portions of the creek support mule fat scrub and open sand bars. The riparian zones are confined by the geology of the valley, but contain high topographic complexity, an abundance of coarse and fine woody debris, leaf litter, and a mosaic of understory plant communities. The creek contains shallow pools that retain water into the late spring and summer.
- Approximately seven California gnatcatchers locations and 22 cactus wren locations are scattered in the sage scrub on the south-facing slopes of the canyon.
- A *major population* of arroyo toad is present in Talega Canyon and was categorized as “abundant” by Bloom in 1998 based on the abundance of metamorphs. Although not as large as the *major population* in San Juan Creek, this population is one of the most significant in Orange County (Bloom, pers. comm. 2004). In addition, this population is connected to the downstream arroyo toad populations in lower Cristianitos and San Mateo creeks on Camp Pendleton, as well as the upstream *key location* in lower Cristianitos and lower Gabino creeks.
- The two-striped garter snake has been observed in Talega Canyon.
- Raptors nesting in Talega Canyon include white-tailed kite, long-eared owl, Cooper’s hawk, red-shouldered hawk, red-tailed hawk, great horned owl, and barn owl.
- The uplands adjacent to Talega Creek provide foraging and estivation habitat for the arroyo toad.

- Other sensitive upland wildlife species in the sub-basin include rufous-crowned sparrow, grasshopper sparrow, coastal western whiptail, orange-throated whiptail, San Diego horned lizard, northern red-diamond rattlesnake, and San Diego ringneck snake.
- Four locations of thread-leaved brodiaea totaling 288 flowering stalks occur in the Talega sub-basin on the mesa east of Northrop Grumman near the boundary with the Gabino and Blind Canyons subunit. Although not a large population, these locations may be considered an *important population* because they potentially contribute to connectivity and genetic exchange among the various nearby locations in the subregion.
- Fourteen locations of many-stemmed dudleya totaling 292 individuals are known from Talega Canyon east of Northrop Grumman. Although not a large population, these locations may be considered to comprise an *important population* because they contribute to geographic diversity in the subregion and potentially provide a connection with nearby populations on Camp Pendleton.
- Chaparral beargrass (CNPS List 1B) occurs at five locations on the steep, south-facing slopes in the eastern portion of the sub-basin and one in coastal sage scrub in the north-central part of the sub-basin.
- Talega Canyon is a habitat connection for large- and medium-sized mammals such as mountain lion, mule deer, bobcat, coyote, and gray fox in the San Mateo Watershed.

2. Planning Recommendations

(a) Protection Recommendations

- Protect the integrity of arroyo toad populations in Talega Canyon by maintaining current stormwater runoff patterns and hydrologic conditions.
- Provide for comprehensive water quality treatment consistent with protection of arroyo toads in Talega Creek (see Water Quality Management Plan, *Appendix K*).
- Protect breeding and foraging habitat and movement opportunities within the streamcourse and adjacent alluvial terraces for the arroyo toad. Address potential upland estivation habitat needs in the context of best scientific information regarding the influence of topography, soils and other factors that appear to influence arroyo toad lateral movement and frequency of use in upland areas away from streamcourse habitat areas.
- Protect raptor nesting locations in the sub-basin, with particular attention to nesting of white-tailed kite and long-eared owl within the sub-basin.
- Maintain an east-west habitat linkage for gnatcatcher and cactus wren to protected habitat in the Talega and Forster Ranch Planned Communities.

- Maintain an east-west habitat linkage for large mammals along Talega Creek with sufficient width at confluence with Cristianitos Creek and along south-facing slope.
- Protect the four locations totaling 288 individuals of thread-leaved brodiaea in the Talega sub-basin east of the Northrop Grumman facilities. The locations are considered *important populations* because they contribute to the geographic diversity and provide additional sources for genetic exchange and connectivity in this portion of the subregion.
- Protect 12 locations of many-stemmed dudleya east of the Northrop Grumman facilities that may constitute an *important population*.

h. Other Planning Area

A small area comprising approximately 290 acres is located in the San Mateo Creek Watershed on RMV land south of the Cristianitos sub-basin, southeast of the Donna O’Neill Conservancy at Rancho Mission Viejo and west of the Lower Gabino and Blind Canyons sub-basin and the Talega sub-basin. This area warrants a discussion because although it is outside the identified sub-basins it has important biological resources and reserve design considerations. The dominant landscape feature of the area is lower Cristianitos Creek south of the confluence with Gabino Creek where it exits RMV property.

1. Planning Considerations – Existing Conditions and Resources

- Soils in the main canyon are primarily sandy and soils on the uplands adjacent to Northrop Grumman are erodable clays.
- Elevations in the area range from approximately 200 feet above mean sea level in the creek bottom to approximately 300 feet on the mesa east of the creek.
- The area is approximately 4 miles from the Pacific Coast.
- Upland vegetation communities in the area are dominated by annual grassland and small patches of coastal sage scrub and southern cactus scrub. A small patch of native grassland is present on the northeast corner of the area that overlaps with native grasslands in the Gabino and Blind Canyons sub-basin.
- Riparian communities in lower Cristianitos Creek include southern coast live oak forest and woodland, southern sycamore riparian woodland, southern willow scrub, arroyo willow riparian forest, and mule fat scrub.
- Recent studies have identified substantial invasive plant species in this area.
- The small, scattered patches of coastal sage scrub support only one gnatcatcher location and the site is not part of an *important population*.
- Scattered cactus scrub supports about six cactus wren locations.

- The grasslands include about 16 locations of the grasshopper sparrow.
- Other sensitive upland wildlife species in the area include rufous-crowned sparrow, San Diego desert woodrat, orange-throated whiptail and western whiptail.
- The reach of Cristianitos Creek between the confluence with Gabino Creek and the planning boundary supports an *important population* of the arroyo toad in a *key location*. Toad counts for this reach have ranged from 11 individuals in 1998 to 37 in pre-1997 surveys, and toads have been found in the area in all surveys conducted.
- The uplands adjacent to Cristianitos Creek provide foraging and estivation habitat for the arroyo toad.
- The riparian vegetation supports breeding habitat for the least Bell's vireo (5 locations), yellow-breasted chat (11 locations) and yellow warbler (1 location).
- A variety of raptors historically have nested in the riparian vegetation, including long-eared owl (1 location), Cooper's hawk (1 location), red-tailed hawk (3 locations), red-shouldered hawk (2 locations), great horned owl (1 location) and barn owl (1 location).
- The grasslands adjacent to Cristianitos Creek provide foraging habitat for both breeding resident and wintering raptors such as ferruginous hawk and Swainson's hawk.
- The only known sensitive plant from the area is many-stemmed dudleya, with approximately four discrete locations. Two of the locations have population counts of 20 and 33 individuals. These locations are part of the *major population* of dudleya in the Cristianitos and lower Gabino Canyon and Blind Canyon sub-basins.
- This area, in conjunction with the Cristianitos sub-basin, probably serves as a primary north-south dispersal area for the California gnatcatcher between large populations in Chiquita Canyon and Camp Pendleton.
- In combination with Talega, Gabino, La Paz, and Cristianitos canyons above the confluence with Gabino Creek, this area provides a habitat connection for the mountain lion, mule deer, bobcat, coyote and gray fox to adjoining sub-basins and Camp Pendleton.

2. Planning Recommendations

(a) Protection Recommendations

- Protect a habitat linkage, averaging 500 feet in width, along consisting of the Donna O'Neill Land Conservancy and an area along the east side of Cristianitos Creek, to provide connectivity for gnatcatchers in the upper portion of the sub-basin with other populations in lower Gabino Creek and Camp Pendleton along lower Cristianitos/San

Mateo Creek, and to maintain habitat integrity through connectivity within the Donna O'Neill Land Conservancy at Mission Rancho Mission Viejo.

- Protect the majority of native grasslands in the area.
- Protect the integrity of arroyo toad populations in lower Cristianitos Creek by maintaining current hydrologic conditions.
- Protect breeding and foraging habitat and movement opportunities within the streamcourse and adjacent alluvial terraces for the arroyo toad. Address potential upland estivation habitat needs in the context of best scientific information regarding the influence of topography, soils and other factors that appear to influence arroyo toad lateral movement and frequency of use in upland areas away from streamcourse habitat areas.
- Protect breeding and foraging habitat for the least Bell's vireo, yellow-breasted chat and yellow warbler along lower Cristianitos Creek.
- Protect breeding habitat and to the extent feasible foraging habitat for resident and wintering raptor species.
- Maintain a north-south habitat linkage along Cristianitos Creek between San Juan Creek and lower San Mateo Creek for gnatcatchers and other avian species, as well as large mammals such as mountain lion, bobcat, coyote, and mule deer.
- Maintain an east-west habitat linkage from Gabino Creek to the confluence with Cristianitos Creek for wildlife movement between Gabino Canyon and the Donna O'Neill Conservancy at Rancho Mission Viejo.

(b) Management Recommendations

- In conjunction with upstream and adjacent invasive species control efforts, implement the Invasive Species Control Plan (*Appendix J*).

4.5.3 Other Planning Area-Wide Species Considerations

Several other planning species have broad geographic distributions and habitat requirements, and thus are best addressed at the subregional landscape level rather than the sub-basin level. These species include golden eagle, mountain lion and mule deer.

a. Golden Eagle**1. Planning Considerations – Existing Conditions and Resources**

Golden eagles are an uncommon resident in the subregion. They are known to nest in the Cleveland National Forest, and although they are not known to nest on RMV, they occasionally forage in grasslands and agricultural areas throughout much of RMV, but especially in grasslands and agricultural areas in the Chiquita, Gobernadora, upper Gabino, Cristianitos and Talega sub-basins.

2. Planning Recommendations**(a) Protection Recommendations**

- Protect foraging habitat for the golden eagle to the extent feasible in the Chiquita, Gobernadora, upper Gabino, Cristianitos and Talega sub-basins.

b. Mountain Lion**1. Planning Considerations – Existing Conditions and Resources**

Mountain lions range throughout much of the undeveloped portions of the planning area. The most extensive work on mountain lions in the study area has been conducted by Beier and Barrett (1993) using radiotelemetry to track lion movements. They included virtually the entire planning area as mountain lion habitat for the Santa Ana Mountains population. They also identified important lion use areas in the planning area, including Arroyo Trabuco, General Thomas F. Riley Regional Park and the Donna O’Neill O’Neill Land Conservancy at Rancho Mission Viejo. The FTC surveys also recorded mountain lions at three camera stations: Northrop Grumman/Cristianitos, Blind and Gabino canyons, and Sulphur Canyon. While much of the planning area provides habitat for the mountain lion, Gabino, La Paz, and Blind canyons in the San Mateo Watershed and Verdugo Canyon in the San Juan Creek Watershed provide particularly important “live-in” and movement habitat connecting the southern portions of the planning area with the Cleveland National Forest. The western portion of the planning area, including Arroyo Trabuco, Sulphur Canyon, and Chiquita Ridge, provide important movement habitat, but are less suitable as “live-in” habitat because habitat blocks are not as large and adjacent urban development increases the risk of mountain lion mortality from vehicle collisions and depredation.

2. Planning Recommendations

(a) Protection Recommendations

- Protect “live-in” habitat within the portion of the San Mateo Watershed in the planning area and Verdugo Canyon in the San Juan Creek Watershed adequate to meet the life history requirements of the mountain lion, comprising a large, unfragmented block (7,000+ ac or 11 square miles) of chaparral and coastal sage scrub directly connected to more than 100,000 acres in Caspers Wilderness Park, the Cleveland National Forest, and Camp Pendleton. (Beier and Barrett [1993] describe the Santa Ana Mountain Range as encompassing 800 mi² [512,000 acres) of “contiguous wildlands used by cougars.” This habitat includes the Santa Margarita Mountains, the Santa Rosa Plateau, the Chino Hills and the San Joaquin Hills.) “Live-in” habitat provides adequate prey (primarily mule deer) and vertical and horizontal cover suitable as resting and bedding sites (*e.g.*, woodlands and riparian areas, rocky areas). The reader should note that the approximately 11 square miles of “live-in” habitat within in the San Mateo Watershed portion of the planning area and Verdugo Canyon would only provide about 25-30 percent of an average mountain lion home range in the Santa Ana Mountains (Padley 1989, 1996), and that the home range of any lions using the planning area likely will include Caspers Wilderness Park, Audubon Starr Ranch Sanctuary, Cleveland National Forest, and Camp Pendleton.
- Maintain habitat connections throughout the planning area to provide movement opportunities for the mountain lion. As described above for individual sub-basins, as well as other areas in the planning area, important movement areas for mountain lion include Arroyo Trabuco, the Foothill-Trabuco Specific Plan Area, Chiquita Ridge, Sulphur Canyon, San Juan Creek, Trampas Canyon, Cristianitos Canyon, Verdugo Canyon, Gabino Canyon, La Paz Canyon and Talega Canyon.

(b) Management Recommendations

In areas identified as “live-in” habitat or habitat connections, roads that are necessary to serve approved land and water uses located inside or outside the Habitat Reserve shall be designed and sited to accommodate mountain lion movement to the maximum extent feasible. Where roads are necessary, under the approved NCCP/MSAA/HCP, they will be designed consistent with safety, roadway design criteria that are appropriate for the setting and desired roadway function. Roadway design shall include bridges and/or culverts large enough to accommodate mountain lion movement at key areas and, where appropriate and feasible, may include wildlife over crossings. As appropriate, fencing, grading and plant cover will be provided to serve wildlife crossings consistent with conservation principles and the AMP element of the HRMP. Where feasible and safe, lighting along roadways within the Habitat Reserve should be avoided. Where

roadway lighting within the Habitat Reserve is necessary for public safety reasons, it should be low-sodium or similar low intensity lighting that is directed away or shielded from the Habitat Reserve.

c. Mule Deer

1. Planning Considerations – Existing Conditions and Resources

Mule deer are common in the planning area in coastal sage scrub, chaparral, and woodland habitats. A radiotelemetry study of mule deer was conducted by Padley (1992) in what he termed the "Gabino" and "Chiquita" general areas. This study characterized habitats use and movement patterns and concluded that mule deer in the planning area are year-round residents (*i.e.*, they do not migrate) and their home ranges are relatively small. Also, there are no critical resource areas (*e.g.*, meadows or mineral licks). Areas frequently used by deer include most of the major drainages and canyons, including Chiquita Canyon, Blind Canyon, Verdugo Canyon, Gabino Canyon, La Paz Canyon, and Trampas Canyon. Deer also frequent Arroyo Trabuco, Gobernadora Canyon, Bell Canyon, and many other smaller drainages. In addition, mule deer are the main prey of mountain lions and their presence in the planning area is important for maintaining the mountain lion population.

2. Planning Recommendations

(a) Protection Recommendations

- Protect “live-in” habitat within the portion of the San Mateo Watershed in the planning area adequate to meet the life history requirements of the mule deer, comprising a large, unfragmented block (7,000+ ac or 11 square miles) of chaparral and coastal sage scrub directly connected to Caspers Wilderness Park, the Cleveland National Forest, and Camp Pendleton.
- Protect “live-in” habitat within the San Juan Creek Watershed in the planning area adequate to meet the life history requirements of the mule deer, including Chiquita Ridge, Chiquadora Ridge, the ridgeline separating the Chiquita and Wagon Wheel sub-basins, and the ridgeline separating the Gobernadora and Bell Canyon sub-basins that directly connects to Caspers Wilderness Park and Audubon Starr Ranch Sanctuary.
- Maintain habitat connections throughout the planning area to provide movement opportunities for the mule deer. As described above for individual sub-basins, as well as other areas in the planning area, important movement areas for mule deer include Arroyo Trabuco, the Foothill-Trabuco Specific Plan Area, Chiquita Ridge, Sulphur Canyon, San Juan Creek, Trampas Canyon, Cristianitos Canyon, Verdugo Canyon, Gabino Canyon, La Paz Canyon and Talega Canyon.

(b) Management Recommendations

In areas identified as “live-in” habitat or habitat connections, roads that are necessary to serve approved land and water uses located inside or outside the Habitat Reserve shall be designed and sited to accommodate mule deer movement to the maximum extent feasible. Where roads are necessary, under the approved NCCP/MSAA/HCP, they will be designed consistent with safety, roadway design criteria that are appropriate for the setting and desired roadway function. Roadway design shall include bridges and/or culverts large enough to accommodate mule deer movement at key areas and, where appropriate and feasible, may include wildlife over crossings. (note: of the large mammal species, mule deer are the most sensitive to bridge and culvert design. Designs that accommodate mule deer are generally suitable for mountain lion, bobcat and coyote.) As appropriate, fencing, grading and plant cover will be provided to serve wildlife crossings consistent with conservation principles and the AMP element of the HRMP. Where feasible, and safe, lighting along roadways within the Habitat Reserve should be avoided. Where roadway lighting within the Habitat Reserve is necessary for public safety reasons, it should be low-sodium or similar low intensity lighting that is directed away or shielded from the Habitat Reserve.

SECTION 4.6 PLANNING AREA RESTORATION OVERVIEW

The term “restoration” is used very broadly in this section. It is intended to cover the spectrum of possible restoration activities, from creation of new vegetation communities to enhancement of existing degraded vegetation communities. It is anticipated that restoration actions will be undertaken in accordance with certified/approved restoration plans under the NCCP/MSAA/HCP and SAMP within the NCCP/MSAA/HCP Habitat Reserve and in areas subject to the aquatic resource management program. As a planning area-wide comprehensive program, this section summarizes restoration recommendations for several sub-basins and explains how these recommendations could contribute to a more effective Habitat Reserve and AMP element of the HRMP. The complete Habitat Restoration Plan is attached as *Appendix H*. Restoration recommendations are considered preliminary and will be subject to refinement and modification during the NCCP/MSAA/HCP approval and environmental documentation processes. Preliminary restoration areas are illustrated in *Figure 42-M*.

4.6.1 Restoration of Upland Vegetation Communities

a. Preliminary Designation of Coastal Sage Scrub Restoration Areas

The main goal of the coastal sage scrub restoration program is to establish coastal sage scrub in areas that: (1) probably supported coastal sage scrub prior to ranching operations; and/or (2) would contribute to the Habitat Reserve by increasing the carrying capacity for the California gnatcatcher and other sage scrub species. With these goals in mind, the following areas have

been tentatively identified for coastal sage scrub restoration. Selection of these areas for restoration/enhancement will require additional field study to determine the likelihood of a successful restoration program, including factors such as soil conditions and presence of exotic species both within the restoration area and surrounding habitat.

- Sulphur Canyon in the Gobernadora sub-basin was identified for restoration/enhancement to provide additional habitat and enhance connectivity between Chiquita Canyon and Wagon Wheel Canyon to the west and Gobernadora and Bell canyons to the east. Sulphur Canyon is currently characterized by coastal sage scrub on the slopes of the canyon and grazed annual grasses on the valley floor. Opportunities to improve “live-in” habitat and connectivity for California gnatcatchers through enhancement of existing coastal sage scrub via the removal of grazing will be identified.
- Several side canyons between Chiquita Ridge and Chiquita Creek were identified for restoration/enhancement. Restoration of the two large canyons just northwest and southwest of the “Narrows” would greatly improve the habitat integrity of Chiquita Ridge, which narrows to less than 2,000 feet in width at the top of these side canyons, and provide substantial “live-in” habitat for California gnatcatchers and other species, and improve the integrity of the Habitat Reserve.

b. Preliminary Designation of Valley Needlegrass Grassland Restoration Areas

Areas identified for potential valley needlegrass grassland restoration/enhancement includes areas that: (1) currently support annual grasses, but have suitable soils and are adjacent to existing valley needlegrass; (2) currently support low quality valley needlegrass grassland (*i.e.*, areas with less than 10 percent cover of native grasses); and (3) would contribute to an overall native grasslands ecosystem (*i.e.*, small, isolated patches of native grasslands would not be considered valuable to the overall system). Because establishing a functioning native grassland system is a goal of the restoration program, impacts to native grasslands in a particular sub-basin may be mitigated in another sub-basin to achieve greater value for the overall reserve system. Upper Cristianitos and portions of Blind Canyon mesa are recommended for valley needlegrass restoration.

- Upper Cristianitos is recommended for valley needlegrass restoration and enhancement to reduce the generation of fine sediments from clayey terrains, promote stormwater infiltration and to enhance the value of upland vegetation communities adjacent to Cristianitos Creek. This area includes areas of annual grassland underlain by clay soils suitable for restoration and low quality valley needlegrass grassland suitable for enhancement. These areas also are contiguous with existing medium quality grassland, suggesting a high likelihood of successful restoration/enhancement.

- Portions of Blind Canyon mesa are recommended for grassland restoration. This area has at least one patch of annual grassland suitable for restoration and possibly two patches of low quality valley needlegrass suitable for enhancement. These areas are adjacent to existing medium quality valley needlegrass, suggesting a high likelihood of successful restoration/enhancement. Additional fieldwork in the area may reveal additional restoration/enhancement opportunities.

c. Preliminary Designation of Coastal Sage Scrub/Valley Needlegrass Grassland Restoration Areas

The following areas are recommended for coastal sage scrub/grassland restoration: Upper Gabino and in the Chiquita sub-basin in the area east of the Santa Margarita Water District wastewater treatment plant, the citrus groves west of Chiquita Creek and the disced areas west of the creek to the Chiquita ridgeline.

- Upper Gabino currently generates fine sediment due to extensive gully formation in the headwaters area. A combination of slope stabilization, grazing management and coastal sage scrub/valley needlegrass grassland restoration will reduce sediment generation and promote infiltration of stormwater which will reduce downstream impacts. This area has been identified for a mix of coastal sage scrub and valley needlegrass grassland restoration because some areas mapped as grassland in 1990 have naturally revegetated with sparse coastal sage scrub. Allowing a mixed community to regenerate may represent a more natural climax situation. This area has at least one area of annual grassland adjacent to the creek suitable for restoration and several patches of low quality valley needlegrass grassland suitable for enhancement.
- As discussed above for coastal sage scrub, restoration of disturbed areas of Chiquita Canyon west of Chiquita Creek will provide additional habitat for upland species occupying Chiquita Ridge, and particularly the gnatcatcher. Restoration of areas previously used for agricultural purposes, including grazing and citrus, will also benefit riparian species by removing uses that may contribute to downstream impacts. Additional field work will be needed to identify the areas best revegetated with coastal sage scrub alone and coastal sage scrub/valley needlegrass grassland.

4.6.2 Restoration of Riparian/Wetland Vegetation Communities

a. Preliminary Designation of Riparian/Wetland Restoration Areas

The following areas are recommended for riparian/wetland restoration: Gobernadora Creek and upper Gabino Creek.

- Gobernadora Creek is recommended for riparian/wetland restoration to address the historic meander conditions and excessive sediment input resulting from upstream land uses. Restoration may include the construction of a detention/water quality basin below Coto de Caza.
- Creation of wetland breeding habitat for the tricolored blackbird should be considered a priority in the Gobernadora area because breeding populations have regularly occurred in the ponds in southern Coto de Caza. Northward extension of riparian vegetation from GERA also would provide additional breeding habitats for least Bell's vireo, southwestern willow flycatcher, yellow-breasted chat, yellow warbler, raptors and other wetland species such as two-striped garter snake.
- Upper Gabino Creek currently generates fine sediment due to extensive gully formation in the headwaters area. To address this excessive sediment generation and reduce downstream impacts, both upland habitat restoration (described above) and wetland/riparian restoration is recommended. Depending on the type of wetland restoration in upper Gabino Canyon, several wildlife species could benefit, including two-striped garter snake, southwestern pond turtle, tricolored blackbird, and the riparian birds listed above.

b. Preliminary Designation of Small-scale Creek Stabilization Areas

Several smaller scale creek stabilizations are recommended to address locally induced headcuts in Chiquita Creek and upper Cristianitos.

- Locally induced headcuts (as contrasted with valley deepening reflecting longer-term geologic processes) are present in Chiquita Creek and Upper Cristianitos. Headcuts in Chiquita Creek are caused by the placement of road crossings or other anthropogenic causes. Headcuts in Cristianitos may have a similar origin but may also be influenced by long-term geologic processes. Further investigations of the causes of the Cristianitos headcuts will be necessary before identifying a specific restoration approach.