U. S. Fish and Wildlife Service
Biological Opinion
1-6-07-F-812.8

Intra-Service Formal Section 7
Consultation/Conference
for
Issuance of an Endangered Species Act
Section 10(a)(1)(B) Permit
(TE144113-0, TE144140-0, and TE144105-0)
for
The Southern Orange Natural Community
Conservation Plan/
Master Streambed Alteration Agreement/
Habitat Conservation Plan,
Orange County, California

Carlsbad Fish and Wildlife Office
Carlsbad, California

January 10, 2007

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Acronyms and Abbreviations Used in the Southern Orange County Habitat Conservation Plan Biological/Conference Opinion

A

ac	acres
Act	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)
AMP	Adaptive Management Plan
Applicant(s)	County of Orange, Rancho Mission Viejo, and Santa Margarita Water District

B

BMP	Best Management Practices
BRCP	Biological Resources Construction Plan

C

CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
County	County of Orange

D

DOI	United States Department of the Interior

E

EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Element of Occurrence in the California Natural Diversity Database

F

FTSPA	Foothill-Trabuco Specific Plan Area
FESA	Federal Endangered Species Act

G

GERA	Gobernadora Ecological Restoration Area

GPA/ZC	General Plan Amendment/Zone Change
H	
ha	hectares
HCP	Habitat Conservation Plan
HRMP	Habitat Reserve Management Program
I	
I-	Interstate Highway (I-5)
IA	Implementation Agreement
IRLEH	Independent Reserve Land Easement Holder
M	
MAP	Management Action Plan
MBTA	Migratory Bird Treaty Act
MHCP	Multiple Habitat Conservation Plan
MOU	Memorandum of Understanding
MSAA	Master Streambed Alteration Agreement
MSHCP	Multiple Species Habitat Conservation Plan
N	
NCCP	Natural Communities Conservation Plan
NEPA	National Environmental Policy Act
NTU	Nephelometric Turbidity Unit
O	
OMP	Ongoing Management Program
P	
Permit	Incidental take permit under section 10(a)(1)(B) of the Act
Permits	Collectively, section 10(a)(1)(B) and NCCP permits
Permittees	County of Orange, Rancho Mission Viejo, and Santa Margarita Water District
pers. comm.	Personal communication
Plan	Natural Community Conservation Plan/Master Streambed Alteration Agreement/Habitat Conservation Plan
R	
RMV	Rancho Mission Viejo
RMVLC	Rancho Mission Viejo Land Conservancy
S	
SAMP	Special Area Management Plan

SCORE	South County Review and Evaluation Program
section 7	Section 7 of the Endangered Species Act
section 10	Section 10 of the Endangered Species Act
SMWD	Santa Margarita Water District
SOCTIIP	South Orange County Transportation Infrastructure Improvement Project
SOS	Supplemental Open Space
SR-	State Route or Highway (SR-74, SR-241)

T

TAC	Technical Advisory Committee
TCA	Transportation Corridor Agencies
TNC	The Nature Conservancy

U

USACE	United States Army Corps of Engineers
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

W

Wildlife Agencies	Collectively, the United States Fish and Wildlife Service and the California Department of Fish and Game
WQMP	Water Quality Management Plan

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
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JAN 1 0 2007

In Reply Refer To:
FWS-OR-812.8

Memorandum

To: Chief, Endangered Species Division, California/Nevada Operations Office, Sacramento, California

From: Assistant Field Supervisor, Carlsbad Fish and Wildlife Office, Carlsbad, California

Subject: Intra-Service Formal Section 7 Consultation/Conference for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit (TE144113-0, TE144140-0, and TE144105-0) for the Southern Orange Natural Community Conservation Plan/Master Streambed Alteration Agreement/Habitat Conservation Plan, Orange County, California (1-6-07-F-812.8)

This document transmits the U. S. Fish and Wildlife Service's (Service) biological and conference opinions in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*), regarding the issuance of an incidental take permit (Permit) for implementation of the Southern Orange Natural Community Conservation Plan/Master Streambed Alteration Agreement/Habitat Conservation Plan (Plan) pursuant to section 10(a)(1)(B) of the Act.

The proposed incidental take will occur within southern Orange County as a result of habitat loss and disturbance associated with urban development and other proposed activities (*i.e.*, Covered Activities) identified in the Plan. These activities will be subject to consistency with the Plan and include adaptive management activities within existing Southern Orange County regional and wilderness parklands; improvements to and extension of Avenida La Pata; activities related to the operation and expansion of the Prima Deshecha Landfill facility; ongoing ranching activities, including grazing; construction of residential, commercial, industrial and infrastructure facilities; maintenance and operations of existing ranch and infrastructure facilities; and operation of the Ortega Rock Facility.

The County of Orange (County), Rancho Mission Viejo (RMV), and the Santa Margarita Water District (SMWD) (together "Applicants" or "Permittees") have prepared the Plan in support of an application for an incidental take permit. The Plan proposes establishment of a multi-species conservation program to minimize and mitigate the expected loss of habitat values and the incidental take of certain species. Our opinions address 6 federally listed animals, 1 federally listed plant, and 25 unlisted plants and animals for a total of 32 species (Table 1). Designated

TAKE PRIDE IN AMERICA

and proposed critical habitats for the federally threatened coastal California gnatcatcher (*Polioptila californica californica*), Riverside fairy shrimp (*Streptocephalus woottoni*) (designated), and San Diego fairy shrimp (*Branchinecta sandieogonensis*) (proposed) are also addressed. Collectively, the 32 listed and unlisted species are referred to in the Plan as Covered Species.

Table 1: Proposed Covered Species for the Plan

COMMON NAME	**SCIENTIFIC NAME**	**STATUS Federal and State/ CNPS (Plants)/ Science Advisors Group**
Listed Amphibians		
Arroyo Toad	*Bufo californicus*	FE/CSC/3
Listed Birds		
Coastal California Gnatcatcher	*Polioptila californica californica*	FT/CSC/2
Least Bell's Vireo	*Vireo bellii pusillus*	FE/SE/3
Southwestern Willow Flycatcher	*Empidonx trallii extimus*	FE/SE/3
Listed Invertebrates		
Riverside Fairy Shrimp	*Streptocephalus woottoni*	FE/None/3
San Diego Fairy Shrimp	*Branchinecta sandieogonensis*	FE/None/3
Listed Plants		
Thread-leaved Brodiaea	*Brodiaea filifolia*	FT/SE/List 1B.1
Amphibians		
Western Spadefoot Toad	*Spea [=Scaphiophus] hammondii*	FSC/CSC/3
Birds		
Burrowing Owl	*Athene cunicularia*	FSC, BCC/CSC/3
Coastal Cactus Wren	*Campylorhynchus brunneicapillus couesi*	BCC/CSC/2
Cooper's Hawk	*Accipiter cooperii*	None/CSC/2
Grasshopper Sparrow	*Ammodramus savannarum*	None/None/2
Long-eared Owl	*Asio otus*	None/CSC/3
Tricolored Blackbird	*Agelaius tricolor*	FSC, BCC/CSC/3
White-tailed Kite	*Elanus leucurus*	FSC, MNBMC/FP/3
Yellow-breasted Chat	*Icteria virens*	None/CSC/3
Yellow Warbler	*Dendroica petechia*	None/CSC/3
Fish		
Arroyo Chub	*Gila orcutti*	FSC/CSC/3
Threespine Stickleback	*Gasterosteus aculeatus*	None/None/3
Reptiles		
Belding's Orange-throated Whiptail	*Aspidoscelis hyperythra beldingi*	None/CSC/2
California Glossy Snake	*Arizona elegans occidentalis*	None/None/3
Coast Patch-nosed Snake	*Salvadora hexalepis virgultea*	None/CSC/2
Northern Red-diamond Rattlesnake	*Crotalus ruber ruber*	None/CSC/3

COMMON NAME	SCIENTIFIC NAME	STATUS Federal and State/ CNPS (Plants)/ Science Advisors Group
Red Coachwhip	*Masticophis flagellum piceus*	None/None/None
"San Diego" Coast Horned Lizard	*Phrynosoma coronatum* (blainvillei population)	FSC/CSC/2
Southwestern Pond Turtle	*Emys [=Clemmys] marmorata pallida*	FSC/CSC/3
Plants		
California Scrub Oak	*Quercus berberidifolia*	None
Chaparral Beargrass	*Nolina cismontana*	None/None/List 1B.2
Coast Live Oak	*Quercus agrifolia*	None
Coulter's Saltbush	*Atriplex coulteri*	None/None/List 1B.2
Many-stemmed Dudleya	*Dudleya multicaulis*	None/None/List 1B.2
Southern Tarplant	*Centromadia parryi* var. *australis*	None/None/List 1B.1

Federal and State Status

BCC USFWS Bird of Conservation Concern
FE Federally Listed Endangered Species
FSC Federal Species of Concern
FP State Fully Protected
FT Federally Listed Threatened Species
MNBMC USFWS Migratory Nongame Birds of Management Concern
CSC California Species of Special Concern
SE State Listed Endangered
ST State Listed Threatened

Science Advisors Categories

1. Species whose conservation is minimally affected by the reserve planning process
2. Species conserved most effectively at the habitat or landscape level
3. Species requiring species-level conservation action

CNPS (California Native Plant Society)

Lists

1B: Rare or Endangered in California and Elsewhere

Threat Code Extension

1: Seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat)
2: Fairly endangered in California (20-80% occurrences threatened)

The intent of the Plan is to minimize incidental take of these species in the Plan Area and to provide avoidance, minimization, and mitigation measures for the impacts of proposed activities on Covered Species and their habitats. Three separate permits are proposed for issuance to the three Permittees for a period of 75 years. Implementation of the Plan will require coordinated actions among the Permittees. The Plan will provide for the participation of other non-permittee entities by way of a certificate of inclusion or other appropriate mechanism as set forth in the Plan and the Implementation Agreement (IA). The Plan is also intended to be a "subregional" plan under the State of California's Natural Community Conservation Planning ("NCCP") Act of 2001. The term "Permits" refers to the section 10(a)(1)(B) and NCCP permits.

In order to meet issuance criteria under section 10(a)(2)(B) of the Act such that taking will be incidental to otherwise lawful activities and to the extent Covered Activities will impact unlisted "covered" bird species protected by the Migratory Bird Treaty Act (MBTA), the Covered Activities must comply with the MBTA throughout the Plan Area. In addition, upon issuance of the Permit, incidental take will be authorized for "covered" animal species. Plant species are "covered" only by the Permit in recognition of the conservation measures incorporated into the Plan for such species and, as with covered animal species, will receive assurances under the Service's "No Surprises" rule.

In accordance with our "No Surprises" regulation (50 Federal Register Part 17), we will only provide assurances for species that are adequately conserved by the Plan, treated as if they were listed, and specifically identified on the Permit. The Applicants are seeking incidental take coverage for 25 unlisted species in the event that any of those species become listed during the proposed 75-year Permit term. At this time, we are conferencing on the unlisted species that will be identified as Covered Species on the Permit.

Some of the proposed Covered Activities may require section 7 consultation pursuant to the Act. In this event, any take exemption to the Federal agency will be authorized through the section 7 consultation process. Activities conducted by non-Permittees will not receive incidental take authorization under the subject Permit unless the non-Permittees seek incidental take authorization pursuant to the provisions of the Plan as stipulated in the IA. Federal wetland permitting within the Plan remains subject to the Fish and Wildlife Coordination Act and Clean Water Act and may require additional avoidance, minimization, and mitigation measures.

Consultation History

Prior to initiation of this consultation, the Service was extensively involved with the planning and preparation of the draft and final Plan. Hundreds of meetings were held during the planning and permitting process beginning in 1993 that involved the Service. Below is a summary of the early history and several Plan-related committees and groups in which Service participated to some degree. Key milestones during the planning process are summarized below in Table 2.

The Southern Subregion was designated as one of the original NCCP planning subregions in the NCCP Planning Process Guidelines (CDFG 1991). The Planning Agreement Memorandum of Understanding (MOU) for the subregion was prepared concurrent with preparation of the Central and Coastal Subregion MOU and was signed by the Wildlife Agencies and participating landowners in 1993. Originally, participating landowners (those that provided funding or in kind services) included the County, SMWD, RMV, Transportation Corridor Agencies (TCA), Marblehead Coastal, and Talega Ranch.

The period between 1993 and 1997 constitutes the first phase of the overall NCCP planning process for the Southern Subregion in that the original NCCP/HCP was designed in much the same way as the Coastal and Central Subregion NCCP/HCP. The NCCP/HCP was focused on protection and management of upland species and related habitats, and aquatic resources were

included in the mosaic of natural communities but were not intended to receive regulatory coverage. By 1996 planning had progressed to a point where several alternative reserve design concepts were being considered, but no agreement was reached between the Service and California Department of Fish and Game (CDFG) (collectively, the "Wildlife Agencies") and participating landowners on a particular reserve concept.

Table 2: Summary of Key Milestones During Plan Preparation and Local Approval Process

DATE	MILESTONE
1991	NCCP Act adopted by California Legislature
1992	County Enrollment in NCCP Program
1993	Planning Agreement signed by County, Service, CDFG and participating landowners. Two subregions created: Coastal/Central and Southern
1996	NCCP approved for Coastal/Central Subregion
1997	Southern Subregion Reserve Design Principles prepared by Science Advisors
1998	Second scoping meeting held for Southern Subregion
1998	Decision made to address aquatic resources through a Special Area Management Plan and Master Streambed Alteration Agreement
1999 through 2004	Baseline data/studies prepared
2001	Scoping conducted for joint NCCP and SAMP programs
2001 through 2006	Public meetings held to brief interested persons
2002	RMV filed GPA/ZC application
Nov 2004	GPA/ZC approved by Board of Supervisors
Dec 2004	Lawsuits filed
Aug 2005	Lawsuits settled; revised land plan results
Nov 2005	Draft SAMP released for public review
July 2006	Draft NCCP released for public review
Oct 2006	Board of Supervisors approved NCCP and certified Environmental Impact Report

In 1995-96, a combination of the lengthy recession and a need by RMV to re-think its estate planning resulted in the program going into hiatus, a pause that lasted until the middle of 1997. During this pause in the process, RMV and the County re-considered the overall scope of the NCCP/HCP process and decided to expand the overall planning process to address aquatic resources concurrent with upland resources through preparation of a Special Area Management Plan (SAMP) under the direction of the U. S. Army Corps of Engineers (USACE) and Master Streambed Alteration Agreement (MSAA) under the direction of CDFG as companion pieces to the NCCP/HCP. Accordingly, in 1998 when the four State/Federal agencies had agreed to a comprehensive planning approach, the planning process was re-initiated as a two-part program

with the NCCP/HCP as one component addressing upland species/natural communities and the MSAA/SAMP as a concurrent component addressing aquatic species and communities.[1]

In addition to the NCCP/MSAA/HCP and the SAMP, a further part of the coordinated planning process for the Southern Subregion was the processing by RMV through the County of Orange of a General Plan Amendment/Zone Change (GPA/ZC) for its property. Processing of a GPA/ZC for the RMV property set land uses and allowed the plan participants to evaluate avoidance, minimization and mitigation measures.

Public Participation Process

Another feature of the NCCP/HCP process involved the public consultation that occurred during the formulation and review of the subregional NCCP/HCP. The public participation process for the Southern Subregion involved three separate and independent elements: 1) public workshops conducted by the four lead agencies (Service, County, CDFG, USACE); 2) convening of an "Ad Hoc" group by The Nature Conservancy (TNC); and 3) creation of a citizen outreach program by the County Supervisor with responsibility over the District that includes the 22,815-acre (ac) (9,233-hectare (ha)) RMV property. This three-pronged public participation process was initiated following the June 14, 2001, Scoping Meeting.

Public Workshops

The four lead agencies initiated a series of joint "Public Workshops." Beginning in December 2001, a total of six public workshops were held. Public attendance at these meetings ranged from 250 to about 500 persons. These workshops were intended to provide a collaborative and consultative public forum to discuss NCCP/HCP and SAMP/MSAA planning issues. The Public Workshops were conducted to:

- Explain the coordinated approach for processing the NCCP/HCP and SAMP/MSAA;
- Identify key planning issues that needed to be addressed and assure that the full range of public policy and planning issues were addressed;
- Discuss NCCP/HCP and SAMP/MSAA reserve design tenets and principles;
- Identify and consider alternative habitat reserve designs;
- Discuss adaptive management and species conservation issues and methodologies; and
- Obtain public comments and suggestions prior to preparation of draft documents.

TNC Ad Hoc Group Meetings

In support of the Public Workshops, TNC convened an "Ad Hoc" group designed to involve representatives of the involved agencies, environmental groups and local landowners in

[1] It should be noted that in late 2004, the participating landowners decided to transfer the MSAA to become a part of the NCCP/MSAA/HCP while leaving the SAMP as a stand-alone Federal document. The decision to make the MSAA a part of the NCCP/MSAA/HCP document meant that the County of Orange became the Lead agency under California Environmental Quality Act (CEQA) for both the NCCP and the MSAA. The USACE continued to be the Lead agency under National Environmental Policy Act (NEPA) for the SAMP document.

constructive dialogue within a smaller setting that could focus on NCCP/HCP and SAMP/MSAA issues. The Ad Hoc group met as needed to discuss significant NCCP/HCP and SAMP/MSAA planning issues and to provide comments to the agencies as they prepared agendas and discussion topics for the Public Workshops. In total, the TNC Ad Hoc Group met seven times in 2002 beginning in March and ending in October. These meetings were designed to increase the quantity and quality of information exchange among the lead agencies, participating landowners and public by informing the Ad Hoc participants, thereby enabling them to convey and discuss issues and information to their respective organizations/constituents and discuss issues in advance of the public workshops. These meetings also were designed to make the Public Workshops more effective by providing a forum for discussions of significant issues with informed public interests prior to the public workshops. Attendees at the Ad Hoc Group meetings included staff from the Service, CDFG, County, the participating landowners and members of the environmental community including Endangered Habitats League, Starr Ranch Audubon Society and Sierra Club.

SCORE Process

Finally, County Supervisor Tom Wilson, whose Fifth District includes the RMV property, initiated another important element of the coordinated process to involve interested citizens in planning related to the GPA/ZC for the RMV property: the South County Review and Evaluation (SCORE) program. The overall goal of the SCORE program was to establish and maintain positive and constructive communications among all potentially interested parties including members of the RMV development team, Orange County staff and appointed officials, representatives of all the neighboring jurisdictions, representatives of specific community interest groups, and members of the public at large.

Supervisor Wilson convened two task forces to review RMV development issues, one to address land use and one to address urban runoff. Each task force was given a scope for review (the charge) and a set of ground rules for operation. The Land Use Task Force met a total of 14 times, and the Urban Runoff Task Force met 6 times. The task forces produced a joint report containing commentary based on their review of certain preliminary reserve design concepts and a list of potential solutions to address urban runoff issues. This report was presented to the Orange County Planning Commission on October 23, 2002.

In addition to the meetings discussed above, the lead agencies and participating landowners held working group meetings. These meetings were sporadic through the 1990's and became regular beginning in 2001 and continued through 2006.

Working Group Meetings

These meetings were established to provide coordination at a both a technical and policy level between the County, RMV, SMWD and the Service and CDFG during plan preparation. These meetings were attended by the Service, CDFG, County, RMV, occasionally SMWD, lawyers retained by RMV, and the County's NCCP consultants. The meetings consisted of all-day working sessions to discuss schedule and progress on the plan, technical elements of species

accounts, conservation analyses, implementation approaches, and policy language for incorporation into the draft and final HCP and IA. Department of the Interior Solicitor's Office staff and the CDFG legal staff occasionally attended these meetings. In total, the Working Group held 53 meetings. Five meetings were held in 2001 beginning in October and ending in December. Seventeen meetings were held in 2002 beginning in February and ending in December. Six meetings were held in 2003 beginning in April and ending in November. Five meetings were held in 2004 beginning in January and ending in July. Fourteen meetings were held in 2005 beginning in March and ending in December. In 2006, five meetings were held between March and August.

Administrative Record

These opinions were prepared using the following information that is hereby incorporated by reference:

1) The Plan prepared by Dudek and Associates, Inc. for the County of Orange, dated July 2006. The Plan consists of 14 Chapters and the IA;
2) Service proposed FESA section 10(a) permit terms and conditions dated January 3, 2007;
3) Available scientific literature and interviews with species and area experts; and
4) Other information in Service files.

The project file addressing this consultation is located at the Carlsbad Fish and Wildlife Service Office.

BIOLOGICAL AND CONFERENCE OPINIONS

DESCRIPTION OF THE PROPOSED ACTION

Plan/Action Area Description

The Southern Subregion boundaries in Orange County are as follows: from the west, the boundary follows San Juan Creek from the creek mouth inland to Interstate 5, then northwest along Interstate 5 to El Toro Road, and north along El Toro Road to the intersection of Live Oak Canyon Road, and northeasterly on a straight line from that intersection to the northern apex of the boundary with Riverside County. The San Diego and Riverside county boundaries form the eastern boundary of the subregion. The Southern Subregion encompasses about 131,643 ac (53,274 ha) including 40,001 ac (16,188 ha) within the Cleveland National Forest (Figure 1).

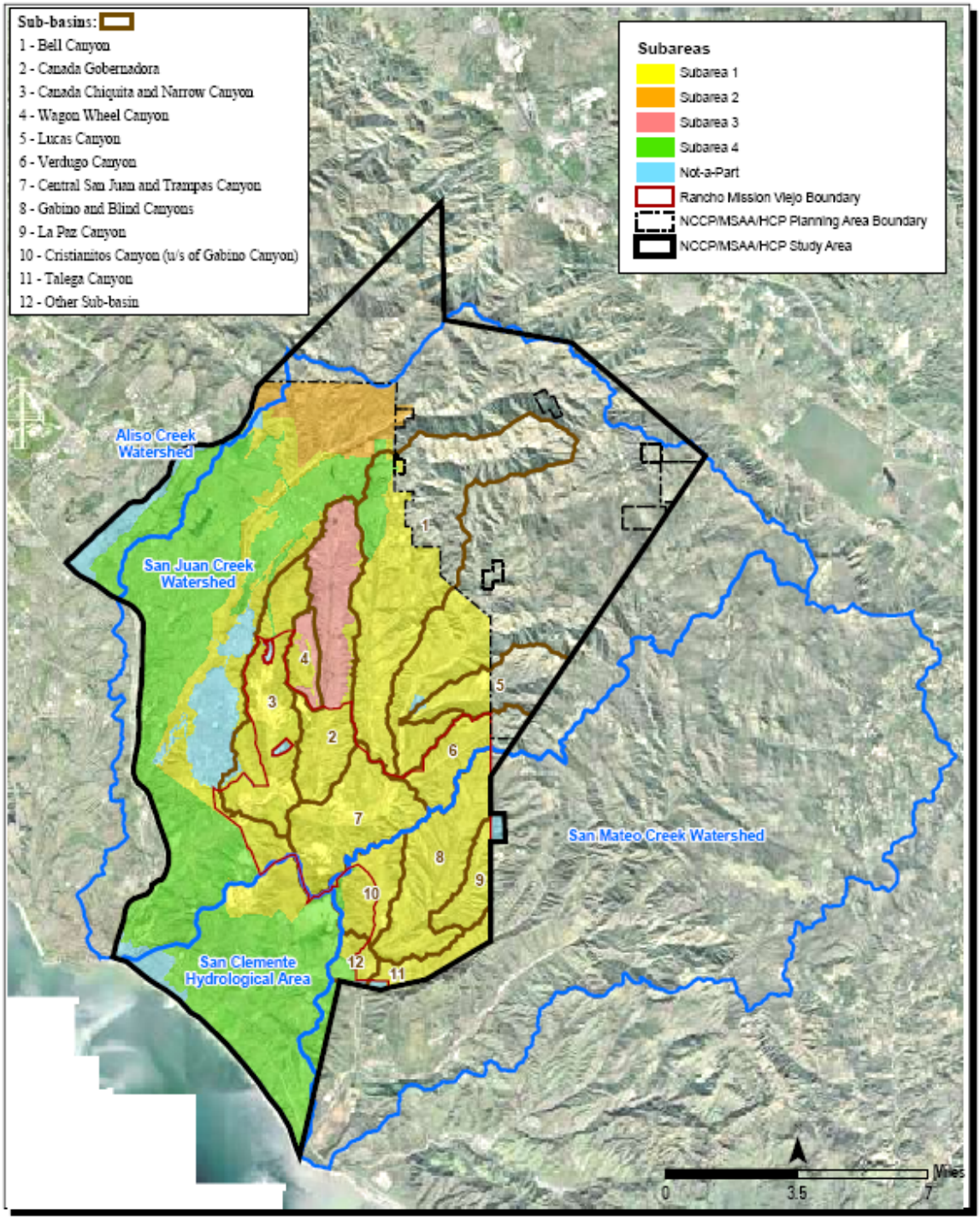

Figure 1. The Orange County Southern Subregion NCCP/HCP area, Plan Subareas, and Watershed Sub-basins.

We have defined the action area as the Southern Subregion (131,634 ac (53,274 ha)), excluding the Cleveland National Forest (40,001 ac (16,188 ha)) and other areas in the Subregion that are identified as "Not a Part" (5,557 ac (2,249 ha)). The Other/Not A Part areas include the cities of Lake Forest and Dana Point, portions of San Juan Capistrano, an "Existing Use" Girl Scout Camp, Ladera Ranch, Las Flores, Tesoro High School, the Foothill Transportation Corridor-North, the Nichols Institute near Caspers Wilderness Park, the sewage treatment facility in Chiquita Canyon and other areas that are in the Southern Subregion but are "Not a Part" of the Plan. After excluding the Cleveland National Forest and "Not a Part" areas, the action area contains 86,076 ac (34,834 ha). The action area is subdivided into 4 geographic subareas: Subarea 1 (44,633 ac (18,062 ha)), Subarea 2 (3,872 ac (1,567 ha)), Subarea 3 (4,026 ac (1,629 ha)), and Subarea 4 (33,545 ac (13,575 ha)). See the Plan Area Environmental Baseline section below for further detail on the subareas.

Covered Activities

The draft environmental documents on the HCP were released for public review and comment on July 21, 2006. The basis for regulatory coverage for the Permittees' Covered Activities is set forth and reviewed in the draft and final EIR/EIS. The Covered Activities are provided for through the implementation of the County of Orange Southern Subregion Conservation Strategy, including the preferred alternative Habitat Reserve design, Alternative B-12. The Conservation Strategy selected to implement the HCP and provide the basis for incidental take authorization for Covered Activities consists largely of the following four elements:

1. Creation of a Permanent Habitat Reserve: The HCP will provide for a large, biologically diverse and permanent subregional Habitat Reserve that would protect: (1) large blocks of natural vegetation communities that provide habitat for the proposed Covered Species; (2) "important" and "major" populations of the proposed Covered Species in key locations; (3) wildlife corridors and habitat linkages that connect the large habitat blocks and proposed Covered Species populations to each other, the Cleveland National Forest, and the adjacent Central/Coastal Orange County Subregion NCCP/HCP; and (4) the underlying hydrogeomorphic processes that support the major vegetation communities providing habitat for the proposed Covered Species. The proposed Habitat Reserve will include two large ownerships including approximately 11,950 ac (4,836 ha) owned by the County and contained within three existing Orange County regional and wilderness parks in the southern subregion (O'Neill Regional Park, Riley Wilderness Park, and Caspers Wilderness Park)("County Parks") and approximately 20,868 ac (8,445 ha) owned by RMV consisting of 4,284 ac (1,734 ha) in existing conservation easements that were set aside by RMV prior to completion of the HCP ("Prior RMV"); 48 ac (19 ha) of RMV lands located within Arroyo Trabuco ("Prior RMV"), and 16,536 ac (6,692 ha) that will be provided by RMV as part of a phased dedication program ("Proposed RMV") linked to completion of construction in its designated development planning areas (PA1 through PA8) (Figure 2).

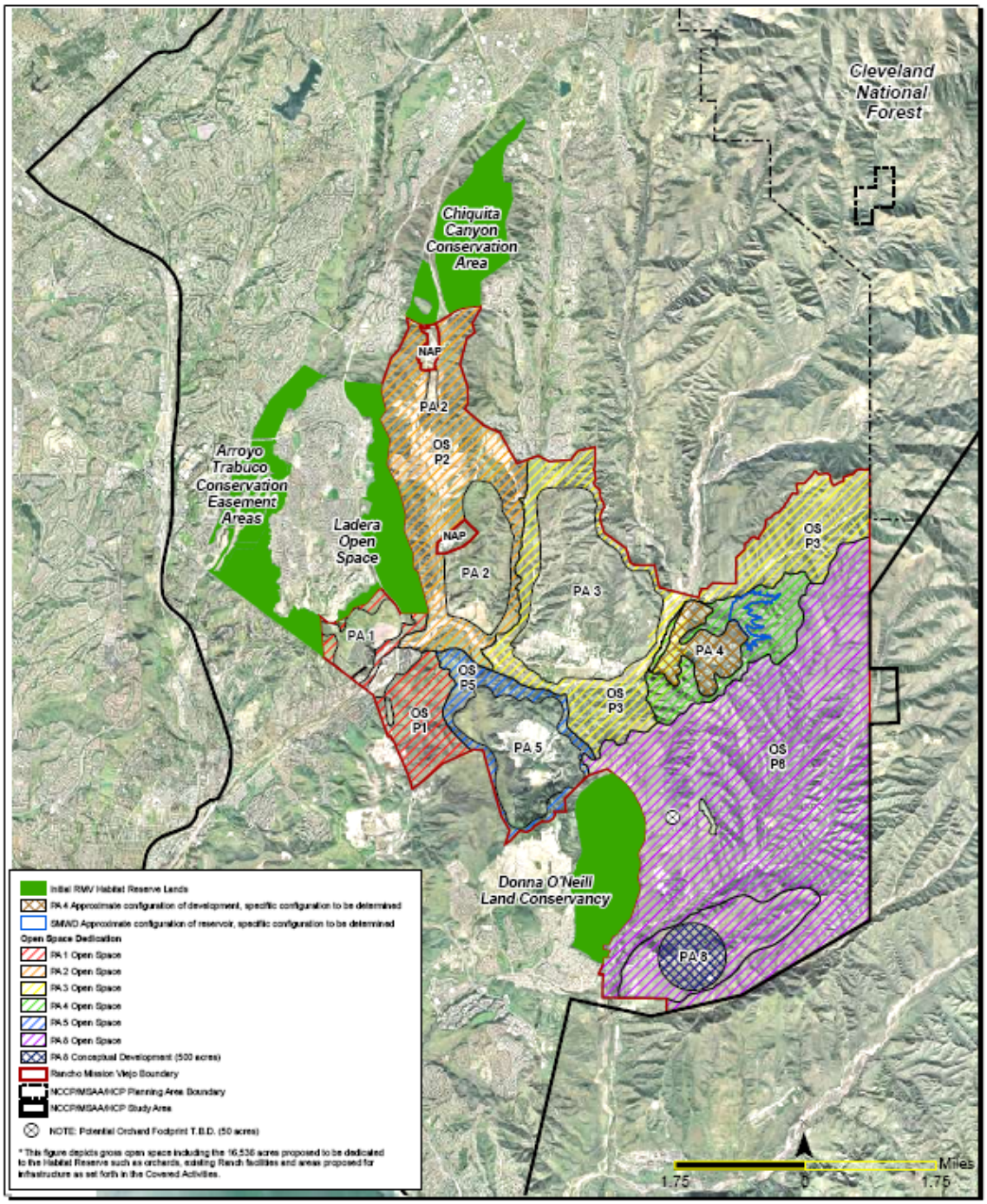

Figure 2. Phased Dedication of the Open Space (Habitat Reserve) by Planning Area. The "Prior RMV" areas are shown in green. The "Proposed RMV" areas are shown within the RMV boundary.

Creation of the Habitat Reserve will occur over time. The County will enroll its lands into the Habitat Reserve within one year of the execution of the IA and issuance of the Permits. The 4,332 ac (1,753 ha) owned by RMV and described in the HCP as the "Initial Habitat Reserve" (also known as "Prior RMV") generally will be enrolled in the Habitat Reserve within 6 months of the execution of the IA and issuance of the Permits. The remaining 16,536 ac (6,692 ha) will be enrolled into the Habitat Reserve according to the Phased Dedication Program. Specifically, the Phased Dedication Program provides that enrollment of San Juan Watershed lands into the Habitat Reserve will occur through a two-step process consisting of (1) the phased recordation of irrevocable covenants by affected RMV landowners on or before grading or grubbing is commenced with each corresponding RMV Planning Area (or portion thereof) at which time the covenant area will become subject to the Adaptive Management Plan (AMP) component of the Habitat Reserve Management Program (HRMP); followed by (2) the phased recordation of conservation easements as soon as practicable but no later than 3 years following recordation of the corresponding Irrevocable Covenant. The dedication of the San Mateo Watershed portion will occur pursuant to recordation of a conservation easement at the earlier of any one of the following: (1) commencement of grading or grubbing for Planning Area 8 development; (2) voluntary termination of the Permits by RMV at or following the commencement of grading or grubbing of the fifth Planning Area within the San Juan Creek Watershed, or (3) 1 year prior to the expiration of the 75-year term of the IA and the associated Permits.

2. Development of a Habitat Reserve Management Program (HRMP): The HRMP focuses on the development and implementation of a coordinated monitoring and management program to sustain and enhance species populations and their associated habitats over the long term, while adapting management actions to new information and changing habitat conditions. The HRMP has two major implementation components: (1) the Ongoing Management Program (OMP) on County parklands within the Habitat Reserve; and (2) the Adaptive Management Program (AMP) that will be implemented on the RMV portion of the Habitat Reserve and on selected portions of the County parklands within the Habitat Reserve.

The HRMP is designed to provide for permanent management and monitoring of biological resources and hydrogeomorphic processes that provide habitat for the 32 proposed Covered Species and to maintain net habitat value over the long term within the subregion. HRMP management/restoration programs and measures are designed to be implemented on a subregional basis to assure that: (1) "important" and "major" populations of species covered under the HCP in key locations and other populations are conserved; (2) large blocks of natural lands containing the targeted vegetation communities that provide the habitat necessary to support Covered Species and other special-status species are managed, and where feasible and appropriate, enhanced and restored over the long term; (3) USACE and CDFG jurisdictional areas will be protected and managed over the long term; and (4) wildlife corridors and habitat linkages are identified, protected and managed to provide for permanent biological connectivity linking the large habitat blocks within the subregion area with each other and with adjacent subregions and the Cleveland National Forest.

Long-term Monitoring

A component of the HRMP (see HCP, Chapter 7) is long-term monitoring, which will include both "Compliance Monitoring" and "Effectiveness Monitoring," as set forth in Section 7.7 of the IA.

Compliance Monitoring refers primarily to administrative duties related to verifying that the Permittee is carrying out the terms of the HCP, the Permit, and the IA. Compliance Monitoring will be coordinated annually by the County Administrator and include submittal of a tabular summary of dates of completion, revisions and implementation progress on the AMP plan components such as the Fire Management Plan, Grazing Management Plan, and 5-year Management Action Plans (MAP) that describe the specific "on-the-ground" management and monitoring actions planned for the upcoming 5 years. HCP Chapter 10, Section 10.7.4 describes the duties of the Administrator that relate to Compliance Monitoring, including: assisting in coordinating the OMP and AMP elements of the overall HRMP; soliciting and summarizing the receipt and expenditure of funds; accounting for the location and amount of impacts on Covered Species, Conserved Vegetation Communities, and CDFG Jurisdictional Areas; accounting for lands added to the Habitat Reserve; and summarizing actions related to assemblage and management and monitoring of the Habitat Reserve.

Effectiveness Monitoring evaluates the biotic and abiotic effects of the permitted management action to determine whether the Habitat Reserve, in conjunction with implementation of the HRMP, is achieving the biological goals and objectives established by the HCP. The key elements for Effectiveness Monitoring of the Southern Subregion Habitat Reserve include: preparation and ongoing revision of goals and objectives for Conserved Vegetation Communities and goals and objectives for each of the 32 Covered Species (see HCP, Sections 7.7 through 7.11 and Appendix E); management and monitoring of resources, including the extent to which goals and objectives are met, at three fundamental scales (natural community landscape mosaic, specific vegetation communities and habitats, and species and species assemblages); use of a "stressors" adaptive management concept, including the use of focal species and habitat conditions monitoring to identify stressors that must be addressed in order to maintain the effectiveness of the long-term management program; preparation of implementation plans, including the 5-year MAP annual reports prepared by the Reserve Manager, with assistance by the Science Panel; public review of the annual reports prepared by the Administrator; and comprehensive "State of the Habitat Reserve" reports coordinated by the Administrator, with input from the Reserve Manager, the Science Panel, and County Harbors, Beaches and Parks, every 5 years.

HCP Chapter 7, Section 7.17 provides a conceptual work plan, schedule and costs of the RMV AMP component of the HRMP for the years 2007-2031 and County OMP/AMP costs. This conceptual plan will be refined by the Reserve Manager, with assistance by the Science Panel, as the 5-year MAPs are developed.

3. Regulatory Coverage for Covered Activities and Designated Covered Species and CDFG Jurisdictional Areas: The HCP involves three Participating Landowners: the County, RMV and

SMWD. A wide range of activities covered by the HCP and carried out by these landowners will impact Covered Species.

For the County, these "Covered Activities" generally include: (1) adaptive management activities within the existing County regional and wilderness parklands portion of the Habitat Reserve including habitat restoration and invasive species eradication in Subarea 3 with monies generated by Coto de Caza mitigation fees; (2) improvements to and extension of Avenida La Pata resulting in up to 331 ac (134 ha) of authorized impacts; and (3) activities related to the operation and expansion of the Prima Deshecha Landfill, including mitigation activities on County parklands, resulting in about 999 ac (404 ha) of permanent impacts, and temporary impacts within the Supplemental Open Space (SOS) portion of the landfill facility as provided for in the HCP. Further, draft Permit Condition #16 for the County of Orange identifies a minor amendment process to address the presence of Riverside and/or San Diego fairy shrimp on Prima Deshecha Landfill. In addition to the above Covered Activities, ongoing management and operations of the existing facilities in the three existing County parklands are treated as "Compatible Uses." Compatible Uses involve activities within the parklands that are not anticipated to result in take of the Covered Species and thus do not require incidental take authorization.

For RMV, Covered Activities generally include (1) HRMP activities involving monitoring throughout the Habitat Reserve (including County parklands enrolled in the Habitat Reserve), adaptive management of the RMV portion of the Habitat Reserve and adaptive management activities within the County portion of the Habitat Reserve under specified conditions; (2) ongoing ranching activities, including grazing according to a Grazing Management Plan; (3) construction of residential, commercial, industrial and infrastructure facilities; (4) maintenance and operations of existing ranch and infrastructure facilities; and (5) activities related to the operation of the Ortega Rock Facility. Lastly, grazing in Ladera Open Space as an adaptive management tool is addressed in draft Permit Condition #14 for RMV.

Although the Plan calculates impacts based on an overstated scenario for planning areas 4, 6, 7 and 8 (see Table 13-19A for example), the ultimate authorized impacts are 6,687 acres consisting of: 1) 5,873 acres attributable to development within planning areas 1-5, and 8; 2) 317 acres due to uses allowed within open space (25 acres relocated Ranch HQ, 50 acres of orchards, 14 acres of employee housing, 18 acres of recycling facility, 175 acres of reservoir in PA 4 and 35 acres for the Gobernadora basin); 3) 136 acres associated with Ortega Rock; and 4) 361 acres (327 acres in the Habitat Reserve and 34 acres in Supplemental Open Space) associated with permanent infrastructure impacts. In addition, temporary impacts of up to 252 acres of Habitat Reserve and 18 acres of Supplemental Open Space will also occur.

RMV lands that will be dedicated to the Habitat Reserve include 4,332 acres of "Prior RMV" conservancies, easements (4,284 acres of Donna O'Neill Conservancy, Upper Chiquita Conservation Area and the Arroyo Trabuco Conservation Easement Area) and land identified for preservation (48 acres in the Arroyo Trabuco) and 16,536 acres of "New" or "Proposed RMV" lands will be dedicated to the Habitat Reserve in accordance with the Phased Dedication Program described in the Plan. To further clarify, 327 acres of infrastructure impacts are

included in the 16,536-acre Proposed RMV Habitat Reserve land. After subtracting 327 from 16,536, the net Habitat Reserve on Proposed RMV lands is 16,211 acres (rounding error from Dudek's database is why this figure is not reported as 16,209 acres).

For SMWD, Covered Activities generally include: (1) construction of designated infrastructure, including pipelines, pump stations, reservoirs, and other facilities resulting in 73 ac (30 ha) of permanent impacts; and (2) operation and maintenance of existing and proposed facilities in SMWD's service area resulting in additional temporary impacts of 146 ac (59 ha) in the Habitat Reserve and 15 ac (6 ha) in the SOS.

4. Implementation Agreement (IA) and Funding Provision: This element of the HCP Conservation Strategy identifies an IA that addresses long-term implementation of the HCP and related funding provisions. Under the IA, regulatory coverage will be provided for under a Federal Endangered Species Act section 10(a)(1)(B) incidental take permit for designated listed and unlisted fish and wildlife species (termed "Covered Species"), in addition to other State of California regulatory processes including the NCCP Act Section 2835 taking of designated listed and unlisted plant and animal species, and impacts to CDFG jurisdictional areas. Seven federally listed threatened or endangered species and 25 non-listed Covered Species are proposed to receive regulatory coverage. The proposed Permit term is 75 years.

To address funding, RMV will create a benefit fee program associated with the close of escrow on home sales to fund the AMP and monitoring measures. The benefit fee program is intended to fund an operating account for the management and monitoring program component of the HRMP over the 75-year term of the Permit and IA and fund an endowment account for perpetual management and monitoring after the Permit term. At the conclusion of the 75-year Permit term, the projected accumulated amount in the operating and endowment accounts are $945,000 and $208 million, respectively. The RMV benefit fee also would fund a reserve account that would grow to a maximum of $10 million during the 75-year term of the IA. This reserve account would be funded over and above the operating fund to address the potential for "Changed Circumstances" within the Habitat Reserve that could generate the need for currently unidentified management/monitoring responses.

The County may generate up to $2.18 million, which will be secured in an endowment, for AMP activities in County parklands and SOS in Subarea 3 through an "opt in" in-lieu mitigation fee generated by development of the remaining undeveloped residential lots in Coto de Caza. Ongoing operations and management of County parklands for compatible uses will continue to be funded by the County of Orange, generating an estimated $1.4 million for the approximately 11,950 ac (4,836 ha) of parklands. In addition to funding the HRMP, the County has also provided for funding in the amount of $43 million for the management and monitoring of Prima Deshecha SOS and $850,000 for offsite mitigation for the Prima Deshecha Landfill and Avenida La Pata Covered Activities.

SMWD will contribute a total of $3.7 million to fund SMWD's proportionate share of the Adaptive Management Program component of the Habitat Reserve Management and Monitoring

Program. Of that amount, $700,000 consists of mitigation fees pursuant to the terms of the San Juan Creek/San Mateo Creek SAMP.

Administration and Coordination of Management and Monitoring Programs

Carrying out the HRMP will require coordination among the various responsible entities, in addition to coordination with the Science Panel (described below) and Wildlife Agencies/USACE. The five individual components of the HRMP administrative structure are: (1) the County NCCP/MSAA/HCP Administrative Coordinator ("Administrator"); (2) the Rancho Mission Viejo Land Conservancy; (3) the RMV Reserve Manager ("Reserve Manager"); (4) the Independent Reserve Land Easement Holder; and, (5) the Science Panel. Each element of the administrative structure will have its own duties, obligations, and directorial requirements in regards to implementation of the HRMP. The following is a brief description of the roles of the five administrative components of the HRMP; refer to the HCP Section 7.3 and IA for more detail on responsibilities.

Administrator

The Administrator will coordinate activities conducted under the OMP and AMP components of the HRMP. The County of Orange acting as the Administrator will serve as the entity responsible for coordinating the HRMP within the Habitat Reserve.

Rancho Mission Viejo Land Conservancy

Following execution of the IA, the Rancho Mission Viejo Land Conservancy ("RMVLC") will be incorporated as a not-for-profit, tax-exempt entity in accordance with the provisions of Section 501(c)(3) of the U. S. Internal Revenue Code. RMVLC's specific purpose and function will be the collection, investment, and distribution of funding for the benefit, preservation, and enhancement of the RMV Habitat Reserve Lands (*i.e.,* approximately 4,284 ac (1,734 ha) of prior RMV conservancy lands and approximately 14,579 ac (5,900 ha) of RMV lands subsequently enrolled into the Habitat Reserve pursuant to the Phased Dedication Program).

Reserve Manager

The primary duty of the RMV Habitat Reserve Lands Manager ("Reserve Manager") will be to manage and monitor the RMV Habitat Reserve Lands pursuant to the approved NCCP/MSAA/HCP.

Independent Reserve Land Easement Holder

All RMV Habitat Reserve Lands shall be enrolled into the Habitat Reserve through a master conservation easement and spreader amendments granted in favor of an Independent Reserve Land Easement Holder ("IRLEH"). The IRLEH shall be a not-for-profit, tax-exempt entity formed in accordance with the provisions of Section 501(c)(3) of the U. S. Internal Revenue Code. The IRLEH shall have responsibility for complying with all laws and regulations

concerning the holding of the conservation easements granted by RMV; performing such obligations and duties as are specified for the IRLEH in the RMV conservation easements, and verifying that the RMV Reserve Manager is acting in accordance with the provisions of the RMV conservation easements relative to activities conducted upon the easement properties.

Science Panel

Objective review and advice from outside scientists and technicians is a key element of the AMP. Scientists are a primary source of information and data for generating and refining the conceptual models that are the foundation of the AMP. The primary purpose and role of the Science Panel is to provide assistance in obtaining the best scientific information available so that "effectiveness monitoring" of the Habitat Reserve is carried out in accordance with the AMP concepts. Members of the Science Panel will be scientists drawn from academia or other sources with recognized expertise in ecology and conservation science. The target number of panel members is five with representative expertise in plant and animal ecology, quantitative methods and statistical analysis, and conservation planning on private lands.

Timeline for Initiation of the Habitat Reserve Management Program

Following execution of the IA for the NCCP/MSAA/HCP, the Participating Landowners will begin to take steps that ultimately will lead to full implementation of the HRMP. These initial steps will include: (1) appointment of an Administrator to coordinate and administer the overall Habitat Reserve and HRMP; (2) creation of the RMVLC; (3) formation of the Science Panel; and (4) designation of the Reserve Manager to carry out the HRMP as described in this chapter. The timing and sequence of HRMP implementation is strongly influenced by (1) the timing of impacts related to Covered Activities; (2) the amount of time that will be needed to assemble the overall Habitat Reserve; and (3) the amount of time that will be needed to fully fund HRMP measures. It may take as long as 15-20 years or more to assemble all of the lands designated for inclusion in the permanent Habitat Reserve assuming development of all planning areas. Within approximately the first 12 months following execution of the IA, approximately 16,282 ac (6,589 ha) will be available as part of the permanent Habitat Reserve. These lands will consist of the three existing County regional and wilderness parks, totaling about 11,950 ac (4,836 ha) and the previously set aside RMV easements and conservancies (*e.g.,* Ladera Open Space, Upper Chiquita Canyon Conservancy, Donna O'Neill Land Conservancy) and CDFG open space in Arroyo Trabuco that total about 4,332 ac (1,753 ha). The remaining lands designated for inclusion in the approved Habitat Reserve will be dedicated in phases over time as development proceeds. Within approximately 12 months of execution of the IA, it is anticipated that impacts related to Covered Activities, namely grading of all or a portion of RMV Planning Area 1, will occur. Thus, it is anticipated that management and monitoring of some or all of the Planning Area 1 Habitat Reserve lands will also be initiated. For a full description of the RMV Phased Dedication Program refer to the IA.

Service Regulatory Coverage for Covered Activities

The HCP Permit would cover impacts to federally listed and non-listed species from impacts associated with development of RMV residential and commercial properties and associated utilities and infrastructure, as well as County and SMWD Covered Activities. The HCP Permit will also cover ongoing Grazing Management Plan activities and implementation of the HRMP. Federally-listed species covered under the plan are: the threatened coastal California gnatcatcher and thread-leaved brodiaea and the endangered least Bell's vireo, southwestern willow flycatcher, arroyo toad, Riverside fairy shrimp, and San Diego fairy shrimp. Federally listed and non-listed species covered under the Plan are listed in Table 1.

Table 3 (Table 13-19A from the HCP) provides the acres of impacts (overstated) and conservation by habitat type. The permanent impacts include approximately 2,423 ac (981 ha) of sage scrub, 1,161 ac (470 ha) of chaparral, 2,666 ac (1,079 ha) of grasslands, and 190 ac (77 ha) of riparian. New conservation on RMV (Proposed RMV) provided for through RMV-phased dedications to the Habitat Reserve includes approximately 5,571 ac (2,255 ha) of sage scrub, 2,754 ac (1,115 ha) of chaparral, 3,129 ac (1,266 ha) of grasslands, and 1,281 ac (518 ha) of riparian. Permanent impacts to all vegetation community and non-natural land cover types from all Covered Activities are anticipated to total a maximum of 8,054 ac (3,353 ha) since the maximum allowable build-out will be 725 ac (293 ha) in PA4, 75 ac (30 ha) total in PA6 and 7, and 500 ac (202 ha) in PA8. Within the Habitat Reserve, identified key locations and "important" populations of Covered Species will be protected, and key habitat linkages for the species will also be conserved.

Conservation Measures

Construction-Related Conservation Measures

Construction-related conservation measures for Covered Activities will be implemented in the action area. These include habitat clearing, grubbing, grading, and associated construction actions outside of the active bird breeding season of February 15 to September 15. Should habitat clearing need to take place during the above defined bird breeding season, pre-construction focused surveys and other measures will be undertaken to avoid impacts to nests and nestlings. No work will be done within 300-500 feet (91-152) of active nests. Based on these conservation measures, which indicate clearing will be done outside the breeding season or only after nesting surveys in the impact area, we do not anticipate that eggs or nestlings will be killed or injured during habitat clearing or grading activities.

Table 3: Summary of Conserved and Impacted Acres in the Plan Area.

Vegetation Community	Gross Conserved Acres in Habitat Reserve				Gross Conserved Acres in SOS			Permanent Impact Acres[1]					Net Habitat Reserve[4]	Net SOS
	Proposed RMV	Prior RMV	County Parks	CDFG[2]	Starr Ranch	Prima Deshecha	Ladera Ranch	RMV[3]	Ortega Rock	Prima Deshecha	La Pata	SMWD		
Sage Scrub	5,571	1,276	5,556	10	2,061	133	0	2,163	63	122	52	23	12,191	2,196
Chaparral	2,754	401	2,053	0	288	28	0	1,118	0	43	0	0	5,194	311
Grassland	3,129	1,237	1,538	29	622	331	2	1,918	0	484	250	14	5,690	954
Riparian	1,281	325	1,546	7	563	14	0	156	1	21	9	3	3,120	577
Freshwater Marsh	17	0	0	0	0	0	0	2	0	0	0	0	16	0
Alkali Meadow	36	0	0	0	0	0	0	3	0	0	0	0	36	0
Open Water	43	4	5	0	0	0	0	64	0	0	0	0	50	0
Streamcourses	8	0	17	0	0	0	0	0	0	0	0	0	24	0
Woodland & Forest	645	117	672	0	352	1	0	561	0	1	0	0	1,417	353
Cliff & Rock	2	3	0	0	0	0	0	5	0	0	0	0	5	0
Agriculture	1,089	696	156	0	2	0	0	1,497	0	0	0	32	1,844	3
Disturbed	220	79	167	2	0	20	0	273	72	304	1	0	374	20
Developed	109	146	240	0	2	3	36	385	0	24	19	1	465	42
TOTAL	14,904	4,284	11,950	48	3,890	530	38	8,147	136	999	331	73	30,426	4,456

[1] The impact acreage is an overstated impact scenario that assumes 100 percent disturbance in PAs 4 and 8 and potential orchards in PAs 6 and 7 because the specific impact areas have not been determined. Ultimately impacts will be reduced by 1,632 acres and the Habitat Reserve will be increased by the same amount.

[2] Indicates CDFG conservation easement area in Arroyo Trabuco.

[3] Permanent impacts for RMV include the construction of new residential/commercial, potential orchards in PAs, and new infrastructure (roads, trails, sewer, water, etc.) and operation and maintenance/repair of existing infrastructure in the Habitat Reserve and SOS.

[4] Net Habitat Reserve and Net SOS reflect the subtraction of permanent infrastructure impacts from Gross Conserved Acres.

Finally, all temporarily impacted upland areas shall be restored to pre-construction elevations within one month following completion of work (Appendix U of the Plan). All temporarily impacted upland areas will be restored per the performance standards set forth in Table 1 of Appendix H of the Plan. Revegetation should commence within three months after restoration of pre-construction elevations and be completed within one growing season. SMWD must restore temporarily impacted CSS associated with the construction of the Upper Chiquita Reservoir with CSS species according to a restoration plan approved by the Wildlife Agencies. Temporary impacts associated with Prima Deshecha Landfill and Avenida La Pata will be hydroseeded with CSS species to mimic the original condition within three years. Although these areas will experience a temporal loss of habitat, upon completion of the restoration they are expected to provide suitable habitat.

RMV Conservation Measures

In addition to the Habitat Reserve and HRMP project elements described above, further conservation measures to avoid and minimize take of Covered Species are included in the HCP. These measures include (1) establishment of an urban/wildland interface zone that would separate the Habitat Reserve and adjacent non-reserve urban uses (HCP, Section 10.5); (2) implementation of a Translocation, Propagation and Management Plan for Special-status Plants as an element of the HRMP (HCP, Appendix I); (3) avoidance and minimization measures related to project modifications, construction-related activities, indirect effects (light, invasive species, public access), temporary impacts, grazing activities (HCP, Appendix U), and waters and wetland area activities (HCP, Appendix U); (4) implementation of a Wildland Fire Management Plan (HCP, Appendix N); (5) implementation of a Water Quality Management Plan (WQMP)(HCP, Appendix K); and (6) implementation of an Invasive Species Control Plan (HCP, Appendix J). Please refer to the cited sections and appendices of the HCP for greater detail.

In the urban/wildland interface zones (HCP, Section 10.5), measures to be implemented include:

1. Creation of fuel management zones combining irrigated and non-irrigated native plantings;
2. Prohibitions on the planting of invasive plants identified by the California Exotic Pest Plant Council and the Orange County Fire Code;
3. Management of pesticides, herbicides and fertilizers within and adjacent to the interface zone;
4. Shielding/directing light sources away from the Habitat Reserve; and
5. Provisions for barriers and signage to direct/control access to the Habitat Reserve by the public and domestic animals.

To further minimize impacts to sensitive plant species, the Translocation, Propagation and Management Plan for Special-status Plants (HCP, Appendix I) will be implemented. The plan will include development of a restoration program, pre-translocation monitoring, seed collection, selection and preparation of receptor sites, translocation, and long-term maintenance and monitoring of translocation sites. These activities will be carried out with the goal of

maximizing the likelihood that no functional loss of the species will occur within the Habitat Reserve. The plan will address four Covered Species (thread-leaved brodiaea, many-stemmed dudleya, southern tarplant, and Coulter's saltbush). The plan will also address four special-status species not proposed as Covered Species: intergraded mariposa lily (intergrade between *Calochortus weedii* var. *weedii* and *C.w.* var. *intermedius*), mud nama (*Nama stenocarpum*), and Salt Spring checkerbloom (*Sidalcea neomexicana*). These species were addressed by the Draft Southern Planning Guidelines and may require mitigation pursuant to the California Environmental Quality Act (CEQA).

Avoidance and minimization measures set forth in the HCP, Appendix U of the Plan and included as project design modifications are related to specific species and/or their habitats. Specific locations and general habitat areas identified in Appendix U of the Plan will be completely avoided so that no impacts will occur to specific populations. The largest subpopulation of a major population and key location of the thread-leaved brodiaea on Chiquadora Ridge will be completely avoided per USACE Special Condition I.A.3. Key locations and major populations of southern tarplant and Coulter's saltbush in the Chiquita sub-basin also will be substantially avoided. A 1,312-ft (400-m) wide corridor along San Juan Creek 656-ft (200-m) setback on either side of the center line of the creek upstream of Trampas Canyon for construction, with some adjustments for infrastructure facilities and recreation) will be implemented to avoid impacts to arroyo toad. In the San Mateo Watershed, a telemetry study will be conducted near Planning Area 8 and will be used to design appropriate measures to avoid and minimize impacts to the toad in this area. All vernal pools and Riverside and San Diego fairy shrimp and western spadefoot toad occupying these pools in the Trampas Canyon development area (Planning Area 5) will be avoided. Wildlife movement corridors will be protected by designing bridge crossings for new and upgraded existing arterials to allow unhindered wildlife movement. Fencing or similar barriers will be installed on both sides of approaches to bridges for appropriate distances to deter wildlife from entering roadways. Should Cristianitos Road be constructed from Planning Area 2 to 3, a box culvert to facilitate wildlife movement will be constructed in Chiquita Canyon. Riparian habitat will only be removed between September 15 and February 15, which is outside of the general bird breeding season, to avoid impacts to nesting birds, including least Bell's vireo and southwestern willow flycatcher.

A Biological Resources Construction Plan (BRCP) will be prepared and implemented. This plan will include, at minimum: specific measures for protection of special-status amphibian, mammal, bird, and plant species during construction; identification and quantification of habitats to be removed; establish protective fencing around conserved habitat areas; have specific construction monitoring programs for special-status species required by permitting agencies; and measures required to protect sensitive habitats, including erosion and siltation control, dust control measures, grading techniques, construction area limits, and biological monitoring requirements. During construction, exclusion fencing will be erected within 300 ft (91 m) of any known arroyo toad population in the areas of San Juan, Verdugo, Gabino, Cristianitos, and Talega creeks for construction occurring outside of the toad aestivation period. Specific measures regarding waters and wetlands Best Management Practices (BMPs) and turbidity in the San Juan Creek Watershed will be observed for arroyo toad, arroyo chub, partially-armored threespine stickleback, and other aquatic species in accordance with the provisions of the WQMP and the

USACE SAMP Special Permit Conditions. In addition for the chub and stickleback, per USACE Special Condition II.9, pre-construction surveys will be conducted within 1,000 feet downstream of each development Planning Area. If either species is found, turbidity within 300 feet of the Planning Area during construction will not exceed 10 Nephelometric Turbidity Unit (NTU) over background when the background is less than 50 NTU or a 20 percent increase in turbidity when the background turbidity is more than 50 NTU.

Indirect effects such as lighting, invasive species and public access are addressed by avoidance and minimization measures included in the HCP, Appendix U of the Plan. Lighting effects will be minimized by directing lighting away from habitat areas and using low intensity lights or other methods to reduce light spillage (USACE Special Condition I.D.7). Invasive species risk will be minimized by prohibiting them from the plant palette for development areas and fuel modification zones. An exotic animal removal program to remove cowbirds, bullfrogs, non-native fishes and other exotic animals that are predators or competitors with native species will be implemented as outlined in the Invasive Species Control Plan (HCP, Appendix J). Access to the RMV Habitat Reserve Lands will be limited to future trails (*i.e.*, Class 1 bikeway north of San Juan Creek, riding and hiking trail south of San Juan Creek and limited community trails) and docent-led tours. No general public access is anticipated. Prior to issuance of building permits the County of Orange will verify that measures to restrict public access, including fencing and signs, have been incorporated into building plans.

Temporarily impacted upland areas will be restored to pre-construction contours within one month of completion of work. These upland areas will be restored to equivalent or better conditions than pre-existing. Where restoration may be delayed due to seasonal conflicts, appropriate erosion control measures will be implemented.

Under the Grazing Management Plan (HCP, Appendix G), cattle will be seasonally excluded from active arroyo toad breeding pools, sand bars and benches in lower Gabino Creek and San Juan Creek following dedication to the Habitat Reserve to the maximum extent practical during the toad breeding season to reduce the likelihood of trampled egg masses and tadpoles. Temporary fencing, if necessary, will be erected to exclude cattle from breeding pools. A recent study of Central California vernal pools suggests a complex relationship between cattle and vernal pool hydrology, where in some cases cattle grazing may enhance pool duration and the likelihood of vernal pool species completing their reproductive cycle. Thus, cattle exclusions for vernal pools are not proposed at this time. If recommended by the Science Panel, cattle will be seasonally excluded from the Radio Tower Road vernal pools. Grazing once every three years within the Gobernadora Ecological Restoration Area (GERA) for fuel modification will be conducted outside of the breeding season for vireos and flycatchers to avoid impacts to nesting birds. Grazing for fuel modification purposes will also occur within the current Donna O'Neill Land Conservancy.

RMV Covered Activities within jurisdictional waters and wetlands will be conducted according to provisions of the USACE Permit Special Conditions (Special Conditions II.1-6, -10, -12) set forth in Appendix U of the Plan. Conditions include a contractor education program, project timing to avoid and minimize impacts to nesting birds, plans provided to the USACE showing

work areas, minimizing vehicle access routes, use of low tire pressure equipment, determination of appropriate discharge and refueling areas, clearly delimiting work areas with flags, tape or other markings to prevent unauthorized grading, restoration of waters and wetlands post-construction, and weekly construction reporting.

The Wildland Fire Management Plan (HCP, Appendix N) addresses short- and long-term tactical and strategic wildland fire protection. Elements of the Fire Management Plan include: identification of appropriate spatial scales and patterns for the long-term management of fire; development of active fire management prescriptions; quantification of effects of varying fire regimes on selected wildlife species; use of prescribed fire to reduce unplanned fire events; refinement of fire prescriptions that will aid in restoring habitat areas; and quantifying post-fire active restoration techniques. The plan will aim to reduce unplanned fire events that would negatively affect habitat that supports Covered Species through use of maintained firebreaks and strategic burns. The plan will also implement a fire regime and management and restoration strategies for the benefit of some habitats including valley needlegrass grassland, potentially in areas formerly occupied by coastal sage scrub, and in oak woodlands with thick undergrowth that excludes cattle.

The conceptual WQMP (HCP, Appendix K) is the first of four levels of water quality plan preparation; a Master Area Plan, a Subarea Plan and a final project-specific plan will follow. Water quality management assures the long-term viability of ecosystems through maintenance of existing flow durations that influence channel geomorphology. These plans will address BMPs and structural solutions, and each plan will become more focused and specific while maintaining consistency with the prior level WQMP. These plans will include solutions such as constructing detention/desilting basins to address sediment generation, detrimental turbidity, pollutants, and hydrologic and geomorphic processes. The focus of the plans will be to maintain and improve current water quality conditions in the watersheds affected by the HCP.

The Invasive Species Control Plan (HCP, Appendix J) is an element of the overall HRMP. Initial phases of the plan include: census and mapping of invasive plants and introduced predators on RMV and other portions of the Habitat Reserve; review of the ecology and habitat requirements for invasive species targeted for control; provide an overview of species-specific and density-dependent eradication methods; and analyze impacts and benefits to habitats and target/special-status species with implementation of the plan. Some specifics of the plan include manual and/or mechanical removal and use of foliar spray on invasive plants; draining of ponds, use of netting, gigging and shooting for bullfrog control; trapping of cowbirds; and insecticidal treatment of mounds/nests and broadcast treatments for invasive non-native ants. All methods will be implemented to limit detrimental impacts to native species.

<u>County Conservation Measures</u>

In addition to the contribution of County lands to the Habitat Reserve as described above, the County of Orange will implement the following conservation measures: 1) Invasive Plant Species Control within the San Juan Creek portion of Caspers Regional Park; 2) preservation, restoration and management of approximately 530.7 ac (214.8 ha) of Prima Deshecha SOS as

described in the Prima Deshecha Supplemental Open Space Management Plan; and 3) implement the measures set forth in Appendix M and applicable measures as set forth in Appendix U of the Plan (*e.g.*, clearing outside the bird breeding season).

SMWD Conservation Measures

In addition to the contribution to the AMP component of the HRMP described above, SMWD will also implement the measures set forth in Appendix U of the Plan (*e.g.*, clearing outside the general bird breeding season, project boundaries clearly marked in the field, arroyo toad exclusion fencing).

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 Federal Register §402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation and the impacts of State and private actions that are contemporaneous with the consultation in progress.

Under section 7(a)(2) of the Act, the action area is defined as the reach of direct and indirect effects, as well as the analysis area for this opinion. The action area is also the area in which baseline conditions and cumulative effects are analyzed. For our analysis, the action area is generally defined as the action area in that we anticipate the direct and indirect affects to Covered Species will be confined to within the action area. Because of the landscape nature of the proposed action, we are providing a general assessment of the existing conditions of the action area. The baseline for individual species is provided in the Species by Species Evaluation section of this biological opinion.

We have defined the action area as the Southern Subregion (131,634 ac (53,270 ha)), excluding the Cleveland National Forest (40,001 ac (16,188 ha)) and other areas in the Subregion that are identified as Not a Part (5,557 acres (2,249 ha)). The Other/Not a Part areas include the cities of Lake Forest and Dana Point, portions of San Juan Capistrano, an "Existing Use" Girl Scout Camp, Ladera Ranch, Las Flores, Tesoro High School, the Foothill Transportation Corridor-North, the Nichols Institute bounded by Caspers Wilderness Park, the sewage treatment facility in Chiquita Canyon and other areas that are in the Southern Subregion but are Not a Part of the Plan. After excluding the Cleveland National Forest and Not a Part areas, the action area contains 86,076 ac (34,834 ha) (Table 4). The action area is subdivided into 4 geographic Subareas: Subarea 1 (44,633 ac (18,062 ha)), Subarea 2 (3,872 ac (1,567 ha)), Subarea 3 (4,026 ac (1,629 ha)), and Subarea 4 (33,545 ac (13,575 ha)).

Table 4: Vegetation or Land Cover Communities (acres) Within the Action Area.

Vegetation Community/ Land Cover	Subregion Total[1]	Cleveland National Forest	Other/Not A Part	Action area[2]	Subarea 1	Subarea 2	Subarea 3	Subarea 4
Coastal Sage Scrub	25,788	4,831	239	20,718	16,811	1,300	753	1,854
Chaparral	38,019	29,449	65	8,505	6,668	1,156	54	627
Grassland	15,231	120	245	14,866	9,212	367	292	4,995
Woodland/Forest	5,836	3,217	1	2,618	2,334	172	49	63
Riparian	7,375	2,231	76	5,068	3,895	419	233	521
Open Water	388	1	10	377	113	0	24	240
Freshwater Marsh	34	0	0	34	20	1	0	13
Slope Wetland	2	0	0	2	2.2	0	0	0.2
Watercourses	75	0	7	68	25	8	0	35
Alkali Meadow	42	0	4	38	38	0	0	0
Cliff and Rock	72	62	0	10	10	0	0	0
Marine	131	0	33	98	0	0	0	98
Developed	32,768	65	4,727	27,976	970	235	2,380	24,391
Disturbed	1,829	24	84	1,721	1,050	39	70	562
Agriculture	4,044	1	66	3,977	3,485	175	171	146
TOTAL	**131,634**	**40,001**	**5,557**	**86,076**	**44,633**	**3,872**	**4,026**	**33,545**

[1] Acreage is the sum of Cleveland National Forest, Other/Not a Part areas, and action area. The figures include updated vegetation acreages for Prima Deshecha Landfill and therefore may vary from figures in the Plan.
[2] Action area is the sum of Subareas 1 through 4.

Subarea 1 includes 44,633 ac (18,062 ha) and is subdivided into the following areas: Rancho Mission Viejo lands, the County-owned and operated Prima Deshecha Landfill, County Park lands, Arroyo Trabuco conservation easement lands, and the Audubon Society's Starr Ranch Sanctuary. RMV lands include lands already conserved under conservation easements consisting of the Ladera Open Space, the Donna O'Neil Land Conservancy area, the Arroyo Trabuco Conservation easement areas, and the Upper Chiquita Canyon Conservation Area (all of these areas referred to in the Plan documents as Prior RMV) and phased dedication lands (referred to in the Plan documents as Proposed RMV).

Subarea 2 includes multiple ownerships located within the 3,872 ac (1,567 ha) of the Foothill-Trabuco Specific Plan area (FTSPA) located within the Southern Subregion. A significant portion of the FTSPA is located outside this Subregion and within the Central and Coastal NCCP/HCP Subregion. Within the Southern Subregion, Subarea 2 contains considerable existing natural open space in addition to the northern portion of the O'Neill Regional Park which is located within the FTSPA boundaries. About 1,500 ac (607 ha) of natural open space is designated in the General Plan, and these General Plan designated open space areas support a variety of listed and unlisted species and provide wildlife corridors linking the FTSPA to the Cleveland National Forest and to the proposed Habitat Reserve.

Subarea 3 includes 4,026 ac (1,629 ha) with 2,830 developed ac (1,145 ha), and 780 ac (316 ha) of supplemental open space. Subarea 3 is built out except for a few undeveloped private lots located within the Coto de Caza Planned Community, primarily along the northern edge.

Subarea 4 includes 33,545 ac (13,575 ha) including the four incorporated cities of Rancho Santa Margarita, Mission Viejo, San Juan Capistrano and San Clemente, and some interstitial unincorporated lands adjacent to the cities. Within Subarea 4, important natural areas have been previously protected through Section 4(d) and Section 7 consultations. Currently, only about 106 ac (43 ha) of uncommitted developable land remains in scattered parcels within the entirety of Subarea 4. Of the 106 ac (43ha) of natural lands, only about 11 ac (5 ha) are capable of supporting State or federally listed species.

The action area is characterized by rural, urban, and suburban development intermixed with agricultural operations and areas of undeveloped lands. Large expanses of land along the northeastern boundary of the action area include the Cleveland National Forest. Urban development is more prevalent in the western portion of the action area. The topography in the action area is generally lowland valleys intersected with rolling hills surrounded by mountain ranges. Lowland valleys occur at elevations below 2,000 ft (600 m), and hillsides dominated by scrub and chaparral occur at elevations of 2,000-3,000 ft (600-900 m).

The action area is divided into land use or vegetation communities including: coastal sage scrub; chaparral; grassland; woodland and forest; riparian; open water; freshwater marsh; slope wetland; watercourses; alkali meadow; cliff and rock; marine; agriculture; and disturbed or developed lands. Within these generalized or "collapsed" categories there are more specific habitat associations or "uncollapsed" vegetation categories. Vegetation communities in the context of individual species are addressed in the Species by Species Evaluation section of this biological opinion. The following discussion sets the framework for the vegetation communities within the subareas that are summarized in Table 4.

Developed or disturbed land (29,697 ac (12,018 ha)) and agricultural lands (3,977 ac (1,609 ha) together comprise 33,674 ac (13,627 ha) (39 percent) of the action area. These areas are anticipated to provide minimal value to most of the species addressed by the Plan. However, urban areas with tree or shrub vegetation may provide a minor amount of habitat for some migratory birds. Agricultural areas generally provide little functional value but can provide limited support for certain species. For example, field edges may provide habitat for species such as burrowing owl and field croplands may provide foraging opportunities for species such as grasshopper sparrow when crop rotation leaves newly plowed or stubble fields. Some agricultural lands can continue to support vernal pools and alkali playas that provide habitat for species associated with these habitat types. Also, agricultural lands can provide connectivity between habitat areas and act as buffers between developed and natural areas.

Coastal sage scrub (20,618 ac (8,344 ha); 24 percent) is the predominant natural vegetation community in the action area. Coastal sage scrub occurs throughout the action area, mostly in lowlands and foothill slopes up to about 1,500 feet (450 m) in elevation. Grasslands (14,866 ac (6,016 ha); 17 percent) are the second most abundant vegetation type in the action area and are

comprised of mostly non-native grassland with some native grassland component. While they are a smaller component of the total acreage within the Plan, native grasslands contain structural and biotic elements that non-native grasslands lack and therefore are important to grassland associated species. Chaparral (8,505 ac (3,442 ha); 10 percent) is the third most abundant vegetation community and is generally found along the foothill and lower mountain slopes.

Chaparral, scrub communities, and grasslands each exist in dense stands but in some areas have a sparse or open character. These vegetation communities are found in contiguous stands, but they also may have a patchy distribution and exist in a matrix with other habitats. These differences in density and distribution lead to differing suitability for species' use. However, due to the limitations of our dataset, we were unable to map the habitats at that scale. Therefore, we may overestimate or underestimate habitat available for any particular species. Overall, these vegetation communities support a wide number of the species addressed under the Plan and provide habitat connections within the action area and to adjacent areas.

Meadows and marshes (71 ac (29 ha) inclusively), riparian (5,068 ac (2,051 ha), and watercourses (68 ac (28 ha)), cover about 5,208 ac (2,108 ha) (6 percent) within the action area. While these wetland habitats comprise a relatively minor amount of the total acreage within the action area, they support a large number and wide variety of sensitive, wetland-dependent or wetland-associated plant and animal species that cannot exist or are unlikely to be found in other habitat types. Riparian scrub, woodland and forest areas also frequently provide vital corridor or linkage areas that facilitate wildlife movement within the action area and to adjacent areas. Of note are the vernal pools that support numerous species that depend on vernal pools and their surrounding watersheds as habitat. Further discussion of the baseline for vernal pools in the action area is provided later in this document under the Species by Species Evaluations. The remaining vegetation communities of woodlands and forest (2,618 ac (1,060 ha); 3 percent), open water (377 ac (153 ha)), and marine (98 ac (40 ha)) comprise a relatively small percentage of the overall habitats in the action area.

Habitat Linkages

Habitat linkages are displayed in Figure 3 and include:

- The Arroyo Trabuco (A) between approximately Avery Parkway and the Cleveland National Forest.

- The area (B) between the Las Flores and Ladera Ranch developments that connects Arroyo Trabuco and Chiquita Ridge. Linkage B provides a linkage for the coastal California gnatcatcher and for large mammals.

- The Chiquita Ridge and Creek area (C) has a north-south linkage from San Juan Creek to the habitat around the northern end of Coto de Caza. This linkage provides for the coastal California gnatcatcher, cactus wren, and for the movement of large mammals.

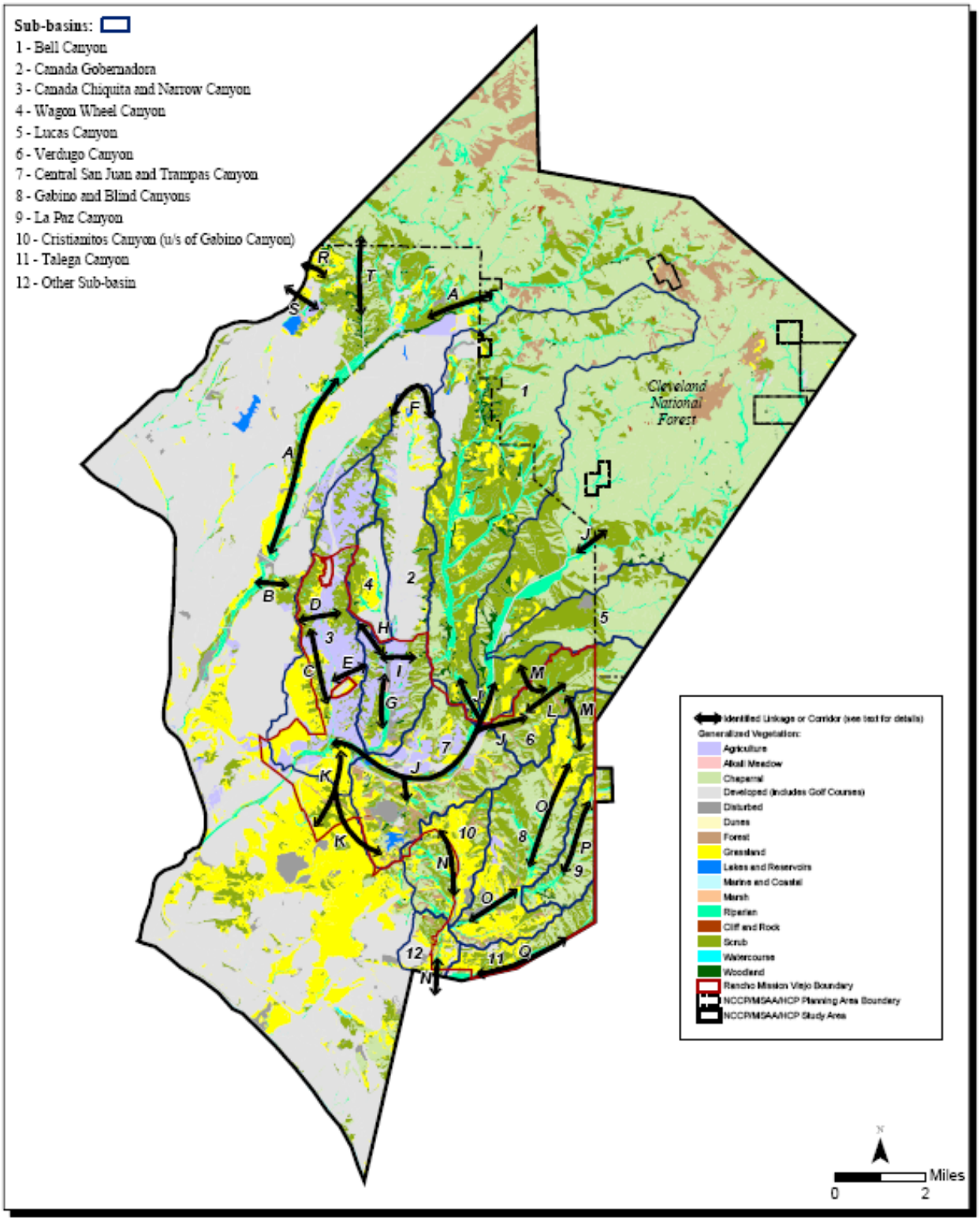

Figure 3. Habitat Linkages in the Action Area.

- The "Narrows" area (D) separating middle and lower Chiquita Canyon consists of oak/riparian and coastal sage scrub habitats and provides an east-west habitat linkage between Chiquita Ridge and Chiquadora Ridge and Sulphur Canyon for large mammals and the coastal California gnatcatcher.

- Lower Chiquita Canyon (E) has a mosaic of coastal sage scrub and grassland and provides for the east-west movement of coastal California gnatcatcher and for the movement of large mammals.

- The area north of Coto de Caza (F) provides a linkage for the coastal California gnatcatcher and cactus wren and some limited function for larger animals.

- Chiquadora Ridge and adjacent Gobernadora Creek (G) provide a north-south linkage for coastal California gnatcatcher, cactus wren, and large animals to San Juan Creek.

- Sulphur Canyon (H) provides a north-south and east-west linkage for large mammals between Chiquita and Wagon Wheel Canyons and Canada Gobernadora and allows for movement to the east to Bell Canyon and Caspers Wilderness Park. It also provides for north-south movement for the coastal California gnatcatcher and cactus wren.

- San Juan Creek (J) acts as a central nexus for north-south and east-west movement in the middle of the action area. It connects Chiquita Ridge and Canyon with the Central San Juan Creek and Trampas Canyon sub-basin to allow movement to the south via Cristianitos Canyon. It also allows for east-west movement from Chiquita Canyon upstream to the Cleveland National Forest and tributaries such as Canada Gobernadora, Bell Canyon, and Verdugo Canyon. Large mammals moving across Ortega Highway use box culverts or cross the highway.

- Habitat west of the silica mine in Trampas Canyon (K) provides dispersal opportunities for coastal California gnatcatchers and other species between Chiquita Ridge and San Juan Capistrano and San Clemente and eastward dispersal between Trampas Canyon and the Talega development to the RMV Conservancy, Cristianitos Canyon, and Marine Corps Base Camp Pendleton (MCB Camp Pendleton). This linkage connects Subareas 1 and 4.

- Verdugo Canyon (L) provides and east-west linkage for large mammals between San Juan Creek and the Cleveland National Forest.

- Coastal sage scrub and chaparral adjacent to Verdugo Canyon (M) may provide some north-south movements for cactus wren and other species.

- Cristianitos Canyon (N) links San Juan Creek with coastal California gnatcatcher populations in lower Gabino Creek and MCB Camp Pendleton along lower Cristianitos/San Mateo Creek.

- Gabino Canyon (O) provides a north-south linkage between the Planning Area and the Cleveland National Forest for large mammals and may also provide linkage for cactus wren and other species. La Paz Canyon.

- (P) provides a north-south linkage between the action area and the Cleveland National Forest for large mammals and possibly for cactus wren and other species.

- Talega Canyon (Q) provides for east-west and north-south movement between the action area and MCB Camp Pendleton for large mammals, cactus wren, and other species.

- The Saddleback Meadows (R) location provides for a lower elevation linkage between the action area and the Central Subarea component of the Central and Coastal NCCP/MSAA/HCP Habitat Reserve. This area provides a corridor via two 300-foot-long (91 m) steel pipe undercrossings of El Toro Road.

- The area north of Oso Reservoir (S) provides a lower elevation linkage between the Southern Subregion Planning Area and the Central Subarea component of the Central and Coastal NCCP/MSAA/HCP Habitat Reserve.

- The upper Arroyo Trabuco area (T) includes the locations of several habitat linkages.

Ranching Operations

In the past, the Rancho Mission Viejo had several thousand head of cattle. In recent years, there has been an average of 500 head of cattle that graze on about 19,100 ac (7,730 ha) of pasture. Within Rancho Mission Viejo, about 86 percent of the area is designated as grazing land. Pastures within the action area are described below:

McFadden. This pasture is actively grazed and occurs between the Horno and Narrow/Chiquita sub-basins. Vegetation types include agriculture and annual grasslands.

Oil Well Pasture. This pasture occurs between the Horno and Narrow/Chiquita sub-basins. Vegetation types in Oil Well Pasture include agriculture, annual grasslands, coastal sage scrub and minor amounts of native grassland, riparian and developed. This pasture is part of the Ladera Open Space Conservation Easement and grazing is not expected.

Lower Chiquita, Middle Trabuco, Upper Chiquita and Cecil's Pasture. These pastures are all located within the Chiquita sub-basin and include the majority of Chiquadora Ridge located in the western portion of the Gobernadora sub-basin. Portions of Middle Trabuco, Cecil's, and Upper and Lower Chiquita pastures have been removed from active grazing for development purposes (Cecil's pasture below Oso Parkway) or set aside for conservation purposes (Cecil's pasture and Upper Chiquita above Oso Parkway, Horseshoe pasture, Narrow Canyon and portions of Horno). The remaining parts of these pastures are grazed. Vegetation in these pastures includes coastal sage scrub, agriculture (in the form of citrus and avocado orchards and barley fields), patches of annual and native grasslands, chaparral and riparian vegetation.

Chiquita and Lower Chiquita Pasture. Agricultural operations, including citrus, avocados, and barley fields also occur in this area, but cattle are excluded from these operations. Water is provided via pipeline from Chiquita Creek. Vegetation includes coastal sage scrub, chaparral, southern willow scrub, arroyo willow riparian forest, and coast live oak riparian forest.

Vineyard Pasture. Barley is often grown in the alluvial valley of this pasture, and annual grasslands are also used for grazing. Cattle troughs and Gobernadora Creek provide water to the pasture. Vegetation includes riparian habitats along Gobernadora Creek.

River Pasture. The pasture occurs on San Juan Creek and barley is grown in the area. Water is provided via troughs and San Juan Creek. Habitat types include chaparral, forest, open water, marsh, riparian, coastal sage scrub, and oak woodlands.

Bull Pasture. This pasture is located west of Gobernadora Creek and is enclosed by four-strand barbed wire fence. Barley and annual grasslands are used for grazing and a trough provides water. Vegetation types include coastal sage scrub, chaparral, oak woodlands, and riparian habitat.

Lower Gobernadora. This pasture is south of Bull Pasture. Barely and annual grasslands are used for grazing and a trough provides water. Vegetation types include coastal sage scrub, chaparral, and oak woodlands.

South 40 Pasture. This pasture is south of Ortega Highway. Barley and annual grasslands are used for grazing and a trough provides water. Chaparral also occurs in this pasture.

Gabino. This pasture is in the eastern portion of the action area. Water is provided from Jerome's Lake, water troughs, and Gabino Creek. Coastal sage scrub and chaparral dominate this pasture. Grasslands, including native grasslands, riparian, marsh, woodland, and rock also occur in Gabino pasture.

Cristianitos. This pasture is south of Ortega Highway and east of Cristianitos Road. Lemons and avocados are grown in the southeastern end of the pasture. Water is provided via old mining ponds and water troughs. Grassland, including native grasslands, and coastal sage scrub dominate this pasture. Chaparral, forest, riparian, open water, woodland, and rock also occur in this pasture.

Rinconada. This pasture is located south of Ortega Highway and east of the Sierra Pasture. This area is disturbed from the Oglebay Norton Industrial Sands operation. Water is provided via troughs and mining ponds. Vegetation types in this pasture include coastal sage scrub, grassland, chaparral, riparian, and oak forest and woodland.

Sierra. Sierra is located south of Ortega Highway and east of La Pata Avenue. Water is provided via water troughs. Vegetation types in this pasture include mainly grassland and coastal sage scrub, with some riparian and minor amounts of oak woodland and forest.

Horse. This pasture is located within the Central San Juan subunit of the Central San Juan and Trampas Canyon sub-basin. Vegetation includes coastal sage scrub, chaparral, oak woodlands, grassland, open water, riparian, agriculture, and developed and disturbed areas. No active grazing occurs in this pasture.

Nick's Pasture. This pasture is located within the Central San Juan subunit of the Central San Juan and Trampas Canyon sub-basin. Vegetation types include coastal sage scrub, chaparral, oak woodlands, grassland, riparian and agriculture; a small area is developed.

Talega. This pasture is within the Talega and Blind Canyon sub-basins. Vegetation types include coastal sage scrub, chaparral, grassland, and riparian. Developed land is present in small amounts.

TRW (Northrop Grumman) Pasture. This pasture is located within the Talega and Cristianitos sub-basins. Vegetation types include coastal sage scrub, grassland, riparian, chaparral, open water, woodland, and forest. The Northrop Grumman facility occurs in this pasture. No active grazing occurs in this pasture.

Cattle have been rotated between pastures based on water and forage availability and a desire to maintain an average of 25 percent residual dry matter for natural pastures. Generally, cattle have grazed in the southern pastures (South 40, Sierra, Rinconada, Cristianitos, Gabino, and Talega) from October to May. In late May or early June, the cattle are moved to the northern pastures, which allow the cattle to benefit from the areas planted with barley.

Prima Deshecha Landfill

The following habitat acreage occurs within the proposed 530.7-acre (215-ha) SOS area on the Landfill including: 99.45 ac (40 ha) of existing CSS, 33.31 ac (14 ha) of re-vegetated CSS (14 of these acres are counted towards mitigation for County Covered Activities in this HCP), 0.22 ac (0.09 ha) of open water, 315.76 ac (128 ha) of annual grasslands (most of which is of extremely poor quality dominated by artichoke thistle, black mustard, and tree tobacco), 13.44 ac (5 ha) of southern needlegrass grassland, 3.16 ac (1 ha) of ruderal, 3.90 ac (2 ha) of freshwater and alkali marsh/southern willow scrub, and 10.7 ac (4 ha) of riparian. These figures were unavailable to us during our analysis of impacts for Avenida La Pata and Prima Deshecha Landfill. However, these additional acreages, particularly for CSS, add to the conservation value of this area.

Currently Conserved Lands

Described here are some of the areas currently restricted from future development; ownership status is also noted.

O'Neill Regional Park (County)

O'Neill Regional Park includes about 2,130 ac (862 ha) of land in the northern portion of the action area. O'Neill Regional Park provides part of a lower elevation linkage between the action area and the Central Subarea component of the Central and Coastal NCCP/MSAA/HCP Habitat Reserve.

General Thomas F. Riley Wilderness Park (County)

General Thomas F. Riley Wilderness Park covers 551 ac (223 ha), contains portions of a major coastal California gnatcatcher population, and allows for the linkage of coastal California gnatcatcher populations located in the Upper Chiquita Conservation Area and on Chiquadora Ridge. This area also supports large patches of grassland.

Caspers Wilderness Park (County)

Caspers Wilderness Park includes about 7,180 ac (2,906 ha) south of Starr Ranch. With the Cleveland National Forest and the Starr Ranch almost all of Bell Canyon watershed is included in protected open space. Caspers Wilderness Park includes portions of San Juan Creek and an arroyo toad population. This area also includes Lucas Canyon. Both Bell and Lucas canyons provide sand and gravel sediment for the arroyo toad downstream. Caspers Wilderness Park helps link Gobernadora Creek to coastal California gnatcatchers in the Chiquita sub-basin and areas along San Juan Creek. Caspers Wilderness Park also contains large areas of live oak woodland.

Donna O'Neill Land Conservancy (Prior RMV)

The Donna O'Neill Land Conservancy includes 1,161 ac (470 ha) of land and contains significant habitat resources including woodlands/riparian areas and coastal sage scrub habitat. The western side of the Conservancy is dominated by coastal sage scrub and chaparral habitat. The Conservancy does not contain known coastal California gnatcatcher breeding territories, but its 366 ac (148 ha) of coastal sage scrub habitat provides connectivity between populations to the west and south of the action area and a location of coastal California gnatcatchers in upper Cristianitos Canyon. The Conservancy also contains several sensitive plant locations including the many-stemmed dudleya and areas of live oak habitat. The Conservancy also contains a small portion of cliff and rock in its southern portion.

Ladera Open Space (Prior RMV)

Ladera consists of about 1,608 ac (651 ha) of land and includes a large area of grassland. The Chiquita Ridge portion is contiguous with the Las Flores dedication. Another portion of the dedication area includes the slopes above Arroyo Trabuco.

Gobernadora Ecological Restoration Area (Prior RMV)

The Gobernadora Ecological Restoration Area (GERA) includes about 105 ac (42 ha) of riparian/wetlands habitat that are permanently protected by a conservation easement. The GERA provides an area for nesting birds and allows for further riparian habitat protection within Gobernadora Creek. Twelve to fifteen pairs of least Bell's vireos and six pairs of southwestern willow flycatchers have been located within GERA and Gobernadora Creek.

Upper Chiquita (Prior RMV)

Upper Chiquita includes 1,182 ac (478 ha) of land which is dominated by coastal sage scrub, chaparral, and grassland. Oak woodland, sycamore woodland, and riparian habitats also occur. Upper Chiquita contains portions of a large population of coastal California gnatcatchers and also contains a large population of coastal cactus wrens. Other species occurring include orange-throated whiptails and northern red diamond rattlesnakes.

Starr Ranch Sanctuary (Supplemental Open Space)

Starr Ranch Sanctuary includes about 3,892 ac (1,575 ha) of habitat located contiguous with the Cleveland National Forest and Caspers Wilderness Park. Major habitat types found within the sanctuary include coastal sage scrub (2,061 ac (834 ha)), grassland (622 ac (252 ha)), riparian (563 ac (228 ha)), woodlands and forests (352 ac (142 ha)), and chaparral (288 ac (117 ha)). The Starr Ranch Sanctuary also contains populations of coastal California gnatcatchers and many other sensitive wildlife and plant species. Starr Ranch Sanctuary allows for linking the Gobernadora Creek area to habitat with coastal California gnatcatchers in the Chiquita sub-basin and habitat along San Juan Creek.

Past Federal Actions

Appendix 1 of this biological/conference opinion provides information on prior Federal Actions in the action area including Section 7 consultations and Interim Habitat Loss Plans under the special 4(d) rule for the coastal California gnatcatcher. This appendix outlines the previous Federal actions that have affected the environmental baseline within the action area in general terms but cannot be used to precisely summarize previous impacts. In some cases, projects were not implemented as described or were not implemented at all. In cases for which we have specific knowledge regarding implementation, we provide results of project completion.

Summary of Studies Conducted in Action Area

The database for special-status wildlife species in the study area is compiled from the cumulative results of a number of general and focused biological survey efforts and existing databases. Depending on the species being surveyed for, the survey area varied according to suitable habitat. Several species-specific surveys have been conducted including surveys for California gnatcatcher, orange-throated whiptail, cactus wren, tricolored blackbird, raptors, riparian birds, arroyo toad, spadefoot toad, Riverside and San Diego fairy shrimp, and special-status plants

species, including thread-leaved brodiaea. In addition to these species-specific surveys, general biological surveys have been conducted on portions of the study area, specifically RMV lands. A substantial portion of these species-specific and general biological surveys on RMV lands were multi-year surveys conducted over the last 10 years by the Transportation Corridor Agencies (TCA) for the Foothill Transportation Corridor (FTC) North (FTC-N) and South (FTC-S) segments. These multi-year TCA surveys provide comprehensive survey coverage for planning areas 2, 3, 6 and 7. Anecdotal observations and records of species from the Science Advisors and other biologists for the study area and specific projects are also included in the database. Much of the herpetofauna and historic raptor nest data are from P. Bloom, who has conducted numerous general surveys of RMV over the last two decades. Due to broad extent and repeated nature of the survey work conducted in the study area, it is not expected that "major" or "important populations" of special-status species in development planning areas that could affect regulatory coverage of a particular species have been missed. The only development planning areas that have had relatively less survey efforts are planning areas 4 and 8. Planning Area 4 has been surveyed specifically for California gnatcatcher and cactus wren, but probably due to the rugged terrain, "chaparral-dominated" vegetative structure of the area (*i.e.*, even the coastal sage scrub is structurally more like chaparral than the low-growing, more open coastal sage scrub preferred by gnatcatchers in the study area) and lack of cactus patches, these species were absent during the surveys. Based on the vegetation and rugged terrain, it is unlikely that Planning Area 4 supports "major" or "important populations" of species proposed for regulatory coverage. Planning Area 8 also has been specifically surveyed for the gnatcatcher and wren and other species have been anecdotally noted. The most significant species associated with Planning Area 8 is the arroyo toad. Multi-year focused toad surveys in the lower Gabino, La Paz, Cristianitos and Talega creeks bordering Planning Area 8 have been conducted. Also, pursuant to SAMP USACE Permit Condition I.D.8, a 5-year radio-telemetry study of the arroyo toad populations near Planning Area 8 will be undertaken and submitted to the Service, CDFG and USACE prior to submittal of an application to USACE. The results will be used to design appropriate measures to minimize impacts to arroyo toad in Planning Area 8. Similar to Planning Area 4, Planning Area 8 likely does not support any other "major" or "important populations" of species that would affect regulatory coverage.

The following is a summary list of surveys that have contributed to the NCCP database as documented in the Plan. These various survey efforts have resulted in a cumulative database that provides a strong portrayal of the abundance, richness, and distribution of biological resources in the study area.

- Coastal California gnatcatcher surveys conducted by Michael Brandman Associates (MBA) on various private lands in 1990 and 1991 and for the proposed Foothill Transportation Corridor in 1994-1996 (MBA 1996).
- General biological surveys conducted by Ed Almanza & Associates on Forster Ranch in 1992 (Almanza & Associates 1992).
- Bird surveys conducted by Sweetwater Environmental Biologists on County parkland in 1993 (SEB 1993).

- Focused surveys for the orange-throated whiptail conducted by Lilburn Corporation on portions of RMV in 1994 (Lilburn Corporation 1994).
- Focused surveys conducted by Bontrager for the coastal California gnatcatcher (1989), coastal cactus wren (1989-1990), and tricolored blackbird (1989) on RMV (Bontrager 1989, 1990a, and 1991).
- A general survey of the distributions of sensitive biological resources and wildlife corridors on RMV (Bontrager 1990b).
- Focused bird surveys conducted by Dudek and Associates, Inc. in three areas: Coto de Caza/Dove Canyon, Northrop Grumman/Ford Aerospace, and Reservoir Canyon (Dudek and Associates 1994).
- A wildlife corridor study conducted by Dudek throughout the Southern NCCP/MSAA/HCP in 1994 (Dudek and Associates 1995).
- A cumulative database on historic raptor nest sites in the study area compiled by P. Bloom between approximately 1990 and 2000 with review and update in 2006 (Bloom 2006).
- Pitfall trap data for Audubon Starr Ranch Sanctuary provided by P. DiSimone.
- Focused surveys conducted in 1998 by Dudek and Harmsworth Associates throughout RMV for riparian birds (Dudek and Associates 1998a).
- Focused surveys conducted in 1998 by Glenn Lukos Associates (GLA) throughout RMV for sensitive and rare plants.
- Focused surveys conducted in 1998 by P. Bloom throughout the study area for arroyo toad and western spadefoot toad (Bloom 1998)[2].
- Focused surveys by Dudek for least Bell's vireo, southwestern willow flycatcher, coastal California gnatcatcher, and arroyo toad in lower Arroyo Trabuco in 1997-2000 (Dudek and Associates 2001a).
- Focused survey for rare and sensitive plants by GLA in lower Arroyo Trabuco in 2000 (found in Dudek and Associates 2001a).
- Focused surveys for sensitive wildlife and plants by Dudek in middle Chiquita Canyon in 1997 (Dudek and Associates 1997).
- Focused survey by Dudek for coastal California gnatcatcher and other sensitive wildlife species on the Donna O'Neill Land Conservancy at RMV in 2003 (Dudek and Associates 2003).
- Vernal pool and fairy shrimp surveys conducted in 2001 on RMV jointly by Dudek and PCR (Dudek and Associates 2001b; PCR 2003b).

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[2] As stated in the Draft NCCP/MSAA/HCP, Appendix E (p. E-236), "The 1998 surveys began somewhat late in the spadefoot toad breeding season and some breeding sites may have been missed. Bloom believes that the toad is more widespread in the Planning Area than indicated in the database. However, it seems unlikely that any new locations would constitute a *"major" population* or a *key location*. Even though the survey probably was too late in the season to find all the locations, it seems unlikely that a *"major" population* would have been missed."

- Various biological surveys conducted by BonTerra on the Prima Deshecha Landfill (BonTerra Consulting 2004a, b; 2005).
- The California Natural Diversity Database (CNDDB).
- A cumulative database for sensitive and rare plants compiled by botanist F. Roberts (formerly with the Service) received circa 1994.
- WES/CRREL and PCR *et al.* (2002) studies of riverine and non-riverine wetlands, geomorphology and hydrology conducted in 2000-2002 in support of the SAMP and NCCP/MSAA/HCP.
- Various other studies and anecdotal records of species from the Science Advisors and other biologists for the study area and specific projects (*e.g.,* Beier and Barrett 1993; Padley 1992; Harmsworth Associates 1997, 1998, 1999, 2001a and b, 2003, 2004).
- Updates to the listed species database from the Service in 2002 incorporating surveys conducted under federal permits from 1999 to 2002.
- Updates to sensitive plant database for RMV provided by GLA in 2002 and 2003.
- Update to sensitive plant database for the Donna O'Neill Land Conservancy at RMV.

GENERAL EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. Many of the general effects described below are specifically identified on a species by species basis in the following Status of the Species and species-specific Effects of the Action sections.

Direct impacts to Covered Species and their habitats are anticipated to occur within the Action area upon issuance of an incidental take permit due to land alterations primarily associated with development and infrastructure on approximately 8,054 ac (3,259 ha). This total is from the sum of Permanent Impacts of RMV, Ortega Rock Quarry, Prima Deshecha Landfill, Avenida La Pata extension and SMWD projects for all habitat types; this total is based on the maximum allowable build-out of 725 ac (293 ha) in PA4, 50 ac (20 ha) total in PA6 and 7, and 500 ac (202 ha) in PA8. In addition to the direct loss of habitat, potential effects associated with the issuance of an incidental take permit include habitat fragmentation, increased invasion by exotic plant and animal species, noise effects, disruption of the natural fire regime, increased anthropogenic disturbances, changes in hydrology, and changes to water quality and quantity.

Urbanization

Fragmentation

A primary effect of urban development is fragmentation of the natural landscape. Habitat fragmentation can result in a variety of negative effects to populations of many species. In southern California effects of fragmentation have been shown to decrease the number of resident bird species, decrease the diversity of small rodents, and decrease the diversity and cover of native plant species (Soulé *et al.* 1988; Bolger *et al.* 1991; Alberts *et al.* 1993; Bolger *et al.* 1997a).

Fragmentation can result in landscapes with many small habitat patches rather than few large patches. Small habitat patches tend to have altered species composition, reduced community diversity, and smaller population sizes for individual species. Species with greater susceptibility to the effects of reduced habitat patch size are more likely to be extirpated from these small patches. Reduced community diversity and altered species composition can change natural ecological functions, which can result in unpredictable effects given the complexity of community dynamics. Smaller populations are more susceptible to extirpation due to random fluctuations in population dynamics or catastrophic events (Ewens *et al.* 1987; Shaffer 1987). Small habitat patches also have high perimeter to area ratios, which increases edge effects that can result in even smaller populations. If small populations are isolated from nearby populations, they will be susceptible to deleterious genetic effects of inbreeding depression (Lande and Barrowclough 1987), and extirpated populations may not be replaced by dispersing individuals from other populations (Gilpin 1987).

Fragmentation studies by Soulé *et al.* (1988) and Crooks and Soulé (1999) concluded that the decline of top predators in fragmented landscapes could lead to the release of smaller predators that, in turn, strongly limit populations of prey species. This phenomenon, known as mesopredator release, has been implicated in the decline and extinction of prey species worldwide (Willis and Eisenmann 1979; Matthiae and Stearns 1981; Whitcomb *et al.* 1981; Wilcove *et al.* 1986; Soulé *et al.* 1988; Terborgh 1988; Sovoda *et al.* 1995; Crooks and Soulé 1999; Haas and Crooks 1999). Parks and Harcourt (2002) found that preserves adjacent to high density development had significantly more large-mammal extinction. Mesopredator release may also be facilitated through predator control programs. Human populations in proximity to top predators can lead to the lethal removal of individual animals as a result of real or perceived threats to humans.

The effects of habitat fragmentation can be minimized by maintaining linkages (Soulé 1986; Saunders *et al.* 1991; Beier and Noss 1999). Linkages are connections between larger blocks of habitat that allow for wildlife movement, recruitment, and colonization between different core biological areas. Linkages are important for allowing species to move or disperse from their natal areas to sites where they may reproduce. Linkages that provide for successful movement between core population areas reduce genetic isolation and allow for recruitment into areas where populations have been extirpated due to natural or anthropogenic disturbances or stochastic events (Soulé and Simberloff 1986; Lande 1988). Several factors influence the

effectiveness of habitat linkages including length, width, and species targeted for use (Meffe and Carroll 1997). When large blocks of habitat remain intact, the rate of successful dispersal between core population areas is higher. At a minimum, dispersal habitat within linkages should provide some level of foraging and limited protection from predators. When the distance between core populations of a species is greater than the dispersal distance for individuals, effective linkages must provide live-in habitat. It is important to recognize that the effectiveness of any habitat linkage varies considerably by species. Linkages are critical to the design and function of any conservation area.

The key features of the Habitat Reserve and associated HRMP and SOS that contribute to reducing the potential effects of fragmentation may be summarized as follows:

- An ultimate Habitat Reserve totaling more than 32,000 ac (12,950 ha) and not less than 72 percent of vegetation communities/land covers in Subarea 1;
- SOS totaling an additional 4,440 ac (1,797 ha) and 10 percent of vegetation communities/land covers in Subarea 1;
- Combined Habitat Reserve and SOS system Communities totaling more than 36,000 ac (14,569 ha) and 82 percent of the existing acreage of the proposed Conserved Vegetation Communities;
- Conservation of 89 percent of the Habitat Reserve and SOS in Subarea 1 in three large, contiguous and functionally connected habitat blocks;
- All identified habitat linkages will be protected through the proposed Conservation Strategy with the exception of Linkage K, which will be partially protected and which will be complemented by the proposed Prima Deshecha Landfill SOS. Given the overall protections of the linkages and the contribution of the HRMP, General Policy 3 of the Southern NCCP/HCP is fully addressed and the limited impacts to Linkage K are mitigated through the protection and management of the Prima Deshecha Landfill SOS;
- Physiographic (watershed and elevation) conservation balance of the five major vegetation communities of coastal sage scrub, chaparral, grassland, riparian and woodland and forest such that the Habitat Reserve and SOS are representative of existing spatial diversity in Subarea 1;
- Implementation of the HRMP, including the Adaptive Management Program and Ongoing Management Program elements, respectively; and
- Implementation of the complementary "Coordinated Management Plans," namely the Grazing Management Plan (GMP) and the Water Quality Management Plan (WQMP) (*see Section 5.10* of the Final EIR/EIS (*Part II*) for the avoidance, minimization and mitigation provided by the WQMP).

<u>Edge Effects</u>

The deleterious effects of conversion of natural habitats to other land uses often extend beyond project footprints resulting in "edge effects." The biological integrity of habitats adjoining development can be diminished by adverse effects of noise, lighting, exotic plant and animal invasion, predators, parasitism, disturbance from human activities, changes in fire regimes, and other factors. The severity of these effects depends on distance to land alteration boundaries,

source of disturbance, and the affected species. Species that are particularly vulnerable to edge effects, known as interior species, require large patches of habitat that are relatively free from edge effects (*e.g*., Winter *et al.* 2000; Flaspohler *et al.* 2001).

Land uses adjacent to habitat areas may introduce noise and artificial lighting that are likely to impact wildlife species. The impact of noise on wildlife is likely to differ from species to species and is not only dependent on the decibel level of the noise, but also on the duration and frequency. For example, birds rely on auditory signals in the form of songs and alarm or scolding calls to establish and defend territories, attract a mate, feed and care for young at the nest, and to locate and evade a potential predator. Noise may alter these time-consuming and energetically expensive behaviors of birds. Increased noise levels have the potential to lower reproductive fitness by affecting territorial defense, mate acquisition, the ability to detect con-specific encroachments, foraging, and predator avoidance. Noise may also be detrimental to birds by causing nest neglect or abandonment due to startle effects, cause sleep interference, or otherwise elicit physiological responses or annoyance that have energetic costs (Ward and Stehn 1989). Construction and the use of heavy equipment can result in noise and vibration impacts that are thought to be potentially harmful to a variety of bird species (Gunn and Livingston 1974; RECON 1989; Pike and Hays 1992).

Non-native species invasion and increased predation are important consequences of urban/wildland edge (*e.g*., Andrén and Angelstam 1988; Callaway and Aschehoug 2000; Hennings and Edge 2003). Habitat edges are particularly vulnerable to introduction of non-native species. A number of potentially harmful non-native invasive plant species present in the area include giant reed (*Arundo donax*), pampas grass (*Cortaderia selloana*), castor bean (*Ricinus communis*), Tamarisk (*Tamarix ramosissima*), Tree tobacco (*Nicotiana glauca*), and Spanish sunflower (*Pulicaria paludosa*). Many of these species are known to displace native species. Invasion by non-native plant species may alter microhabitats and disrupt natural ecological processes that in turn may negatively affect native animal and plant species. Numerous predators such as opossums, raccoons, skunk, ground squirrels, and various corvids thrive on edges by making use of the additional food and water sources provided by residential and golf course development adjacent to habitat areas. Brood parasitism by brown-headed cowbirds, which can lower the reproductive success of native avian species, is likely to be exacerbated by urban development, particularly golf courses and equestrian/livestock centers, by providing foraging habitat for this species (*e.g*., Chace *et al*. 2002).

Irrigation practices may contribute to overall wetter soil conditions, thereby creating more favorable soil conditions for invasive ant species such as the Argentine ant, which are known to be abundant in landscaped areas and invade habitat edges (Suarez *et al.* 1998). The Argentine ant can pose a predation threat to the young of low lying avian nests. For example, Argentine ants can move up to approximately 1,300 feet from an urbanized edge (Suarez *et al.* 1998) and have been documented as predators of the California gnatcatcher (Sockman 1997; Atwood and Bontrager 2001). The Argentine ant is ubiquitous in southern California developments. Thus, it is expected that the eggs and/or nestlings of avian species adjacent to urbanized areas will be vulnerable to increased predation by Argentine ants. In addition, the Argentine ant can alter the native arthropod community, thereby significantly reducing their diversity and abundance

(Bolger *et al.* 2000). A reduction in the native arthropod community may result in reduced food resources for arthropod predators, such as the California gnatcatcher and horned lizard.

Where development occurs adjacent to habitat, domestic pets, including cats, can intrude into natural areas and opportunistically prey on certain avian, herptile, and small mammal species (Crooks and Soulé 1999). Since domestic cats have been documented to range up to 3,100 ft (945 m) from their home (Barratt 1997), an increased risk of predation to species may result from development in proximity to the Habitat Reserve.

Where the Habitat Reserve is near urban or residential developments, natural fire regimes will likely be altered resulting in the elimination (suppression) of natural fire regimes or an increase in fire frequency from anthropogenic ignition. Repetitive fire may cause type-conversion of vegetation communities away from more perennial systems (*e.g.*, shrublands) into more annual systems (*e.g.*, non-native grasslands).

Urbanization outside of the Habitat Reserve may result in changes to local (and regional) hydrology, run-off, and sedimentation. These changes could indirectly impact species associated with riverine and vernal pool systems by altering natural hydrogeomorphic processes that sustain habitat. Increased urban run-off into natural habitats and channelization for flood control could result in highly erosive rain-flows and increased rates of scouring, which could result in downstream habitat loss. Urban run-off may also increase sediment loads that could result in downstream habitat degradation. Species that rely on alluvial type habitats could be impacted by changes in sedimentation. Increased channel flow could disrupt the meandering nature of small or intermittent flowing riparian systems and thereby adversely affect species that occur on sand banks along streams. The timing and duration of stream flows in the Habitat Reserve could be altered by urban run-off. The vegetation communities that are associated with intermittent streams may be type-converted to other habitats if flows become more perennial. Similarly, reduced flow caused by water diversion may reduce scouring events that maintain appropriate habitat for flood plain-dependent species. Urban run-off may also contain contaminants that may impact downstream habitat and/or species.

Edge effects will be addressed through the proposed Habitat Reserve on RMV land which, when combined with other open space areas in the Habitat Reserve, will create three large areas of habitat that are interconnected and connected with other large-scale protected habitat areas. The eastern and northern portions of the Habitat Reserve will connect with other protected open space areas to comprise a block of habitat containing about 23,210 ac (9,393 ha). This habitat block extends westward to include the portion of the San Juan corridor between the East Ortega and Trampas development areas. A 7,300-ac (2,954-ha) block will occur in the west, extending from the Upper Chiquita Canyon Conservation Area in the northern part of the Chiquita Canyon sub-basin to San Juan Creek and connecting with adjacent portions of Chiquadora Ridge, the Riley Wilderness Park, Gobernadora Creek and to Caspers Wilderness Park via open space corridor at the northern edge of the proposed Gobernadora/Central San Juan development area. There will also be a 1,900-ac (769-ha) area of habitat in Arroyo Trabuco that connects with the Chiquita Canyon habitat area via Habitat Linkage B and extending to the Foothill-Trabuco Specific Action area to the north and to the Cleveland National Forest to the east. Combined

these three large habitat areas total approximately 32,400 acres (13,121 ha), or about 98 percent of the Habitat Reserve.

The Permittee will also implement the Habitat Reserve Management and Monitoring Plan to minimize edge effects, including implementation of the Invasive Species Control Plan to reduce the potential for invasive non-native species, both plant and animal, to affect the Covered Species.

Changes to hydrology and treatment of urban runoff will be controlled through implementation of Water Quality Management Plans for each development Planning Area or sub-portion thereof. The Water Quality Management Plans are designed to address both Conditions of Concern and Pollutants of Concern as defined by the San Diego Regional Water Quality Control Board through the Municipal Stormwater Permit issued to the County of Orange.

The Permittee will also implement actions as specified in Appendix U of the Plan to minimize lighting effects by the shielding of lighting adjacent to open space, invasive species through the prohibition in development planning areas of plants listed on the CalEPC list of invasive plants and require restoration of temporarily impacted areas.

To minimize the temporary effects of construction on Covered Species, the Permittee will develop and implement, for each construction project, a Biological Resources Construction Plan (BRCP) that provides for resource protection and establishes construction related monitoring requirements. The BRCP will contain specific measures for the protection of sensitive species during construction including erosion and siltation control measures, dust control measures, grading techniques, construction area limits, identification and quantification of habitats to be removed, and protective fencing around conserved and construction staging areas.

Roads

New Roadways

Placement of roadways within the natural landscape can cause direct loss of habitat and individuals, alter quality of adjacent habitats, disrupt hydrologic regimes, cause road kills, and fragment habitat. This in turn can result in the decline of certain species populations (particularly smaller populations that can be more susceptible to genetic isolation and local extinction), a loss in species diversity near roadways, and impede animal movements.

The direct effects associated with new roadway construction are the permanent loss of habitat and direct mortality of individuals. Temporary impacts to habitat are also likely to occur during actual construction in conjunction with such activities as land contouring, construction staging and vehicle access, increased noise and dust generation, and the possible introduction of night lighting if construction is not limited to the dawn-to-dusk hours of daylight.

The habitat altering effects of new road construction include the creation of new microclimates and a change in other physical conditions extending beyond the road's edge, increase of exotic

plant species, and direct mortality and/or relocation of flora and fauna from the area of the road as a result of habitat loss and/or physical disturbance (Spellerberg 1998). In general, the effects of roads on wildlife can extend beyond the road edge into an area described as the "road effect zone" (Forman *et al.* 1997). The road effect zone is the area from the road edge to some outer limit within which road traffic has significant ecological effects on wildlife. The width of the road effect zone is variable based on traffic intensity, the number of lanes in the roadway, the species present along the roadway, and a variety of ecological variables, such as vegetation and topography. The threshold where the distance of the road effect zone ends varies for each species (Forman and Deblinger 1998).

The effects of roads on the physical environment include noise, light, dust and other particulates; metals such as lead, cadmium, nickel and zinc; and gases such as carbon monoxide and nitrogen-oxygen complexes (NO_X). Heavy metals are known to accumulate in the tissues of plants and animals up to 656 ft (200 m) away from roads (Trombulak and Frissell 2000). Noise and artificial lighting have been shown to affect some wildlife species given that many species rely on sight or sound to communicate, navigate, avoid danger, and find food. Car traffic has been correlated with a reduction in the density of breeding bird populations adjacent to roads (Reijnen *et al.*, 1995 in Spellerberg 1998). Reijnen *et al.* (1995) documented a reduced ability of male willow warblers close to highways to attract and keep mates possibly due to the distortion of the song by traffic noise. The effects of road and traffic lighting on plants and animals appear to be wide ranging (Spellerberg 1998).

Dust effects have been documented primarily on plants and include physical effects such as cell destruction and blocked stomata that can lead to reduced photosynthesis, respiration, and transpiration. In addition to dust, other road pollutants may cause physiological stress in some plants, making them more susceptible to pest attack, as has been shown by aphid infestations in roadside trees (Braun and Fluckiger 1984 in Spellerberg 1998).

Where roadways cross or parallel watercourses or drainage areas, changes to hydrology and water quality are likely to occur as a result of stream channel and floodplain constrictions and runoff from impervious road surfaces. Road construction can alter hydrological processes in a number of ways including velocity and flow direction. Shifts in velocity can result in increased scour, headcutting, and downstream sedimentation. Changes to hydrology from either redirecting flows or creating wet habitat where none previously existed can alter species' habitats. Potential contaminants emitted from vehicles onto roadways through tire wear, fluid leaks, brake-lining wear, rust, and exhaust are mostly transported through water flow (Forman *et al*. 2003). A review of toxic substances introduced into flowing water from roadways indicated that although a wide range of pollutants could be described, species responses were variable depending upon life form (plant or animal) and life-stage such that few generalizations can be made (Hellawell 1988 in Spellerberg 1998).

Where roads bisect or abut areas with wildlife, mortality due to vehicular collisions is likely to occur. Wildlife collisions are influenced by vehicle speed, traffic volume, and the juxtaposition of the roadway in relation to habitat cover and movement corridors (Forman *et al.* 2003). Some species are attracted to roads and roadsides for thermoregulation and are more vulnerable to

traffic mortality and predation. Other species are attracted to roadways to scavenge road kills thereby increasing risk of mortality from vehicle collisions. Few comparative data are available regarding the significance of road mortality measured against the relative importance of natural sources of mortality such as predation (Forman *et al.* 2003). However, based on the studies conducted to date, road mortality is known to have significant effects on frogs and toads (Fahrig *et al.* 1995) and snakes (Bernardino and Dalrymple 1992; Rosen and Lowe 1994). Wide-ranging carnivores appear to be especially susceptible to road mortality. Vehicle collisions are likely the most important source of mortality for mountain lions in both Florida (Maehr *et al.* 1991) and the Santa Ana Mountains in southern California (Beier and Barrett 1993). Although, the long-term effects on population dynamics of affected species is lacking, road kill seems to have the most detrimental effect on species with small or diminishing populations (Spellerberg 1998).

The most prominent indirect impact of roads is habitat fragmentation (see above Urbanization discussion). In addition to habitat fragmentation, new or improved roadways can facilitate growth in areas of natural habitats by improving access to previously remote areas. Vehicular accidents, hazardous material spills, and related emergency procedures along with increased fire frequency are also likely to occur along roadways that in turn can degrade species' habitats.

The Permittee has sought to minimize the effects of roads on Covered Species but minimizing the overall number of roads to serve the development planning areas, and where possible locating the proposed roadways within the development planning areas. Where the new roadways cross the Habitat Reserve, the distance of these crossings has been minimized to the maximum extent practicable. Wildlife crossings have been incorporated where necessary to preserve wildlife movement corridors and habitat linkages. Measures to be implemented include the placement of bridge crossings a minimum of 20 ft (6 m) above the stream bottom and the installation of fencing to prevent wildlife from entering roadways. Lighting of roadways in open space will not occur except where necessary for public health and safety. Any such lighting will be shielded.

To minimize the potential for new roads and road improvement projects to negatively affect Covered Species during construction, the Permittee will develop and implement, for each construction project, a Biological Resources Construction Plan (BRCP) that provides for resource protection and establishes construction-related monitoring requirements. The BRCP will contain specific measures for the protection of sensitive species during construction including erosion and siltation control measures, dust control measures, grading techniques, construction area limits, identification and quantification of habitats to be removed, and protective fencing around conserved and construction staging areas.

The Permittee will also implement actions as specified in Appendix U of the Plan to minimize lighting effects and invasive species and require restoration of temporarily impacted areas.

Finally, in order to insure that adequate and beneficial management of the Habitat Reserve occurs, the Permittee will submit draft 5-year MAPs, as described in the proposed action above, for review and approval by the Service that will include monitoring of wildlife movement corridors and habitat linkages and overall effects of roadways on Covered Species.

Road Improvements

Where roadways are widened or otherwise modified, direct effects similar to those described above for new roadways are likely to occur in areas beyond the existing roadbed. The incremental effects from road widening are dependent on the degree of the widening from the existing facility, changes in the level of use, and upgrades (*e.g.* dirt road to paved road, introduction of a median barrier) as well as the individual species movement patterns and ability to cross roads. Roadway improvements often provide for increased capacity and/or function resulting in increased volume, speed, and potentially total use time that will likely expand the extent of the road effect zone (*sensu* Forman as described above). The percentage of individual animals killed on roadways has been reported to increase with the width of the road and the number of vehicle trips (Carr and Fahrig 2001 in Longcore and Rich 2004). Forman *et al.* (2003) also reported that road mortality has been significantly correlated with vehicle speed. Depending upon a species' ability to move about and migration needs, widening roadways from as little as two to four lanes can sever population connections between habitats (Longcore and Rich 2004), thereby contributing incrementally to habitat fragmentation and possible species decline.

Two roadways are proposed to be widened, Ortega Highway and Antonio Parkway. Both facilities will be widened across San Juan Creek, thus providing continued wildlife movement along this linkage.

General Effects from Roads on Specific Taxa

1. Fish

Fish species are likely to be negatively affected by changes to hydrology and water quality as a result of new and improved roadways. Fish can be affected by sedimentation, changes in water quantity and temperature, and road runoff. Sedimentation increases turbidity thereby reducing the amount of light in the water column and primary nutrient production. Significant sedimentation may also change streambed characteristics by increasing overall silt content of the bed (*e.g.*, Beschta 1978 in Forman and Alexander 1998; Bilby *et al.* 1989 in Forman and Alexander 1998) and potentially suffocating aquatic organisms, including previously deposited eggs. Changes in hydrology can favor non-native predatory species. Non-native predators such as exotic fish and frogs may negatively affect native fish, for example, by altering the native fish's behavior (*e.g.*, Bryan *et al*. 2004). Contaminants associated with road runoff can be detrimental to reproduction and recruitment. Pollutants may negatively affect fish, for example, by suppressing the immune system thus increasing susceptibility to disease (*e.g.*, Arkoosh *et al*. 1998). Many streams are already highly modified and are likely to be more susceptible to the additional effects of new roadways.

2. Amphibians and Reptiles

In general, amphibians and reptiles have highly restricted home ranges and frequently follow genetically-controlled migratory paths. They are, therefore, more susceptible to mortality and the effects of habitat fragmentation, and local or restricted populations may become rare (Jackson 1996; Forman and Deblinger 1998; Vos and Chardon 1998).

Amphibians are likely to be vulnerable to the effects of roadways as described above for fish species. In addition, many amphibian species require both aquatic and terrestrial habitats for survival. Narrow, linear disruptions next to streams can result in barriers or increased risk of mortality as species transit between upland and aquatic habitats. Amphibians with moist skin have highly permeable skin and are especially sensitive and vulnerable to pollutants (Hayes *et al.* 2002). Temporary pools of water created by road runoff may attract amphibians to breed therein, but juvenile survivorship and recruitment may be low due to the chemical and/or temporary nature of the pond, increased risk of road kill, frequent disturbances, and road-related pollution and contaminants. In addition, many amphibian species are highly sensitive to light; changes in the light regime may prohibit some species from foraging altogether leading to their extirpation from an area (Buchanan 1993; Jaeger and Hailman 1976 in Longcore and Rich 2004).

Reptilian species such as snakes are often attracted to the heat stored in asphalt roads and shoulders for thermal regulation thereby increasing their susceptibility to road kill mortality and predation. While the effects of road-related mortality have not been documented on any particular species in the action area, roads are known to be significant sources of mortality in both Florida and Arizona (Bernardino and Dalrymple 1992; Rosen and Lowe 1994). General principles apply in that road-related mortality and habitat fragmentation will have greater effects on rare or already restricted, threatened, or endangered species and to those that are long-lived and have low reproductive rates than on common, more wide-ranging species.

3. Birds

Edge effects associated with roads include increased light and noise, which can disrupt breeding and foraging behavior and communication necessary to successful mating (Reijnen *et al.* 1997; Bergen and Abs 1997 in Longcore and Rich 2004). The detrimental effects of road noise have been recorded for wetland avian species. A zone of significantly decreased density of birds extending from the roadway was measured to be from 1,640-1,969 ft (500-600 m) for rural roads and 5,250-5,906 ft (1600-1800 m) for highways (Van der Zande *et al.* 1980 in Longcore and Rich 2004).

In addition, changes to existing roadbeds, bridges, and/or barriers and guardrails can change sound characteristics in certain habitats, thereby altering ambient conditions for sensitive and/or threatened and endangered riparian bird species (Biological Assessment for the SR-38, Mill Creek Bridge Project, Caltrans District 8, San Bernardino County, California, December 2001). Non-migratory birds, such as the gnatcatcher, exhibit strong site tenacity. New roadway construction and/or the widening of existing roads may prevent movement across roadways or increase mortality of individuals attempting to cross (Forman and Godron 1986; Forman and

Alexander 1998; Forman *et al.* 2003). The introduction of traffic or a significant increase in ambient traffic noise, volume, and speed associated with road widening may also disrupt bird communication that for some species is a significant factor in pair establishment (Longcore and Rich 2004).

Indirect effects of roads can also include increased access to previously remote areas by both humans and nest-predator species such as corvids and raptors that do well in human-modified environments (*e.g.*, kestrels, crows, and ravens). For example, American crows frequently benefit from inhabiting areas changed by artificial lighting, and increased populations of crows can have detrimental effects to other native bird species (Gorenzel and Salmon 1995 in Longcore and Rich 2004).

Road Maintenance

Road maintenance can affect plant species in several ways. Direct effects include the loss of plants and habitat that are on or immediately adjacent to roads; this can occur when heavy equipment is used to clear debris off the roadway, create drainage leadouts, or clear culverts. Also, repeated grading over time may lower a roadbed below adjacent plant communities and can result in de-watering of those plant communities. A variety of indirect effects are also associated with road use: (1) dust and mud generated by motorized vehicles can cover plants and interfere with physiological functions ultimately affecting plant vigor, reproduction, and survival; (2) changes in hydrology from erosion control efforts may affect adjacent plant occurrences and habitats as water is redirected away from or toward the occurrences; and (3) invasive, non-native plants and animals can be transported into areas along roads (Farmer 1993; Forman and Deblinger 2000).

Effects of road maintenance on animals include the lethal effects associated with spillage of oil, fuel, or other toxic substances into waterways and the suffocation of fish and amphibian eggs and young from sediment transport caused by maintenance activities at stream crossings (*e.g.*, Beschta 1978 in Forman and Alexander 1998; Bilby *et al*. 1989 in Forman and Alexander 1998). The effect of this sedimentation is reduced in measure as the distance from the road crossing increases. The effects will vary depending on the amount of sediment introduced into the stream, the amount of stream flow, gradient and several other instream factors.

Because the footprint of these types of activities will occur within already disturbed areas, which typically support limited habitat and the Plan provides policies, construction guidelines, and best management practices to avoid and minimize adverse effects to species and their habitats, we anticipate that the impacts associated with road maintenance and operation to be minimal. In addition, in order to insure that adequate and beneficial management of the Habitat Reserve occurs, the Permittee will submit draft 5-year MAPs, as described in the proposed action above, for review and approval by the Service.

Agricultural Land

The Plan identifies existing agricultural operations, expansion of existing agricultural operations, and new agricultural land as Covered Activities. In order to insure that adequate and beneficial management of the Habitat Reserve occurs and the potential effects from agricultural lands do not compromise the reserve system, the Permittee will submit draft 5-year MAPs, as described in the proposed action above, for review and approval by the Service.

Direct mortality and habitat loss is anticipated to occur in the course of converting natural lands to agricultural use. However, a maximum of 50 ac (20 ha) will be converted to agricultural land under the Plan. Globally, land conversion for agriculture has caused significant losses of natural habitat (Vitousek *et al.* 1997) while increased agricultural intensity has also contributed to adverse affects to wildlife species (Matson *et al.* 1997). Agricultural land conversion can result in habitat fragmentation and isolation of species as discussed above. Agricultural operations may foster increases in nuisance species populations such as cowbirds and crows that in turn can negatively affect other rare species through increased rates of parasitism, predation, and competition. For many species, agricultural lands offer little to no habitat value and may preclude species use of these areas altogether. However, wildlife taxa respond differentially to the intensity of land use changes, and partially developed areas can contribute to conservation of some native species (Blair 1996; Blair and Launer 1997). Certain species may use agricultural lands for foraging, burrowing, movement corridors, and even nesting. Animals most likely to use agricultural lands include highly mobile species that are able to exploit ephemeral resources such as birds and mammalian predators. Agricultural lands may serve as important buffers between natural habitats and highly developed urban areas or linkages between suitable habitat patches. In some areas, the value of appropriately managed farmlands for wildlife has been recognized, and successful efforts have been made to incorporate the needs of wildlife conservation into agricultural practices (Bignal 1998; McCracken and Bignal 1998).

Other indirect effects of agriculture, especially intensely cultivated monocrop systems, include soil erosion, pollution of ground water, and over-exploitation of water supplies. Conversion of land for agriculture can alter soil structure resulting in erosion (Vandermeer 1995). Soil erosion increases the runoff of water and agricultural chemicals into natural wetlands systems. These chemicals can act as pollutants, and wetlands can be functionally lost due to such contaminations (Lemly *et al.* 2000). Increased input of nitrogen and phosphorous through fertilizers and manure can cause increased levels of these nutrients when they are transported to aquatic ecosytems (Carpenter *et al.* 1998). These nutrient inputs can result in eutrophication of lakes and streams, which causes increased growth of algae and aquatic weeds and subsequent fish kills due to oxygen shortages. Diversion of water for agricultural uses has resulted in severe impacts to natural wetland systems throughout areas with irrigated agriculture including California (Lemly *et al.* 2000). However, these potential effects are expected to be minimal due to the low acreage of existing and proposed orchards and that the 1,000 acres of barley fields provide habitat for some Covered Species.

Livestock Grazing

Ecological changes due to overgrazing can include declines in riparian, oak woodland, grassland and meadow habitats. Grazing can cause reduced tree regeneration, substantial reductions in vegetative cover, streambank destabilization, water quality degradation, and the spread of invasive plants (Stephenson and Calcarone 1999). Livestock numbers, timing and duration of grazing, animal distribution, and livestock type can all affect the impact to habitat conditions and can be modified to avoid, minimize, or benefit species. Historically RMV has employed a rotational grazing system at a light to moderate intensity that has been compatible with the persistence of special status species. Cattle-related impacts will be minimized in the future by the continued use of rotational grazing, the maintenance of 25 percent residual dry matter, the use of fencing, and planted forage such as barley in the San Juan watershed to keep cattle from sensitive areas as set forth in the Grazing Management Plan (Appendix G). In addition, in order to insure that adequate and beneficial management of the Habitat Reserve occurs, the Permittee will submit draft 5-year MAPs, as described in the proposed action above, for review and approval by the Service.

1. Plants

Livestock grazing during the growing season of plants can result in the trampling or consumption of the above-ground portion of the plant, preventing the plant from reproducing via seed in that year. Grazing can also indirectly affect plant habitat if there is excessive grazing or trailing activity, which results in accelerated erosion. The loss of soil and its accompanying nutrients and seed banks exacerbates the degradation of habitat. The disturbed condition of the substrate and the continued grazing pressure maintain a condition that is much more favorable to introduced annual grassland species than the native communities that once covered many grazing allotments (Stephenson and Calcarone 1999). The HRMP includes management and monitoring measures designed to avoid and minimize effects of cattle-related impacts on Covered Plant Species.

2. Fish

Effects to fish can occur from livestock trampling of stream banks, which can result in soil compaction, sedimentation, direct mortality, loss or reduction in vegetative bank cover, and collapse of the stream banks (Kie *et al.* 1996). Added sedimentation of stream segments at crossings or other stream areas used by livestock for watering or grazing of riparian vegetation also occurs. This sedimentation can result in impacts to eggs, fry, and aquatic insects that serve as a food source. High levels of sedimentation can result in the filling of pool habitats, but this level of sedimentation from livestock use seems unlikely.

Potential effects of livestock grazing include defecation into streams, which can cause eventual development of algal blooms in the shallower and slower moving waters used for fry and young-of-the-year rearing. The algal blooms may affect oxygen uptake, reduce feeding, and result in the general decline in health and lead to disease, decreased growth, reproduction, and death (Belsky *et al*. 1999).

Avoidance of arroyo toad breeding pools in San Juan Creek as set forth in the Grazing Management Plan will result in benefits to Covered Fish Species.

3. Amphibians and Reptiles

The potential effects to amphibians are similar to the effects to fish described above. However, while algal blooms are often seen as a negative effect, they may be beneficial for more rapid development of tadpoles as the temperature is raised, speeding up development. Also, the algae may provide cover from predators and serve as a food source for young tadpoles (Belsky *et al*. 1999).

Livestock grazing has the potential affect reptiles via degradation of habitat for coastal sage scrub dependent species due to overgrazing. There is also some potential for trampling of individuals and crushing of burrows.

Avoidance of arroyo toad breeding pools in San Juan Creek, and vernal pools, if recommended by the Science Panel as set forth in the Grazing Management Plan, will result in benefits to Covered Amphibian and Reptile Species.

4. Birds

Grazing during the breeding season can result in physical damage to avian nests. Ground disturbance associated with grazing also tends to increase brown-headed cowbird abundance (USFWS 2002). Cowbirds are known to parasitize the nests of some listed bird species. In addition, grazing may alter riparian vegetation and coastal sage scrub habitat and affect suitability for nesting (USFWS 2002, 65 FR 63680).

Avoidance of breeding season grazing in GERA and the Donna O'Neill Conservancy lands will reduce impacts to riparian nesting birds. Implementation of the Invasive Species Control Plan will reduce the effects of cowbirds.

5. Invertebrates

Livestock can trample and crush individuals and fairy shrimp cysts when livestock are allowed to concentrate in ephemeral wetland areas such as vernal pool complexes, in search of water. Habitat degradation from erosion could also provide opportunities for non-native plants to become established in upland habitats. At the same time, livestock grazing could also have a beneficial effect on vernal pool habitats if managed as a way to control upland exotic plants. Monitoring of vernal pools will occur through the Habitat Reserve Management and Monitoring Plan, and if recommended by the Science Panel, installation of exclusionary fencing around vernal pools during ponded periods will benefit Invertebrate Covered Species (i.e., Riverside and San Diego fairy shrimp).

CUMULATIVE EFFECTS

The Service must consider both the effects of the proposed action and the cumulative effects of other activities in determining whether the action is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat. Cumulative effects are defined as the effects of future State, local government, or private actions that are reasonably certain to occur in the action area. Future Federal actions are not considered cumulative to the proposed action because they require separate consultation pursuant to section 7 of the Act. Such future Federal actions in the action area include the South Orange County Transportation Infrastructure Improvement Project (SOCTIIP), the Transportation Corridor Agencies' extension of SR-241 toll road from its current terminus at Oso Parkway across RMV lands through MCB Camp Pendleton. Service is currently in section 7 consultation with Federal Highway Administration on this project.

SPECIES BY SPECIES EVALUATIONS AND CONCLUSIONS

Introduction

The analyses below have been prepared jointly for all three Permits addressing the 32 Covered Species for all Covered Activities, despite the potential for a Permittee's withdrawal from participation per the IA (Section 17). However, all of the raw information regarding impacts and mitigation for each permittee is provided in the species by species analyses below. Further, we specifically identify and analyze SMWD/RMV Covered Activities in the *Planning Area* analysis independently from County Covered Activities.

The NCCP/MSAA/HCP proposes that RMV/SMWD receive coverage and take authorization for all 32 species even if the County terminates or withdrawals its permit. However, should RMV/SMWD withdraw or terminate their permits, the NCCP/MSAA/HCP proposes that the County receive coverage and take authorization only for the coastal California gnatcatcher, least Bell's vireo, thread-leaved brodiaea, yellow-breasted chat, yellow warbler, and red-diamond rattlesnake for activities associated with Prima Deshecha Landfill and Avenida La Pata Extension and for the arroyo toad for habitat restoration actions along San Juan Creek in Caspers Regional Park. Lastly, the IA specifies that withdrawal of RMV from the NCCP/HCP shall result in the termination of SMWD's permit.

In consideration of the termination language of the IA, the conclusions for each of the 32 individual species reflect whether such terminations by individual permittees affect our overall "jeopardy/adverse modification" determinations for each of the 32 Covered Species. Likewise the individual take statements in the following *Incidental Take* section consider the effects of the termination language in the IA.

Listed Amphibians

Arroyo Toad

Status of the Species

Listing Status

The arroyo toad was listed as endangered on December 16, 1994 (59 FR 63264). At the time of listing, the arroyo toad was described as the arroyo southwestern toad (*Bufo microscaphus californicus*). Gergus (1998) published a genetic justification for the reclassification of the arroyo southwestern toad as a full species (*i.e.*, arroyo toad [*Bufo californicus*]). Critical habitat for the arroyo toad was designated on April 13, 2005 (70 FR 19562).

Species Description

The arroyo toad is a small, dark-spotted toad of the family Bufonidae. The parotoid glands, located on the top of the head, are oval-shaped and widely separated. A light/pale area or stripe is usually present on these glands and on top of the eyes. The arroyo toad's underside is buff-colored and usually without spots (Stebbins 1985). Recently metamorphosed individuals typically blend in with streamside substrates and are usually found adjacent to water. The male arroyo toad's courtship vocalization is a high trill, usually lasting 8 to 10 seconds per call.

Arroyo toad eggs are small and darkly-pigmented. Females lay between 2,000 and 10,000 eggs in parallel gelatinous strings. Arroyo toad tadpoles are darkly pigmented at hatching and within the first few weeks become opaque ventrally and tan dorsally, with irregular dark crossbars (Sweet 1992).

Habitat Affinities

Arroyo toads breed and deposit egg masses in shallow, sandy pools which form in low-gradient sections of streams. These stream segments are usually bordered by sand-gravel flood-terraces. Stream order, elevation, and floodplain width appear to be important factors in determining habitat capability (Sweet 1992; Griffin 1999). High stream order (*i.e.*, 3rd to 6th order), low elevation (particularly below 3,000 ft (915 m)), and wide floodplains seem to be positively correlated with arroyo toad population size. However, small arroyo toad populations are found along 1st and 2nd order streams at elevations up to 4,600 ft (1,403 m), and this species has been known to occur at up to 8,000 ft (2,440 m) in Baja (USFWS 1999a).

Optimal breeding habitat consists of low-gradient sections of slow-moving streams with shallow pools; also, these areas contain nearby sandbars and adjacent, undeveloped stream terraces. Outside of the breeding season, arroyo toads are essentially terrestrial and are known to use a variety of upland habitats, including, but not limited to, sycamore-cottonwood woodlands, oak woodlands, coastal sage scrub, chaparral, and grassland (Holland 1995; Griffin *et al*. 1999).

Arroyo toads usually burrow underground during periods of inactivity; thus they tend to use upland habitats with friable soils (70 FR 19562).

The primary constituent elements of designated critical habitat include: 1) rivers or streams with hydrologic regimes that supply water to provide space, food, and cover needed to sustain eggs, tadpoles, metamorphosing juveniles, and adult breeding toads (specifically, the conditions necessary to allow for successful reproduction of arroyo toads are: a) breeding pools with areas less than 12 in (30 cm) deep, b) areas of flowing water with current velocities less than 1.3 ft/s (0.4 m/s), and c) surface water that lasts for a minimum length of 2 months in most years (*i.e.*, a sufficient wet period in the spring months to allow arroyo toad larvae to hatch, mature, and metamorphose); 2) low-gradient stream segments (typically less than 6 percent) with sandy or fine gravel substrates that support the formation of shallow pools and sparsely vegetated sand and gravel bars for breeding and rearing of tadpoles and juveniles; 3) a natural flooding regime, or one sufficiently corresponding to a natural regime, that will periodically scour riparian vegetation, rework stream channels and terraces, and redistribute sands and sediments, such that breeding pools and terrace habitats with scattered vegetation are maintained; 4) riparian and adjacent upland habitats (*e.g.*, alluvial scrub, coastal sage scrub, chaparral, and oak woodlands, but particularly alluvial streamside terraces and adjacent valley bottomlands that include areas of loose soil where toads can burrow underground) to provide foraging, aestivation, and living areas for subadult and adult arroyo toads; and 5) stream channels and adjacent upland habitats allowing for migration between foraging, burrowing, or aestivating sites, dispersal between populations, and recolonization of areas that contain suitable habitat.

Life History

Arroyo toad larvae feed on loose organic material such as interstitial algae, bacteria, and diatoms. They do not forage on macroscopic vegetation (Sweet 1992; Jennings and Hayes 1994). Juvenile toads rely on ants almost exclusively (USFWS 1999a). By the time they reach 0.7 to 0.9 in (1.8 to 2.1 cm) in length, they take more beetles, along with the ants (Sweet 1992; USFWS 1999a). Adult toads probably consume a wide variety of insects and arthropods including ants, beetles, spiders, larvae, caterpillars, and others.

Breeding typically occurs from February to July on streams with persistent water (Griffin *et al*. 1999). Female arroyo toads must feed for a minimum of approximately 2 months to develop the fat reserves needed to produce a clutch of eggs (Sweet 1992). Females apparently move to breeding pools for only short time periods during the breeding season (70 FR 19562). Eggs are deposited and larvae develop in shallow pools with minimal current and little or no emergent vegetation. The substrate in these pools is generally sand or fine gravel overlain with silt. Arroyo toad eggs hatch in 4 to 5 days, and the larvae are essentially immobile for an additional five to six days (Sweet 1992). They then begin to disperse from the pool margin into the surrounding shallow water, where they spend an average of 10 weeks (Sweet 1992). After metamorphosis (June-July), the juvenile toads remain on the bordering gravel bars until the pool no longer persists (usually from 8 to 12 weeks depending on site and yearly conditions) (Sweet 1992). Most individuals become sexually mature by the following spring (Sweet 1992).

Arroyo toads spend much of their lives in upland habitats (70 FR 19562). Upland habitat use occurs during both the breeding and non-breeding season (70 FR 19562). This species has been observed moving approximately 1 mi (1.6 km) within a stream reach and 0.6 to 1.2 mi (0.9 to 2 km) away from the stream, into native upland habitats (Sweet 1992; Holland 1995; USFWS 1999a) or agricultural areas (Griffin *et al*. 1999). Movement distances may be regulated by topography and channel morphology. Griffin (1999) reported a female arroyo toad traveling more than 948 ft (289 m) perpendicular from a stream and Holland and Sisk (2000) found arroyo toads 0.7 mi (1 km) from a water course. Most arroyo toad movements and activity appears to occur between the months of January and August (Ramirez 2003). Arroyo toads tend to burrow relatively deep during the fall and winter and remain largely inactive (Sweet 1992).

Distribution

Historically, arroyo toads occurred in at least 22 river basins in southern California from the upper Salinas River system in Monterey County to San Diego County and southward to the vicinity of San Quintin, Baja California, Mexico. They have been found at elevations extending from sea level to 8,000 ft (2,440 m) (USFWS 1999a). Arroyo toads have been extirpated from an estimated 75 percent of their former range in the United States (USFWS 1999a), and they now occur primarily in small, isolated areas in the middle to upper reaches of streams. The current distribution of the arroyo toad in the United States is from the San Antonio River in Monterey County, south to the Tijuana River and Cottonwood Creek Basin along the Mexican border. Arroyo toads are also known from a seemingly disjunct population in the Arroyo San Simeon River System, about 10 mi (16 km) southeast of San Quintin, Baja California. Although the arroyo toad occurs principally along coastal drainages, it also has been recorded at several locations on the desert slopes of the Transverse Range (Patten and Myers 1992; Jennings and Hayes 1994). The current elevational range for most toad populations in San Diego County is about 1,000 to 4,600 ft (304.8 to 1,402.1 m), although they were historically known to extend into the lower portions of most river basins (USFWS 1999a), and populations on MCB Camp Pendleton extend down to just above sea level (Holland and Goodman 1998). Toad populations on MCB Camp Pendleton are considered to be relatively large compared to other populations (Holland and Goodman 1998). The populations on MCB Camp Pendleton represent the relatively few remaining low elevation coastal and most robust populations on San Mateo and San Onofre Creeks, and Santa Margarita River (USFWS 1999a). There are six units of arroyo toad designated critical habitat in Santa Barbara, Ventura, Los Angeles, San Bernardino, and Riverside counties totaling about 11,695 ac (4,736 ha) (70 FR 19562).

Rangewide Trends and Current Threats

Because arroyo toad habitats (*i.e.*, broad, flat floodplains in southern California) are favored sites for flood control projects, agriculture, urbanization, and recreational facilities, such as campgrounds and OHV parks, many arroyo toad populations were reduced in size or extirpated due to extensive habitat loss from 1920 to 1980 (USFWS 1999a). The loss of habitat, coupled with habitat modifications due to the manipulation of water levels in many central and southern California streams and rivers, as well as predation from introduced aquatic species, caused arroyo toads to disappear from a large portion of their previously occupied habitat in California

(Jennings and Hayes 1994). Currently, the major threats to arroyo toad populations are from stream alteration, the spread of giant reed (*Arundo donax*) and other non-native riparian species, introduction and spread of non-native predators (fish, bullfrogs, crayfish, etc.), urban and rural development, mining, recreation, grazing, drought, wildfire, and large flood events.

The Fish and Wildlife Service has issued four landscape-scale multi-species programmatic biological opinions to the Forest Service that address adverse effects to the arroyo toad on Forest Service lands, which contain an estimated 36 percent of the total amount of occupied arroyo toad habitat. These programmatic biological opinions include (1) the Land and Resource Management Plan BO (1-6-00-F-773.2), (2) The Forest Service Riparian Species BO (1-6-99-F-21), (3) The Cleveland National Forest Service Grazing Opinion (1-6-01-F-1694), and (4) the San Bernardino National Forest Service Grazing Opinion (FWS-SB-1464.2). As part of these consultations, the Forest Service has undertaken a variety of actions to protect arroyo toads including: seasonal closures of recreation sites, closure of access roads into occupied breeding sites, closure of portions of grazing allotments, installation of educational signing, and installation of temporary fencing or other barriers to protect breeding sites.

Since the completion of these consultations, the Forest Service has taken a number of steps to improve the status of the arroyo toad including non-native species removals, habitat acquisitions, and stream crossing improvements (USFWS 2005a). A number of the recreation sites addressed in these consultations have been permanently closed (USFWS 2005a). In addition, in 2005 the Service issued biological and conference opinions on the Revised Land and Resource Management Plans for the four southern California national forests. These Plans included strategic direction in the form of land use zoning and standards. The land use zoning and standards indicated that for projects under the Plans: 1) ongoing activities will be neutral or beneficial to certain occupied areas of the arroyo toad, 2) new activities will be neutral or beneficial to the arroyo toad, and 3) expansion of existing facilities or new facilities will be designed to avoid additional public/recreational use of arroyo toad habitat. Exceptions were included in the Plans for fuel treatments in wildland-urban interface areas and to allow for projects with short-term effects and long-term benefits (USFWS 2005a).

The Service issued a biological opinion in 1995 on the activities and conservation plans in riparian ecosystems on MCB Camp Pendleton (1-6-95-F-02). The conservation plans outline actions that improve habitat on the Base for the arroyo toad, including the removal of exotic invasive plants and animals from riparian areas and periodic monitoring of populations, to offset impacts associated with military activities.

In addition, several incidental take permits pursuant to Section 10(a)(1)(B) of the Act have been issued for the arroyo toad addressing the effects of urban development on this species. In 1996, the Service issued a permit for the Central and Coastal Subregion Natural Community Conservation Plan and Habitat Conservation Plan for Orange County. In 1998, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. In 2004, the Service issued a permit for the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). These plans have created large reserve systems that include

substantial habitat and all known core populations of arroyo toad in the plan areas (Appendix 2). If arroyo toads are observed outside of proposed conservation areas, the plans require that the arroyo toads are either avoided or that a plan is developed to offset potential impacts to the toads and their habitat.

Conservation Needs

As described in the arroyo toad recovery plan, the arroyo toad's recovery depends on conserving, maintaining, and restoring the riparian and upland habitats used by the arroyo toad throughout its range. Management activities should address the threats described above, including maintaining appropriate hydrological conditions, controlling non-native vegetation and predators, and minimizing activities in the stream channel that could kill and injure arroyo toads and disrupt their breeding.

In southern Orange County, the San Juan Creek population on private land is identified by the arroyo toad recovery plan as one of the populations that needs to be conserved for species' recovery, and the Service's final rule on critical habitat (70 FR 19562) for the arroyo toad identifies habitat in both the San Juan Creek watershed and the San Mateo Creek watershed as "essential lands" for species' recovery because they support core populations of arroyo toad and provide connectivity to adjacent populations to the north and south. However, there is no critical habitat for arroyo toad designated on RMV land.

Environmental Baseline

Distribution in the Plan Area

The known distribution of arroyo toads within the action area includes the San Juan Creek watershed (San Juan Creek, Bell Canyon, and Trabuco Creek), which runs through the middle of Rancho Mission Viejo and Casper's Regional Park, and the San Mateo Creek watershed (Talega Canyon, lower Gabino Canyon, and lower Cristianitos Creek), which includes several tributaries in the southern portion of Rancho Mission Viejo. All of the observations described here except for the observation in Trabuco Creek are from the NCCP dataset.

San Juan Creek Watershed. In the action area, arroyo toads have been observed repeatedly in San Juan Creek where it runs through Rancho Mission Viejo and Casper's Regional Park. In addition, arroyo toads occupy Bell Canyon, a tributary to San Juan Creek in Casper's Regional Park. The breeding habitat along San Juan Creek and in Bell Canyon is contiguous; there are no major developments, reservoirs, or natural landforms creating barriers to dispersal, so dispersal between the breeding sites is likely fairly common. Arroyo toad breeding has been documented along most of San Juan Creek, but certain areas, such as the confluence of Trampas Canyon and San Juan Creek, may be important breeding sites during drought years because they hold water for longer than other pools along the creek (Ramirez 2003). The arroyo toad population along San Juan Creek is identified as a "major" population, and the arroyo toad population in Bell Canyon is identified as an "important" population.

In 1997, arroyo toad larvae were found in the action area in Trabuco Creek, a tributary to San Juan Creek, approximately 1 mi (1.6 km) west of the Cleveland National Forest boundary (Dan Holland, Biological Consultant, pers. comm. to D. Zoutendyk, CFWO, 2002). However, there is little additional information on arroyo toad distribution and abundance in Trabuco Creek. The observation in Trabuco Creek is over 5 mi (8 km) from the nearest observation in San Juan Creek or Bell Canyon. The intervening habitat between Trabuco Creek and San Juan Creek is a patchwork of developments and open space, so if there is any dispersal between breeding sites in Trabuco Creek and those in San Juan Creek and Bell Canyon, it is likely very infrequent.

San Mateo Creek Watershed. The San Mateo Creek watershed is primarily on MCB Camp Pendleton, to the south of the action area, but there are several tributaries in the southern portion of the plan area, including lower Cristianitos Creek, lower Gabino Canyon, and Talega Canyon. Much of the San Mateo Creek watershed is occupied by arroyo toads, including the tributaries mentioned above. There are no dispersal barriers in lower Cristianitos Creek, lower Gabino Canyon, and Talega Canyon, so there is likely frequent dispersal between breeding sites along these creeks. The arroyo toad population in Talega Canyon is identified as a "major" population, and the arroyo toad population in lower Cristianitos Creek/lower Gabino Canyon is identified as an "important" population.

At their closest, the arroyo toad populations in the San Juan Creek watershed and San Mateo Creek watershed are separated by about 2.5 mi (4 km) of undeveloped open space. Although arroyo toad dispersal distances of 2.5 mi (4 km) have not been observed directly, such dispersal distances are not infeasible, and it is likely that the San Juan Creek populations and the San Mateo Creek populations exchange some gene flow.

Arroyo Toad Habitat in the Plan Area

For the purposes of this analysis, arroyo toad habitat is defined as occupied arroyo toad breeding habitat and suitable upland habitat within the 80-ft (24-m) contour zone on either side of the centerline of streams that support arroyo toad populations. This 80-ft (24-m) contour zone was used by the Service in the final critical habitat designation for arroyo toad (70 FR 19562) and is thought to be the area most likely to be used by arroyo toads. Suitable upland habitat is defined as chaparral, forest, grassland, riparian, coastal sage scrub and woodland on loamy and sandy soil (clay soils and rock outcroppings were excluded). Using this definition, there are a total of 1,764 ac (714 ha) of arroyo toad habitat on Rancho Mission Viejo (Table A1) including 1,074 ac (435 ha) along San Juan Creek, 195 ac (79 ha) along Talega Canyon, and 495 ac (200 ha) along Lower Cristianitos Creek/Lower Gabino Canyon.

Although agricultural areas were not included in the modeled arroyo toad habitat, a low number of toads may be present within the agricultural areas because much of the agriculture is in proximity to the creek and may contain friable soil in some areas. However, because of the high intensity use in these agricultural areas, we expect the numbers of toads and area of friable soil is low.

There is also a substantial amount of arroyo toad habitat along upper San Juan Creek and Bell Canyon in Caspers Regional Wilderness Park, but the amount of toad habitat was not quantified off of RMV lands. Similarly, no estimate of the amount of arroyo toad habitat was made along Trabuco Creek.

Table A1 for Arroyo Toad: Modeled arroyo toad aestivation and foraging habitat in the action area.[1]

Action Area Components	**Arroyo Toad Aestivation/ Foraging Habitat (acres)**
Subarea 1	
Proposed RMV	1,764
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	0
Avenida La Pata	0
Prima Deshecha Landfill	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park, including Ortega Rock)[1]	0
Supplemental Open Space (Audubon Starr Ranch)	0
Subtotal for Subarea 1	***1,764***
Subarea 2	0
Subarea 3	0
Subarea 4	0
TOTAL	**1,764**

[1] Arroyo toads breed in San Juan Creek and Bell Canyon within Caspers Wilderness Park, but aestivation/foraging habitat was not modeled for these areas because they are not subject to development impacts.

Effects of the Action

Direct Effects

The analysis of potential effects on arroyo toads is based on breeding habitat and total modeled habitat rather than the number of occurrences. The arroyo toad observations are distributed throughout the identified breeding habitat, and the number of toads at a particular location varies greatly depending on the environmental conditions at the time, so in this instance analyzing impacts and conservation of habitat provides a better indication of likely effects on the population. Furthermore, all of the surveys, and therefore, almost all of the arroyo toad observations were within the creek channels where the toads are easiest to observe. Since the creek channels will be almost entirely conserved under the Plan, using occurrence data would not provide any additional information. A summary of the impacts and conservation resulting from the Plan is presented in Table A2.

Table A2 for Arroyo Toad: Modeled arroyo toad habitat permanently impacted by Covered Activities and the corresponding sites that will be conserved and adaptively managed as arroyo toad habitat.

Covered Activities and Conservation Areas	**Arroyo Toad Modeled Habitat Impacts (acres)**	**Arroyo Toad Modeled Habitat in Habitat Reserve (acres)**	**Arroyo Toad Modeled Habitat in SOS (acres)**
Proposed RMV (Planning Areas and infrastructure)	442	1,322	
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)	0	0	
Subtotal of impacts and conservation by RMV and SMWD	**442**	**0**	
Prima Deshecha Landfill	0		0
Avenida La Pata	0		
Subtotal of impacts and conservation by the County of Orange	**0**		**0**
Subtotal of impacts and assured conservation with adaptive management	**442**	**1,322**	
Subarea 3 Coto de Caza Parcels 1-17	0		
[1]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		**0**[2]	
TOTAL	**442**	**1,322**	**0**

[1] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[2] Arroyo toads breed in San Juan Creek and Bell Canyon within Caspers Wilderness Park, but aestivation/foraging habitat was not modeled for these areas because they are not subject to development impacts.

RMV Planning Areas

Development of the RMV PAs will not directly impact any arroyo toad breeding habitat (*i.e.*, habitat within the creek channels). When impacts are broken down by population, the PAs will impact 37 percent of modeled habitat on RMV for the San Juan Creek "major" population, up to 13 percent of modeled habitat on RMV for the Talega Canyon "major" population, and up to 3 percent of the modeled habitat for the Lower Cristianitos Creek/Lower Gabino Canyon "important" population (Table B). A substantial portion of the San Juan Creek "major" population and all of the Bell Canyon "important" population are already conserved in Caspers Regional Wilderness Park and will not be impacted by RMV PAs or infrastructure. Any arroyo toads within the RMV upland development footprint are anticipated to be crushed or buried during construction activities

The RMV development will remove most of the modeled upland habitat along the north bank of San Juan Creek and portions of upland habitat along the south bank of San Juan Creek, but Chiquita Canyon and Gobernadora Canyon on the north side of the creek and much of the south side of the creek will remain undeveloped and available for use by arroyo toads.

Table B for Arroyo Toad: Arroyo toad habitat impacted and conserved and managed in the Southern Subregion NCCP action area, Orange County, California.

Population	Total Acres of Habitat Area on RMV	Acres Conserved and Managed (Percent)	Acres Permanent Impact (Percent)	Acres Impact in PAs	Acres of Infrastructure Impact	Acres of Temporary Impact
San Juan Creek	1,074	672 (63%)	402 (37%)	345	57	29
Talega Canyon[1]	195	169 (87%)	26 (13%)	26	0	0
Lower Cristianitos Creek/Lower Gabino Canyon[1]	495	481 (97%)	14 (3%)	2	12	7
Total	**1,764**	**1,322 (75%)**	**442 (25%)**	**373**	**69**	**36**

[1] The estimated impacts in Talega Canyon and Lower Cristianitos Creek/Lower Gabino Canyon are based on development of a 1,350-ac (547-ha) footprint for PA8. However, the development in PA8 will be a maximum of 500 ac (203 ha) and will be designed to minimize impacts to arroyo toads. Thus, the actual impacts will likely be substantially less than depicted.

A radio telemetry study of 13 arroyo toads between April and September documented that almost 12 of the 13 toads stayed within the channel or along the sandy benches and banks. Therefore, although 37 percent of the modeled upland habitat in RMV along San Juan Creek will be impacted, the areas most heavily used will be conserved. In addition, much of the modeled habitat that will be impacted along San Juan Creek has already been fragmented and separated from the creek channel by agriculture, nursery operations, and SR74.

Infrastructure Improvements

Infrastructure improvements will result in permanent impacts to 69 ac (28 ha) and temporary impacts to 36 ac (15 ha) of suitable arroyo toad habitat (Table C). Almost all of the impacts shown in Table C are to potential upland habitat. New or improved bridge crossings will be constructed for Cristianitos Road, Cow Camp Road, and Antonio Parkway. Installation of bridges over San Juan Creek for Cristianitos and Cow Camp road will permanently impact 0.06 ac (0.02 ha) of streambed habitat. Construction associated with the widening of Antonio Parkway over San Juan Creek and the Cow Camp Road Bridge over Gobernadora Creek is not anticipated to result in disturbance to the wetted channel. A future bridge across lower Cristianitos Creek is also anticipated. Impacts associated with this bridge will be restricted to shading effects, direct loss of a small amount of habitat from bridge pilings, and loss of adjacent upland habitat.

Sewer and water infrastructure is proposed along the south bank of San Juan Creek between PA 4 and PA 5, north bank of San Juan Creek between PA 1 and PA 3, and crossing San Juan Creek near the existing Cow Camp crossing and confluence with Trampas Canyon. In addition, a total of 25 drainage outlets will be installed to allow discharge of water from development areas into San Juan and Gobernadora Creeks. New sewer infrastructure is also proposed along Cristianitos Creek roughly between PA6 and PA8. No permanent impacts to breeding habitat for arroyo toad are anticipated in conjunction with sewer and water infrastructure because the facilities will be buried and/or located outside of the wetted channel.

The construction of bridges and other infrastructure within and near occupied breeding habitat has the potential to crush individual arroyo toads. Habitat degradation associated with infrastructure improvements include alteration of streambed topography, removal of native vegetation, sedimentation and a temporary reduction in water quality due to turbidity in the water column, which can suffocate eggs and small larvae. Changes in streambed topography could result in less suitable habitat conditions for arroyo toads. Removal of native vegetation will reduce available cover and increase the potential for bank erosion.

Other Covered Activities

Other Covered Activities that may impact arroyo toads but will not result in a permanent or determined loss of potential habitat include cattle grazing, prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities such as pitfall trapping and removal of invasive species.

Cattle grazing may result in disturbance of breeding pools including increased sedimentation, which can suffocate eggs and small larvae, and trampling of arroyo toads and eggs. The Plan includes the introduction of grazing in and adjacent to San Juan Creek east of Cow Camp Crossing, which is an area that has not been grazed since 1981. Grazing along San Juan Creek would take place in late May or early June, during the arroyo toad breeding season. The re-introduction of grazing in the east River Pasture will not occur until the land becomes part of the Reserve, which means that all of the minimization measures associated with grazing will be implemented as soon as grazing is re-introduced at this location (see "Conservation Measures" below). If over-grazing occurs, it may degrade upland habitat and breeding pools by removing vegetative cover and increasing erosion rates.

Prescribed burns could result in the death of arroyo toads in the burn area and the temporary degradation of breeding pools due to runoff of ash and sediment into the pools following the burn. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may very occasionally kill or injure arroyo toads in the project area. Habitat management such as invasive plant removal along San Juan Creek and species' monitoring activities may very occasionally kill or injure arroyo toads that are within active restoration areas or that are trapped and handled during monitoring efforts.

Indirect Effects

The arroyo toad will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion. Of particular note is the arroyo toad's susceptibility to changes in hydrology such as surface flow, erosion, and groundwater levels in areas surrounding arroyo toad breeding and foraging pools, which are essential for persistence of arroyo toad populations. Other potentially important indirect effects include the possibility that increased recreational use of the Habitat Reserve along San Juan Creek will facilitate the spread of non-native predators and competitors such as crayfish and non-native turtles, which people can transport and introduce to new locations. Also, because of their

susceptibility to mortality and fragmentation due to roads, the arroyo toad is likely to be vulnerable to indirect effects (*e.g.*, increased vehicle strikes) associated with roads.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access and non-native species and to minimize the effects of construction activities, the following conservation measures specific to and/or of particular importance for arroyo toads will be implemented.

Conservation and Restoration: The Habitat Reserve will contain all of the arroyo toad "major" populations and "important" populations including San Juan Creek and Talega Canyon ("major" populations) and Bell Canyon and Lower Cristianitos Creek/Lower Gabino Canyon ("important" populations). Arroyo toads in Bell Canyon and upper San Juan Creek are in Caspers Regional Wilderness Park, and the rest are within RMV lands.

Reserve Design: The Habitat Reserve maintains connectivity between the conserved populations, as described below. The locations associated with the San Juan Creek and Bell Canyon will be connected by the creek and surrounding upland habitat, identified as Linkage J in the Plan. The development of PA1 through PA5 will eliminate much of the upland habitat surrounding the San Juan Creek, but a corridor at least 1,310 ft (399 m) wide (about 0.25 mi (0.40 km)) will be maintained along the length of the creek. Covered Activities include recreation trails and utilities on the banks of San Juan Creek within the corridor, construction of two new bridges over San Juan Creek, and improvement of an existing bridge, but the bridges will span most of the creek, and direct impacts will be primarily from the support columns and shading effects. Therefore, arroyo toads should be able to disperse along the wide, sandy stream channel bottom and maintain connectivity between locations along San Juan Creek and Bell Canyon.

Similarly, connectivity will be maintained within Talega Canyon and lower Cristianitos Creek/lower Gabino Canyon. Covered Activities will not create barriers to movement along the creek channels, and connectivity will be maintained along Linkages N, O, and Q.

The proposed project will also maintain connectivity between the arroyo toads in San Juan Creek and upper Cristianitos Canyon as described in the "Environmental Baseline" section. A minimum 6,000 ft (1,829m) wide swath of natural vegetation will be conserved between PA4 and PA5, allowing toads to disperse between the two watersheds.

Construction-Related Avoidance and Minimization Measures: As discussed in the Project Description, potential impacts to arroyo toads associated with construction activities on RMV lands will be avoided and minimized through preparation of Biological Resources Construction Plans (BRCP), which will be developed in coordination with the CFWO to address potential impacts to Covered Species associated with a particular project. For example, for projects with a high potential to impact aestivating or dispersing toads, minimization measures to reduce the loss of individuals should be considered, such as trapping and relocating toads out of the impact area.

The project-specific BRCPs described in Appendix U of the Plan provide the process for developing species-specific minimization measures for arroyo toads where necessary. Furthermore, potential degradation of aquatic habitats from pollution, sedimentation, and grading will be minimized through implementation of a variety of measures identified as MSAA Avoidance/ Minimization Measures. Finally, the permittee will install toad exclusionary fencing for any work within 300 ft (91 m) of a known arroyo toad population adjacent to San Juan Creek, Verdugo Creek, Gabino Creek, Cristianitos Creek, and Talega Creek for activities during the arroyo toad breeding season.

Grazing Management Plan: The Grazing Management Plan (see Appendix G of the Plan and Project Description in this document) includes the management of grazing activities and restoration of upland habitat with native grasses and coastal sage scrub to help ensure that the habitat remains suitable for a wide variety of species, including the arroyo toad. In addition, once the lands along San Juan Creek and lower Gabino Creek become part of the Reserve, cattle will be seasonally excluded from active breeding pools and adjacent sand bars and benches during the arroyo toad breeding season. This will involve temporary fencing around active breeding pools and adjacent sand bars and benches "to the extent feasible and/or necessary."

Management of Non-Native Plants and Aquatic Predators: For RMV, the Invasive Species Control Plan (see Project Description) will result in removal of non-native plant species that degrade aquatic habitats and should increase the quality of pools that are used for breeding by arroyo toad. The Invasive Species Control Plan also includes a bullfrog and crayfish control program within permanent and semi-permanent water bodies in San Juan Creek, identification of other bullfrog and crayfish breeding areas that may pose a risk to the arroyo toad, and implementation of additional control programs where necessary. The removal of non-native aquatic predators will benefit the arroyo toad by reducing predation pressure. The Invasive Species Control Plan is anticipated to offset the possible spread of non-native species within the Habitat Reserve by new residents. In addition, on 24.3 ac (10 ha) along San Juan Creek in Caspers Regional Wilderness Park, all invasive plant species will be removed and permanently maintained allowing the native plant species to proliferate and increase the area of suitable breeding habitat for arroyo toad.

Hydrology: Through the Water Quality Management Plans summarized in the project description, flow duration (which influences channel morphology) and water quality will be maintained such that hydrologic conditions of concern such as erosion or sedimentation or pollutants of concern will be addressed. Maintenance/repair of stormwater flow characteristics comparable to existing conditions from Trampas Canyon into San Juan Creek to preserve breeding habitat may be important.

Monitoring: Monitoring will be conducted both at a species-specific level and also at a habitat landscape level. The detailed monitoring program for the arroyo toad will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. The HCP, Chapter 7, Table 7-17 provides a conceptual monitoring schedule for the arroyo toad that includes annual monitoring of the arroyo toad populations between 2009 and 2013. This monitoring would include the use of radio telemetry on toads in the vicinity of PA8 to determine

which areas are most heavily used by arroyo toads and how PA8 could be designed to minimize impacts to the toad. After the 5-year study, periodic monitoring of arroyo toads would take place on average every 3 years through year 2031. The implemented monitoring schedule will be subject to adjustment by the Reserve Manager, with assistance by the Science Panel, as noted above. The monitoring is anticipated to identify potential threats and opportunities to enhance arroyo toad populations and habitat and to guide management activities accordingly.

Analysis of Impacts and Conservation by Planning Area

A summary of arroyo toad modeled habitat that will be impacted and conserved by PA is presented in Table C below.

Table C for Arroyo Toad: Modeled arroyo toad habitat permanently impacted and conserved/managed as a result of Covered Activities by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Arroyo Toad Aestivation/Foraging Habitat Impacted (Cumulative Impacts)**	**Arroyo Toad Aestivation/Foraging Habitat Conserved and Managed (Cumulative Conservation)**
PA1	18 (18)	58 (58)
PA2	29 (47)	238 (296)
PA3	206 (253)	428 (724)
PA4	92 (345)	1 (725)
PA5	0 (345)	4 (729)
PA6 & PA7	0 (345)	0 (729)
PA8	28 (373)	662 (1,391)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	69 (442)	-69 (1,322)
Ortega Rock	0 (442)	
Santa Margarita Water District Impacts	0 (442)	
Subtotal for Proposed RMV and Associated Projects	442	1,322
Prior RMV[1] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		0 (1,322)
TOTAL	**442**	**1,322**

[1] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA2 will impact 29 ac (12 ha) and conserve 238 ac (96 ha) of modeled arroyo toad habitat. Impacted modeled habitat consists of several patches of upland habitat near the confluence of Chiquita Creek and San Juan Creek. Conserved habitat includes potential breeding and foraging habitat in San Juan Creek just south of PA2 and upland habitat on the south side of San Juan Creek and along Chiquita Canyon that could be used for foraging, dispersal, and aestivating. Cumulatively, build-out of PA1 and PA2 will result in the conservation of 296 ac (120 ha) and will impact 47 ac (19 ha) of modeled habitat. The conservation area includes a stretch of stream where arroyo toad breeding has been observed repeatedly in the past.

Build-out of PA3 will impact 206 ac (83 ha) and conserve 428 ac (173 ha) of modeled arroyo toad habitat. The PA3 impact area includes substantial areas of modeled habitat interspersed amongst nursery and agricultural lands and a stretch of suitable upland habitat along the north bank of San Juan Creek that will be graded and left primarily as open space but will include utilities, hiking and riding trails, and an access road for utilities. The PA3 conservation area includes potential breeding and dispersal habitat along most of San Juan Creek. The conservation area also includes upland habitat along the south bank of San Juan Creek and a small amount of upland habitat near the confluence of Canada Gobernadora and San Juan Creek. Finally, the PA3 conservation area includes a large portion of the linkage between San Juan Creek and Cristianitos Creek. Cumulatively, build-out of PA1 through PA3 will result in the conservation of 724 ac (293 ha) and will impact 253 ac (102 ha) of modeled arroyo toad habitat.

Build-out of PA4 will impact 92 ac (37 ha) and conserve 1 ac (0.4 ha) of modeled arroyo toad habitat. The modeled arroyo toad habitat in the PA4 impact area is currently separated from San Juan Creek by a stretch of active agriculture and nursery and by SR74, and therefore, this habitat likely provides little biological benefit for arroyo toads. The impact area for PA4 includes some suitable upland habitat along the south bank of San Juan Creek that will be graded and left primarily as open space but will include utilities, hiking and riding trails, and an access road for utilities. Although PA4 will result in no conservation of breeding habitat and little conservation of modeled upland habitat, the impacts are primarily to habitat with limited value to the arroyo toad, and cumulatively PA1 through PA4 will result in the conservation of all of the breeding habitat and substantial areas of potential upland habitat along San Juan Creek. Cumulatively, build-out of PA1 through PA4 will result in the conservation of 725 ac (294 ha) and will impact 345 ac (140 ha) of modeled arroyo toad habitat.

Build-out of PA5 will impact no modeled arroyo toad habitat and will conserve 4 ac (2 ha). The modeled arroyo toad habitat in the PA5 impact and conservation areas consists of a small amount upland habitat south of San Juan Creek that may be used for aestivating and foraging. The remainder of the project footprint is outside the area most likely to be used by arroyo toads. Cumulatively, build-out of PA1 through PA5 will result in the conservation of 729 ac (295 ha) and will impact 345 ac (140 ha) of modeled arroyo toad habitat. If RMV voluntarily terminates their permit following the commencement of grading PA5, the large conservation area associated with PA8 (see below) will be conserved, which will further offset project-associated impacts.

The expansion of agricultural activities in PA6 and 7 will not impact or conserve any arroyo toad habitat. The expansion of agricultural activities by only 50 ac (20 ha) in PA6 and 7 is not anticipated to interfere with the dispersal of arroyo toad in the San Mateo Creek watershed.

Build-out of PA8 will impact up to 28 ac (11 ha) and conserve an estimated 662 ac (268 ha) of modeled arroyo toad habitat. The estimated impacts associated with PA8 are based on development of a 1,350-ac (547-ha) footprint for PA8. However, the development in PA8 will be a maximum of 500 ac (203 ha) and will be designed to minimize impacts to arroyo toads. Thus, the actual impacts will likely be less than 28 ac (11 ha). The PA 8 conservation area includes all breeding habitat in Talega Canyon and Lower Cristianitos Creek/Lower Gabino Canyon and the great majority of associated upland habitat that could be used for nesting,

dispersal, and foraging. In addition, the PA8 conservation area will complete the connection to populations in San Juan Creek and conserve connectivity with arroyo toad populations outside the action area to the south. Cumulatively, build-out of PA1 through PA8 will result in the conservation of 1,379 ac (558 ha) and will impact 373 ac (151 ha) of modeled arroyo toad habitat.

In addition to the conservation identified by Planning Area, there will be conservation and management of the Covered Species on prior RMV lands from the date of permit issuance if the permit is issued. However, there are no known arroyo toad locations on prior RMV lands.

Lastly, the analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure in the Habitat Reserve. Anticipated impacts associated with infrastructure are described above in the paragraph entitled "Infrastructure Improvements" and will impact an estimated 69 ac (28 ha) of modeled arroyo toad habitat. The impacts associated with infrastructure represent a small portion of the total impacts and will be spread throughout the life of the project. The conservation and management of the Habitat Reserve areas associated with PA1 through PA8 will offset these impacts.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 (*i.e.*, implement PA3 before PA2), the conservation will still offset the impacts after build-out of each successive PA since PA3 will result in a net conservation benefit for the arroyo toad. As described above, build-out of PA3 will conserve 428 acres of modeled arroyo toad habitat, including breeding habitat along most of San Juan Creek in RMV, and will impact 206 acres of potential upland habitat interspersed amongst nursery and agricultural lands.

If RMV chooses to phase development by Alternative Order 1, 4, 3, 2, 5, and 8, new conservation lags behind the development impact by 51 ac (21 ha) following development of PA4. However, this represents only a small loss in the overall amount of modeled habitat for the arroyo toad in the action area and following development of PA3, the conservation again exceeds the development impact by a ratio greater than 1:1 in all remaining phases of development.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of the arroyo toad. We base this conclusion on the following:

1) Arroyo toads are found primarily in small, isolated populations from the San Antonio River in Monterey County, south to the Tijuana River and Cottonwood Creek Basin along the Mexican border and in a disjunct population in the Arroyo San Simeon River system in Baja California. Thus, although the populations in the action area are essential

for survival and recovery of the arroyo toad, there are a number of other locations in a fairly wide geographic range in California that also support the species.

2) Following implementation of the Plan, all of the "major" and "important" populations in the action area will be conserved as follows:

   a) Almost all of the documented breeding habitat in the action area will be conserved;

   b) Only a small portion (a maximum of 28 of 650 ac (11 of 263 ha); 4 percent) of modeled habitat for arroyo toad in the San Mateo Creek watershed will be impacted. The conservation and management of all breeding habitat and remaining upland habitat is anticipated to maintain the "major" population in Talega Creek and the "important" population in lower Cristianitos Creek/lower Gabino Canyon;

   c) Implementation of the Plan will impact a substantial portion (402 of 1,074 ac (163 of 435 ha); 37 percent) of modeled upland habitat for arroyo toad along San Juan Creek on RMV lands. However, the conservation and management of breeding habitat and remaining upland habitat in San Juan Creek combined with the already-conserved habitat in Bell Canyon and restoration of 24 ac (10 ha) of breeding habitat in upper San Juan Creek in Caspers Regional Park is anticipated to maintain the "major" population along San Juan Creek.

   d) The "important" population in Bell Canyon and the portion of the "major" population in upper San Juan Creek are already conserved in Caspers Regional Park and will be cooperatively managed by the County.

3) The design of the Habitat Reserve will help maintain habitat connectivity between arroyo toad populations in the action area and those in San Mateo Creek watershed to the south at MCB Camp Pendleton.

4) We anticipate that permanent protection of arroyo toad populations combined with long-term management and monitoring actions within the Habitat Reserve will help sustain arroyo toad in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the Implementation Agreement is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for arroyo toad remains valid for the following reasons:

1) The impacts and conservation will remain the same except that non-native invasive species will not be removed from 24 acres of potential breeding habitat in upper San Juan

Creek. However, the Plan will still result in the conservation of all the "major" and "important" populations in the action area, as described below:

a. Almost all of the documented breeding habitat in the RMV/SMWD action area will be conserved;

b. Only a small portion (a maximum of 28 of 650 ac (11 of 263 ha); 4 percent) of modeled habitat for arroyo toad in the San Mateo Creek watershed will be impacted. The conservation and management of all breeding habitat and remaining upland habitat is anticipated to maintain the "major" population in Talega Creek and the "important" population in lower Cristianitos Creek/lower Gabino Canyon;

c. Implementation of the Plan will impact a substantial portion (402 of 1,074 ac (163 of 435 ha); 37 percent) of modeled upland habitat for arroyo toad along San Juan Creek on RMV lands. However, the conservation and management of breeding habitat and remaining upland habitat in San Juan Creek in RMV combined with existing conserved habitat in Bell Canyon and upper San Juan Creek in Caspers Wilderness Park[3] is anticipated to maintain the "major" population along San Juan Creek.

2) The design of the Habitat Reserve will help maintain habitat connectivity between arroyo toad populations in the action area and those in San Mateo Creek watershed to the south at MCB Camp Pendleton.

3) We anticipate that permanent protection of arroyo toad populations combined with long-term management and monitoring actions within the Habitat Reserve will help sustain arroyo toad in the Southern Subregion and contribute to the range-wide conservation of this species.

Finally, should the RMV and SMWD determine not to participate in this regional conservation effort, the Covered Activities within the action areas will be reduced to only those only implemented by the County of Orange. Our no jeopardy conclusion for arroyo toad remains valid because the only potential impacts to arroyo toad from County Covered Activities are associated with non-native vegetation removal in 24 ac (10 ha) along San Juan Creek in Caspers Wilderness Park. The benefits of increasing suitable arroyo toad breeding habitat along this stretch of San Juan Creek are anticipated to substantially outweigh incidental impacts to arroyo toad associated with restoration activities.

[3] Cooperative management on County lands will not occur; thus, these lands will not be included in the Habitat Reserve and are now considered SOS by this analysis.

Listed Birds

Coastal California gnatcatcher

Listing Status

The Service listed the coastal California gnatcatcher (*Polioptila californica californica*) as threatened on March 30, 1993 (58 FR 16742). Pursuant to section 4(d) of the Act, on December 10, 1993, the Service defined specific conditions associated with certain land use activities under which incidental take of gnatcatchers and their habitat would not be a violation of section 9 of the Act (58 FR 65088). The Service published a final rule designating critical habitat for the gnatcatcher on October 24, 2000 (65 FR 63680). As a result of various lawsuits and court decisions, the Service reconsidered the critical habitat and its economic analysis. The Service re-proposed critical habitat for the gnatcatcher on April 24, 2003, and in the same rule we sought comments and information for us to consider in changing the listing of the gnatcatcher subspecies as a distinct vertebrate population segment rather than a subspecies on the endangered species list (68 FR 20228). We published a notice of availability of a draft economic analysis for the proposed critical habitat on April 8, 2004 (69 FR 18516). Because the year 2000 designated critical habitat was not vacated by the court decision, it remains in effect.

Species and Critical Habitat Description

The coastal California gnatcatcher (gnatcatcher) is a small, long-tailed member of the thrush family (Muscicapidae) that is endemic to cismontane southern California and northwestern Baja California, Mexico (Atwood 1980, 1988, 1990, 1991; American Ornithologists' Union (AOU) 1983, 1989). Its body plumage is dark blue-gray above and grayish-white below, while the tail is mostly black above and below. The male has a distinctive black cap that is absent during the winter, and both sexes have a distinctive white eye-ring. Vocalizations of this species include a call consisting of a rising and falling series of three kitten-like mew notes. The gnatcatcher is distinguished from the black-tailed gnatcatcher (*Polioptila melanura*) by its darker body plumage, less extensive white on tail feathers (rectrices 5 and 6), and longer tail.

There are 13 designated critical habitat units for the gnatcatcher that include 513,650 ac (207,874 ha) of Federal, State, local, and private land in Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties (65 FR 63680). Proposed gnatcatcher critical habitat includes 495,795 ac (200,648 ha) within 13 units in the same five counties (58 FR 16742). Designated and proposed critical habitat represent a range of suitable habitat types and habitat successional stages within the historic range of the gnatcatcher, including disturbed areas (*e.g.*, due to past agricultural or ranching activities) that may return to suitable gnatcatcher habitat via successional processes. The individual units aid in conservation of suitable habitat for the gnatcatcher and help to identify special management considerations for the species. Primary constituent elements for the gnatcatcher are those habitat components that are essential for the primary biological needs of foraging, nesting, rearing of young, intra-specific communication, roosting, dispersal, genetic exchange, or sheltering (Atwood 1990). Primary constituent elements are provided in (1) undeveloped areas, including agricultural lands, that support or have

the potential to support, through natural successional processes, various types of sage scrub or (2) undeveloped areas that support chaparral, grassland, or riparian habitats where they occur proximal to sage scrub and where they may be used for the biological needs of dispersal and foraging, and (3) undeveloped areas, including agricultural areas, that provide or could provide connectivity or linkage between or within larger core areas, including open space and disturbed areas that may receive only periodic use. Primary constituent elements include, but are not limited to, the following plant communities in their natural state or those that have been recently disturbed (*e.g.*, by fire or grubbing): Venturan and/or Diegan coastal sage scrub, maritime succulent scrub, Riversidean sage or alluvial fan scrub, southern coastal bluff scrub, and coastal sage-chaparral scrub.

Habitat Affinities

The gnatcatcher is an insectivorous species that typically occurs in or near coastal sage scrub (CSS), which is composed of relatively low-growing, dry-season deciduous, and succulent plants. Characteristic plants of these communities include California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), lemonadeberry (*Rhus integrifolia*), bush penstemon (*Keckiella antirrhinoides*), *Salvia* spp., *Encelia* spp., and *Opuntia* spp. (Atwood 1990; Beyers and Wirtz 1997; Braden *et al*. 1997a; Weaver 1998).

CSS has been estimated to have historically covered nearly 2.5 million ac (1 million ha) of coastal California (Barbour and Major 1977), although anthropogenic development and land conversion have substantially depleted this habitat (Kirkpatrick and Hutchinson 1977; Axelrod 1978; Klopatek *et al*. 1979; O'Leary 1990), with potentially less than 15 percent of the original acreage of CSS remaining (Westman 1981a, 1981b). In addition to agricultural use and urbanization, increased fire frequency and the introduction of exotic plants have had an adverse impact on CSS habitat (O'Leary 1990).

CSS is patchily distributed throughout the range of the gnatcatcher, and gnatcatchers are not uniformly distributed within the structurally and floristically variable CSS. Gnatcatchers occur most frequently within California sagebrush-dominated stands of CSS (Atwood 1990; Atwood *et al*. 1998a, 1999; Beyers and Wirtz 1997), and Weaver (1998) found that gnatcatcher densities in northern San Diego County are highest in areas where California buckwheat or California encelia (*Encelia californica*) are co-dominant with sagebrush. Despite these general habitat preferences, all shrub species within CSS are used by gnatcatchers. Gnatcatchers are typically found in stands of CSS that have moderate shrub canopy cover (40-80 percent) (Atwood 1980, 1988; Beyers and Wirtz 1997). The relative density of shrub cover influences gnatcatcher territory sizes, with territory sizes increasing as shrub cover decreases, probably due to limited resource availability. Gnatcatchers will use sparsely vegetated CSS as long as perennial shrubs are available, although there appears to be a minimum cover threshold below which the habitat becomes unsuitable (Beyers and Wirtz 1997). Braden *et al*. (1997a) found that gnatcatcher fitness is positively correlated with the structural complexity of vegetation within territories; however, structural complexity does not necessarily equate to canopy cover or habitat maturity (G. Braden, San Bernardino County Museum, pers. comm. to C. Collier, CFWO, 2000).

Gnatcatchers also use chaparral, grassland, and riparian plant communities where they occur adjacent to, or intermix with, CSS (Campbell *et al*. 1998). The use of these atypical habitats appears to be most frequent during late summer, autumn, and winter, with smaller numbers of birds using non-CSS areas during the breeding season. However, a few breeding territories have been documented in non-CSS (Campbell *et al*. 1998).

Fire is a natural component of CSS ecology (Holland and Keil 1995), but frequent fires may alter species composition of the community by breaking the reproductive cycles of some species, like California sagebrush and California buckwheat (Zedler *et al*. 1983; Malanson and Westman 1985; Holland and Keil 1995). Frequent fires may lead to the conversion of CSS into grasslands (Callaway and Davis 1993). Due to loss of shrub cover, recently burned areas are used infrequently by gnatcatchers, and 4 to 5 years may be the minimum period of vegetation recovery necessary before gnatcatchers establish territories within completely burned areas (Wirtz *et al*. 1997; Atwood and Bontrager 2001). The period of habitat recovery necessary before gnatcatchers reoccupy burned areas depends on fire intensity, existence of unburned refugia within or adjacent to the burn perimeter, seasonal timing of the burn, soil type, post-fire rainfall patterns, topography, and pre-fire habitat conditions (Atwood *et al*. 2000).

Life History

Gnatcatchers are nonmigratory and exhibit strong site tenacity (Atwood 1990). Gnatcatcher pairs strongly defend territories during the breeding season against conspecifics and predators, while some gnatcatcher pairs will also defend territories throughout the year (Preston *et al*. 1998). Breeding season territories range in size from less than 2.5 ac to 25 ac (1 ha to greater than 10 ha) (Atwood *et al*. 1998b; Preston *et al*. 1998), with mean territory size generally being greater for inland populations than coastal populations. In the non-breeding season, the area used by individual gnatcatchers may be almost twice as large as that used during the breeding season (Preston *et al*. 1998).

Most gnatcatchers first breed at 1 year of age (Atwood and Bontrager 2001). The gnatcatcher breeding season extends from late-February through early-August with the peak of nesting attempts occurring from mid-March through mid-May (Grishaver *et al*. 1998; Atwood and Bontrager 2001). Nests are constructed over a 4-10 day period and are most often placed in perennial species of CSS about 3 ft (1.2 ha) above the ground (Atwood 1990). Gnatcatchers do not show any significant preference or avoidance of any CSS species for use in the placement of nests (Grishaver *et al*. 1998). Gnatcatchers typically lay clutches of 3 to 5 eggs (Atwood 1990; Galvin 1998; Grishaver *et al*. 1998), and clutch sizes may be influenced by the amount of precipitation immediately preceding nest initiation (Patten and Rotenberry 1999). The egg incubation period is 14 days, and the nestling period is 10 to 15 days (Grishaver *et al*. 1998). Both sexes participate in all phases of the nesting cycle, and gnatcatcher pairs may produce more than one brood in one nesting season (Atwood 1990; Grishaver *et al*. 1998). Predation is the most common cause of nest failure, accounting for up to 66 percent of nest failures in some areas (Braden *et al*. 1997b; Grishaver *et al*. 1998). Over 30 percent of all nests may be parasitized by the brown-headed cowbird (*Molothrus ater*) in the absence of cowbird trapping, but because

many parasitized nests are eventually depredated, the negative effects of parasitism may be outweighed by the much larger effects of predation (Braden *et al*. 1997b).

Juveniles stay within their natal territories up to 5 weeks after fledging from the nest (Grishaver *et al*. 1998), with juveniles subsequently dispersing to find their own foraging and nesting territories. Juveniles have been observed to disperse up to 6.2 mi (10.0 km) from their natal territory (Atwood and Bontrager 2001), but they generally disperse less than 1.9 mi (3.0 km) on average (Bailey and Mock 1998; Galvin 1998; Atwood and Bontrager 2001). Dispersing gnatcatchers are apparently able to traverse highly human-modified landscapes for at least short distances (Bailey and Mock 1998).

Similar to other passerine species, gnatcatcher mortality is highest for the youngest age class, with much of this attributable to predation of young in nests (Atwood 1990; Braden *et al*. 1997b) and high mortality rates among dispersing juveniles, as indicated by low re-sighting of banded birds (Bailey and Mock 1998; Galvin 1998). Sources of mortality for gnatcatchers have not been well-studied, although physiological stress during cold, wet winter months when food availability may be low is probably the main source of mortality among adults and dispersing juveniles (Atwood 1990; Atwood and Bontrager 2001). Mean average survivorship of gnatcatchers during their first year is estimated to be 29 percent, with annual survivorship for adults 57 percent, although there is probably a high annual variation within and between populations (Atwood and Bontrager 2001). The oldest documented individual was a female at least 8 years old (Atwood and Bontrager 2001).

Population Dynamics

The abundance of gnatcatchers at a given locale can fluctuate extensively on an annual basis (Atwood *et al*. 1998a; Erickson and Miner 1998; Preston *et al*. 1998); population declines or increases of greater than 50 percent between successive years have been reported regularly. Population fluctuations appear to be influenced by precipitation (Atwood *et al*. 1998a; Erickson and Miner 1998; Patten and Rotenberry 1999), with over-winter survivorship being negatively affected and subsequent productivity being positively affected by high winter precipitation. This dynamic relationship between winter precipitation, survivorship and productivity has been noted for other resident bird species in coastal southern California (Kus and Beck 2001) and the Pacific coast (Nott *et al*. 2002).

Stability of gnatcatcher populations may be negatively affected by increasing fragmentation (Atwood and Bontrager 2001), with populations in small, isolated fragments more susceptible to extirpation from stochastic (*i.e.*, drought) or catastrophic (*i.e.*, wildfire) events. Gnatcatcher conservation efforts are directed at preserving relatively large, contiguous patches of CSS suitable for gnatcatchers (58 FR 42717, 65 FR 63680, 68 FR 20228).

Status and Distribution

The gnatcatcher is found on the coastal slopes of southern California, from southern Ventura southward through Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties

into Baja California, Mexico to approximately 30 degrees North latitude near El Rosario (AOU 1957; Atwood 1980, 1990; 65 FR 63680; 68 FR 20228). Within its range, the distribution of coastal California gnatcatcher is further defined by relatively narrow elevation limits (Atwood and Bolsinger 1992). Atwood and Bolsinger (1992) found that of 324 sites occupied by the gnatcatcher between 1960 and 1990, 84 percent were located below 820 ft (250 m) elevation and 97 percent occurred below 1,640 feet (500 m) elevation. In general, inland populations of the gnatcatcher can be found below 1,640 ft (500 m) elevation and coastal populations tend to be found below 820 ft (250 m) elevations. Today, approximately 94 percent of the gnatcatchers in the United States are found in Orange, western Riverside, and San Diego counties (Atwood and Bontrager 2001). Small, extremely isolated populations remain in portions of its former range in Los Angeles, San Bernardino, and Ventura counties; however, wildland fires may have adversely affected the status of gnatcatchers in some of these areas.

Gnatcatchers were considered locally common in the mid-1940s, but they had declined substantially in the United States by the 1960s (Atwood 1980). Although observed declines in numbers and distribution of the gnatcatcher resulted from numerous factors, habitat destruction, fragmentation, and degradation are the principal reasons for the Federal listing of the gnatcatcher as threatened in 1993 (58 FR 16742).

Urban development projects are currently the primary source of gnatcatcher habitat loss and fragmentation. Since the listing of the gnatcatcher, the Service has worked with project proponents to offset the loss of occupied or potential gnatcatcher habitat caused by development projects. This has been achieved through conservation, enhancement, and/or restoration of CSS on or near project sites, as agreed to during interagency consultation or the habitat conservation planning (HCP) process. Gnatcatcher habitat conservation, enhancement, and restoration since the listing of the gnatcatcher are likely to have offset CSS loss to some degree and buffered any decline in the gnatcatcher population caused by habitat destruction. Restored habitat has the potential to support gnatcatchers when there is a source population nearby that can access the restored site (O'Connell and Erickson 1998; Miner *et al*. 1998). When combined with conserved CSS, enhanced and restored CSS has the potential to support a stable gnatcatcher population. For example, in 1993, the Coyote Hills East Preserve area had about 12 pairs of gnatcatchers on approximately 100 ac (40.5 ha) before development impacts and the implementation of habitat restoration associated with an HCP. By 2001, 24 pairs of gnatcatchers and 2 single males were present (Natural Resource Consultants 2001), and in 2005, about 22 gnatcatcher pairs were estimated to be present on the site, which now consists of about 60 ac (24 ha) of preserved habitat and 60 ac (24 ha) of restored habitat (Center for Natural Lands Management 2006a).

Population Estimates

In 1993, the Service (1993) estimated that approximately 2,562 pairs of gnatcatchers remained in the United States. Of these, 30 pairs (1.2 percent) occurred in Los Angeles County, 757 pairs (29.5 percent) occurred in Orange County, 261 pairs (10.2 percent) occurred in Riverside County, and 1,514 pairs (59.1 percent) occurred in San Diego County. In October 1996, the Service estimated the total number of gnatcatchers in the United States at 2,899 pairs (USFWS 1996a). Because the amount of CSS available to the gnatcatcher is believed to have decreased

from 1993 to 1996, the increase in estimated abundance from 1993 to 1996 may have reflected increased sampling effort and stochastic effects rather than an upward trend in the gnatcatcher population. In the most recent assessment of the range-wide gnatcatcher population, the Service determined that there was insufficient quantitative data to determine whether the overall gnatcatcher population had increased or decreased from 1996 to 1999 (USFWS 1999b). To begin to address gnatcatcher populations quantitatively, a study was conducted in 2002 by the Service. Preliminary results for the 79,923-ac (32,345-ha) study area of public and quasi-public lands in Orange and San Diego counties indicated different population estimates for the sampled area based on different sampling methods. Over the 79,923 ac (32,345 ha), a distance sampling method (arithmetic average) estimated 1,767 pairs, an auditory removal method (arithmetic average) estimated 1,324 pairs, a presence/absence method (naïve estimator) estimated 2,625 pairs, and a presence/absence method (Royle and Nichols estimator) estimated 3,009 pairs (Service unpublished data). We caution that these estimates apply only to the areas surveyed, that these results are preliminary, and they have not been fully agency- or peer-reviewed.

Threats and Conservation Needs

It is estimated that up to 90 percent of coastal sage scrub vegetation was lost as a result of development and land conversion (Barbour and Major 1977; Westman 1981a, 1981b), and it is considered to be one of the most depleted habitat types in the U. S. (Kirkpatrick and Hutchinson 1977; O'Leary 1990). Although declines in numbers and distribution of the coastal California gnatcatcher have resulted from numerous factors, the loss, fragmentation, and adverse modification of habitat are considered to be the principal reasons for the federally threatened status (58 FR 16742). In addition, agricultural use, such as grazing and field crops, urbanization, air pollution, increases in fire frequency, and the introduction of exotics have all had an adverse impact on CSS. A consequence of urbanization that is contributing to the loss, degradation, and fragmentation of CSS is an increase in wildfires. High fire frequencies and the lag period associated with recovery of the vegetation may significantly reduce the viability of affected subpopulations (Dudek and Associates 2000). Increased fire frequency also can lead to type-conversion to non-native grasses (Stephenson and Calcarone 1999). Finally, nest-parasitism by the brown-headed cowbird (Unitt 1984) and nest predation threaten the gnatcatcher (Atwood 1980; Unitt 1984).

Gnatcatcher conservation efforts are focusing on preserving relatively large, contiguous blocks of coastal sage scrub habitat (68 Federal Register 20228). Several regional Habitat Conservation Plans have been established pursuant to Section 10(a)(1)(B) of the Endangered Species Act including:

- San Diego Gas and Electric (SDG&E) Natural Community Conservation Plan in 1995.
- Central and Coastal Subregion Natural Community Conservation Plan and Habitat Conservation Plan for Orange County in 1996.
- San Diego Multiple Species Conservation Plan (MSCP) in 1997 for southwestern San Diego County including the County of San Diego and the cities of Chula Vista, Coronado, Del Mar, El Cajon, La Mesa Poway, San Diego, and Santee. Although the umbrella MSCP has been approved for these jurisdictions, only the County of San Diego and cities of Chula Vista, La Mesa, Poway, and San Diego have approved subarea plans.

- San Diego Multiple Habitat Conservation Program (MHCP) in 2003 for the northern cities of Carlsbad, Encinitas, Escondido, Oceanside, San Marcos, Solana Beach, and Vista. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.
- Western Riverside County MSHCP in 2004.

The gnatcatcher is a Covered Species in each of these six habitat conservation plans These plans have created large reserve systems that include substantial habitat for the gnatcatcher and requirements for monitoring and management actions beneficial to the long-term conservation of the species (Appendix 2).

In addition to the populations identified for conservation in the above regional HCPs in Orange, San Diego, and Western Riverside counties, large populations of gnatcatchers occur in Rancho Palos Verdes, Montebello Hills, northern Orange County, and MCB Camp Pendleton, which is contiguous with RMV.

Environmental Baseline

Habitat (CSS) and Locations

The action area contains 20,716 ac (8,390 ha) of CSS, of which 16,814 ac (6,808 ha) or 81 percent are in Subarea 1 (Table A1). According to the Plan, the existing data relating to the status and distribution of the gnatcatcher within the action area were derived from 15 years worth of cumulative presence/absence and nest monitoring data. The action area contains 722 gnatcatcher locations, of which 518 locations or 72 percent are in Subarea 1 (Table A1; Figure 171-M in the NCCP/MSAA/HCP).

According to the Plan, due to the cumulative nature of the data collection, it is likely that only 60 to 70 percent of the gnatcatcher locations are currently occupied (page 13-65 in the NCCP/MSAA/HCP). Based on this assumption, of the 722 gnatcatcher locations in the action area, 433-505 are predicted to be occupied at any given time (Table A2).

Major and Important Populations

Within the action area, 1 “major” population and 11 “important” populations have been identified for the gnatcatcher (Figure 171-M in the NCCP/MSAA/HCP). The “major” population and eight of the “important” populations are in “key” locations. The “major” population contains 404 locations, while the 11 “important” populations total 240 locations. A brief description of each population follows:

- The Chiquita Canyon area, including Chiquadora Ridge and Wagon Wheel Canyon supports a “major” population. This area, which extends from the “horseshoe” in northern Coto de Caza south to San Juan Creek accounts for approximately 56 percent (404 of 722) of the gnatcatchers in the action area.

Table A1 for Coastal California Gnatcatcher: Coastal California gnatcatcher habitat (CSS) and locations in the action area

Action Area Components	**Total Amount of Coastal California Gnatcatcher Habitat (acres)**	**Coastal California Gnatcatcher Locations in NCCP Dataset**
Subarea 1		
Proposed RMV[1]	7,702	243
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	1,286	152[2]
Prima Deshecha Landfill	255	15
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	5,493	87
Supplemental Open Space (Audubon Starr Ranch)	2,061	21
Other	17	
Subtotal for Subarea 1	***16,814***	***518***
Subarea 2	1,300	18
Subarea 3	753	64
Subarea 4[2]	1,849	122
TOTAL	**20,716**	**722**

[1] Includes project footprint for RMV infrastructure in Subarea 4 (5 ac and 0 locations)
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (5 ac and 0 locations); includes 4 locations in proposed SMWD reservoir and 2 locations in Ladera Open Space that is part of Prior RMV.

- Lower Arroyo Trabuco "important" population is located between Avery Parkway and Oso Parkway and supports 41 locations. This population is linked to the Chiquita Canyon population through the open space habitat on Chiquita Ridge between the Las Flores and Ladera Ranch developments.
- The West Foothill-Trabuco Specific Plan "important" population in a "key" location is located in the area west of Live Oak Canyon Road. Although there are only six gnatcatcher locations, the area is important as a low elevation habitat link to gnatcatcher populations in the Central portion of the Central and Coastal NCCP/HCP reserve.
- The East Foothill-Trabuco Specific Plan "important" population is located in the Rose Canyon area and includes 14 locations. It represents the upper elevation limit for this species in the action area.
- The East Coto de Caza/Starr Ranch "important" population in a "key" location includes occurrences along the ridgeline between the Gobernadora and Bell Canyon sub-basins and the scattered occurrences east of northern Bell Canyon. This population of 52 locations provides dispersal habitat and potential refugia habitat for birds in Chiquita Canyon if a wildfire were to occur. It also provides a north-south linkage to other occupied habitat in Caspers Wilderness Park, including scattered locations west of San Juan Creek.

Table A2 for Coastal California Gnatcatcher: The number of coastal California gnatcatcher locations and the estimated number of occupied territories in the action area.

Action Area Components	**Total No. of Coastal California Gnatcatcher Locations**	**No. of Coastal California Gnatcatcher Occupied Territories[1]**
Subarea 1		
Proposed RMV	240	143-167
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	152[2]	91-106
Avenida La Pata	3	2-3
Prima Deshecha Landfill/Avenida La Pata	15	9-11
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	87	52-61
Supplemental Open Space (Audubon's Starr Ranch)	21	13-15
Subtotal for Subarea 1	***518***	**311-363**
Subarea 2	18	11-13
Subarea 3	64	38-45
Subarea 4	122	73-85
TOTAL	**722**	**433-505**

[1] Based on the assumption that only 60-70 percent of the locations are occupied.
[2] Includes 4 locations in proposed SMWD reservoir and 2 locations in Ladera Open Space that is part of Prior RMV.

- The East Caspers Wilderness Park "important" population contains 15 locations and represents the eastern most locations of gnatcatchers in the action area.
- The West San Juan Capistrano "important" population in a "key" location is located north of Camino Las Ramblas in San Juan Capistrano. It contains 35 locations and could potentially provide refugia in case of wildfire for locations to the east.
- The East San Juan Capistrano "important" population in a "key" location is generally located north of Camino Las Ramblas and west of La Pata Avenue in San Juan Capistrano. It contains 28 locations and provides a north-south linkage between the Chiquita Canyon "major" population, the West San Juan Capistrano "important" population, and the North San Clemente "important" population.
- The Trampas Canyon "important" population in a "key" location is generally located northwest of the silica sand mining operation in Trampas Canyon. It contains only seven locations, but it contributes to the north-south linkage between Chiquita Canyon and the San Juan Capistrano populations and also provides a potential east-west linkage between the San Juan Capistrano and Chiquita Canyon populations and the upper Cristianitos population.

- The North San Clemente "important" population in a "key" location is located mostly in San Clemente west of the proposed La Pata Avenue extension and on either side of the Camino Del Rio proposed extension. It contains 21 locations and provides a low elevation linkage between the San Juan Capistrano populations and the "important" population along Avenida Pico, which connects to the population along lower Cristianitos and San Mateo creeks and other populations on MCB Camp Pendleton.
- The Upper Cristianitos Canyon "important" population in a "key" location contains 13 locations. It connects the "major" population with populations in lower Cristianitos Creek and San Mateo Creek on MCB Camp Pendleton. It is the eastern-most of the low elevation population connections.
- The Avenida Pico "important" population in a "key" location is located south of Avenida Pico in San Clemente. It supports 8 locations and provides an east-west linkage between populations in San Juan Capistrano and San Clemente and the population in lower Cristianitos and San Mateo creeks on MCB Camp Pendleton. It is the only remaining southerly link for these populations.

Of these 12 "major/important" populations, 8 have already been afforded some conservation protection:

- Approximately 36 percent (144 of 404 locations) of the Chiquita Canyon "major" population locations are conserved within the Upper Chiquita Canyon Conservation Area and the Ladera Conservancy. An additional 26 locations are located in Coto de Caza SOS.
- Approximately 68 percent (28 of 41 locations) of the Lower Arroyo Trabuco "important" population is currently conserved within the Ladera Conservancy and O'Neill Regional Park.
- A portion of the West Foothill Trabuco Specific Plan "important" population is conserved within O'Neill Regional Park.
- 37 percent (19 of 52 locations) of the East Coto de Caza/Starr Ranch "important" population occurs on Starr Ranch. An additional 7 locations are located in Coto de Caza SOS.
- The East Caspers Wilderness Park "important" population is mostly conserved within Caspers Wilderness Park.
- The East San Juan Capistrano "important" population has been partially impacted by development, but it has a conserved east-west linkage through the middle of this population that is undergoing restoration resulting from a section 7 consultation on the gnatcatcher.
- The North San Clemente "important" population in Subarea 4 has been largely conserved except for potential future impacts associated with Avenida la Pata through the 4(d) Rule for the gnatcatcher.
- The Avenida Pico "important" population in Subarea 4 resides mostly within a San Diego Gas and Electric easement area.

Although not included in any "important" populations, 6 locations in O'Neill Regional Park and 24 locations in Caspers Wilderness Park are conserved and contribute to the long-term conservation of the gnatcatcher in the action area.

Linkages

Several linkages between gnatcatcher populations on RMV and surrounding areas are currently defined by development and/or conserved areas (see Figure 159-M in the NCCP/MSAA/HCP) including the following:

- Linkage F is a "horseshoe" shaped corridor north of the Coto de Caza golf course that provides habitat and connectivity between Upper Chiquita Canyon and Starr Ranch and Caspers Wilderness Park. Although this linkage is fragmented, narrow (substantially less than the 2,000-ft-wide (600 m) Plan goal), and a patchy mosaic of CSS, it still supports many gnatcatcher territories. The patchy CSS habitat also likely provides a route for gnatcatcher dispersal. South of Linkage F, some east-west movement of gnatcatchers may also occur across the Coto de Caza golf course from surrounding SOS lands in the vicinity of Via Ortega/Via Coyote. In this area, native scrub habitat that will remain undeveloped is immediately adjacent to either side of a narrow strip of the golf course.
- Linkage A is defined by the north-south oriented O'Neill Regional Park along Arroyo Trabuco that contains several areas of CSS and continuous riparian habitat. This is the primary low elevation linkage that is expected to be used by gnatcatchers for dispersal between Chiquita Canyon and the Foothill Trabuco Specific Plan area (Subarea 2) and the Central and Coastal NCCP/HCP reserve.
- Linkage B occurs between Ladera and Las Flores developments. This short east-west linkage that contains patches of CSS connects Chiquita Canyon with O'Neill Regional Park and is likely used frequently by gnatcatchers for dispersal.

Linkages between the action area and other important regional gnatcatcher populations include:

- Linkage R, which connects the action area to the Central Subarea component of the Central/Coastal NCCP/HCP Subregion ("Central Subarea"). The Saddleback Meadows area provides a secondary low elevation habitat linkage for the gnatcatcher between O'Neill Regional Park and habitat areas across El Toro Road in the Central Subarea reserve. The Live Oak Canyon parcel, which is being restored to CSS, is located northwest of and contiguous with the Saddleback Meadows open space and provides additional connectivity to the Central Subarea reserve.
- Linkage S, which is the lowest elevation linkage for gnatcatchers between the Southern Subregion and the Central Subarea. This linkage, located north of Oso Reservoir, includes O'Neill Regional Park and the County-owned Oso Nursery Property. Linkage S is not currently a contiguous corridor of natural habitat primarily because of the 44-acre (18-ha) Oso nursery site leased by the County.
- Previously conserved lands containing CSS through the 4(d) Rule process for the gnatcatcher in Subarea 4 (San Juan Capistrano and San Clemente) link the Prima Deshecha Landfill and the area of RMV around the Landfill with MCB Camp Pendleton

(see Figure 6-M in the NCCP/MSAA/HCP). Additionally, natural open space in the City of San Clemente contributes to these corridors and linkages between RMV/Prima Deshecha Landfill and MCB Camp Pendleton. Although some of these corridors are extremely fragmented and narrow in places, there continues to be a high number of gnatcatchers here; 3 of the 11 gnatcatcher "important" populations identified in the Plan occur in this area.

- Linkage N currently consists of patches of CSS and riparian areas between Donna O'Neill Conservancy and the eastern boundary of RMV. This gnatcatcher-occupied area provides a linkage between the gnatcatcher population in upper Cristianitos Canyon and gnatcatcher populations in the San Juan Creek Watershed and the gnatcatcher population on MCB Camp Pendleton.

Critical Habitat

As mentioned above, critical habitat for the gnatcatcher was designated in 2000 (65 Federal Register 63680). The action area contains 10,715 ac (4,348 ha) or 16 percent of the designated critical habitat in Unit 8, including 8,346 ac (3,380 ha) or 12 percent in Subarea 1; 2,288 ac (927 ha) or 3 percent in Subarea 2; none in Subarea 3; and 81 ac (33 ha) or less than 1 percent in Subarea 4. Unit 8 contains significant core populations and provides the primary linkage for core populations on MCB Camp Pendleton (Unit 5) to core populations further north in Orange County (Unit 11). Although several lawsuits have challenged this critical habitat designation, the Court ruled that it should remain in place while the Service completes a new proposed rule, and until the new, final regulation becomes effective.

In 2003, the Service re-proposed critical habitat for the gnatcatcher (68 FR 20243); however, this rule has not been finalized. Under the 2003 proposal, a smaller portion of the action area was included in Unit 6, which encompassed approximately 44,340 ac (17,958 ha), a decrease of approximately 35 percent. A total of 9,004 ac (3,647 ha) or 20 percent of proposed critical habitat falls within the action area, including 6,965 ac (2820 ha) or 16 percent in Subarea 1; 1,936 ac (784 ha) or 4 percent in Subarea 2; none in Subarea 3; and 104 ac (42 ha) or less than 1 percent in Subarea 4. According to this proposal, Unit 6 contains some of the "largest, most robust gnatcatcher populations known, as well as essential regional populations and linkages." This unit also provides the primary linkage for core populations in Northern San Diego MHCP (Unit 3) and the Fallbrook Naval Weapons Station (Unit 4) to those populations further north in Orange County (Unit 7).

<u>Effects of the Action</u>

Direct Effects

The action area includes 20,716 ac (8,390 ha) of suitable nesting and foraging habitat (CSS) for the Coastal California gnatcatcher and 722 gnatcatcher locations (Table A1). For all Covered Activities over the 75-year term of the permits and within the action area, 2,479 ac (1,004 ha) or 12 percent of gnatcatcher nesting and foraging habitat (CSS) will be permanently impacted. The

impact area includes 98 gnatcatcher locations or 14 percent of the locations documented in the action area (Table B).

Infrastructure improvements by RMV and SMWD will temporarily impact 71 ac (29 ha) of CSS in the Habitat Reserve and SOS in Subareas 1 and 4. Three gnatcatcher locations in the Habitat Reserve will be temporarily impacted as a result of infrastructure improvements. Future landslide remediation activities on Prima Deshecha Landfill may temporarily impact additional acres of CSS and gnatcatcher locations.

We do not anticipate mortality or injury of adult or juvenile gnatcatchers or gnatcatcher nests or eggs during habitat grading or grubbing since a biological monitor will flush gnatcatchers out of harms way and habitat removal will be conducted outside of the gnatcatcher breeding season (February 15 – September 15). Mortality and injury to displaced gnatcatchers, however, is likely. Gnatcatchers are resident birds and are site tenacious. For birds whose use areas are completely destroyed or significantly reduced, the search for suitable habitat exposes them to increased predation pressure. Further, birds that are able to disperse from the area of habitat destroyed by grubbing or grading will likely have to engage in increased competition for remaining suitable habitat resulting in increased stress and energy expenditure beyond normal behavior. Displaced birds that do not find suitable replacement habitat may starve or otherwise die from lack of shelter or predation. Lastly, gnatcatchers that do find suitable habitat may lose their mates and be unable to find new mates, at least initially after disturbance, causing a decline in reproductive output.

Other Covered Activities that may impact the gnatcatcher, but are not expected to result in a permanent loss of habitat, include prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities and habitat and wildlife management and monitoring activities. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance but should occur outside the gnatcatcher breeding season. Habitat management and monitoring activities could result in minor disturbance of individuals and temporary loss of habitat, but no direct loss of individuals is anticipated.

Major and Important Populations

Most of the impacts to “major” and “important” populations are from PA2, Prima Deshecha Landfill, and infrastructure. A total of 52 locations or 13 percent of the Chiquita Canyon “major” population and 26 locations or 11 percent of the “important” populations will be permanently impacted by the Covered Activities. No “major” or “important” population is expected to be lost due to Covered Activities.

Table B for Coastal California gnatcatcher: The amount of coastal sage scrub (CSS) and the number of coastal California gnatcatcher locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the gnatcatcher in the action area.

Covered Activities and Conservation Areas	**CSS Impacts (acres)**	**CSS in Habitat Reserve (acres)**	**CSS in Prima SOS[1] (acres)**	**CSS with Status Unchanged**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations in Prima SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	2,248	5,454			79	163		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		1,286				152		
Subtotal of impacts and conservation by RMV and SMWD	**2,248**	**6,740**			**79**	**315**		
Prima Deshecha Landfill	122		133		8		7	
Avenida La Pata on RMV Lands	42	-42	52		3	-3	0	
Avenida La Pata in Subarea 4	10				0			
Subtotal of impacts and conservation by the County of Orange	**174**		**185**		**11**		**7**	
Subtotal of impacts and assured conservation with adaptive management	**2,422**	**6,698**	**185[4]**		**90**	**312**	**7**	
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 57				Up to 8			
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	0	5,493			0	87		
No Covered Activities				5,861				217
TOTAL	**2,479**	**12,191**	**185**	**5,861[5]**	**98**	**399**	**7**	**217[5]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum impacts to CSS and gnatcatcher locations are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] See Project Description for a full explanation of the County CSS mitigation program.
[5] Includes 2,061 ac of CSS and 21 locations in Audubon Starr Ranch SOS and additional conserved habitat and locations in SOS in Subareas 2-4.

New Roads

As each Planning Area on RMV is developed, associated infrastructure will also be constructed (see Planning Area analysis below). Roads will be built to connect each Planning Area with pre-existing development in the action area. We expect both juvenile and adult gnatcatchers to occasionally disperse/fly over these new roads (Department of Parks and Recreation, San Diego County 2003) and possibly establish territories adjacent to them if appropriate habitat is available. Dispersing birds as well as territorial birds will have a risk of being struck by a vehicle when crossing these roads. Gnatcatchers may also be indirectly affected by these roads, as roads fragment habitat and create more edges; especially the proposed local arterial connector between Oso Parkway and PA2 and PA3 and Cow Camp Road where it crosses several of the north-south linkages.

Coto de Caza

As described in the Baseline Section, Linkage F provides habitat and connectivity for the gnatcatcher between Upper Chiquita Canyon, Starr Ranch, and Caspers Wilderness Parks. However, if all participants choose to pay the fee and conserve no CSS on-site then Linkage F will likely be non-functional for gnatcatcher movement.

Grazing

RMV has grazed cattle on its property since 1882. Areas containing CSS and gnatcatchers are not fenced to exclude cattle. Free-ranging cattle could therefore forage within CSS and possibly disturb and/or knock-over nests, displace roosting gnatcatchers, or otherwise degrade the habitat. Grazing cattle could also inhibit the recovery of burned CSS areas, whether the fire was a result of a prescribed burn or natural wildfire. The re-introduction of cattle into a burned area too early can negatively affect the natural recovery process and may result in type conversion of the CSS to annual grassland.

Critical Habitat

Implementation of the Covered Activities will impact an estimated 2,422 ac (981 ha) or less than 0.5 percent of the designated and proposed critical habitat for the coastal California gnatcatcher. The impacts from Covered Activities represent 3.5 percent of the designated critical habit for gnatcatcher in Unit 8 or 5 percent of the proposed critical habitat in Unit 6. Critical habitat function and primary constituent elements will be lost in those areas that are urbanized.

Indirect Effects

The gnatcatcher could be subject to indirect effects from Covered Activities as described in the "General Effects" section of this biological opinion and more specifically as follows.

In Southern California, effects of fragmentation have been shown to decrease the number of resident bird species, decrease the diversity of small rodents, and decrease the diversity and

cover of native plant species (Soulé *et al*. 1988; Bolger *et al*. 1991; Alberts *et al*. 1993; Bolger *et al*. 1997a,b). These alterations to the species assemblage, especially the reduction in native plant species diversity and cover, may decrease the quality of habitat for gnatcatchers over time. This could occur as the arthropod abundance and diversity declines in correlation with the decline in their native plant hosts, decreasing the food supply of this insectivorous species.

The fragmentation of natural habitats in the action area may also negatively affect the quality of remaining habitat by facilitating the invasion of exotic plant and animal species. Invasive weedy annual plants can alter the species composition and structure of the habitat, which may make it less suitable to the gnatcatcher and also more susceptible to fire.

Invasive ant species such as the Argentine ant (*Linepithema humile*) are known to be abundant in residential areas and invade habitat edges (Suarez *et al*. 1998). This species alters the native arthropod community, significantly reducing their diversity and abundance (Bolger *et al*. 2000). Any reduction in arthropod numbers related to invasion by Argentine ants as a result of the increased urbanization anticipated in Subarea 1 is likely to reduce food resources for arthropod predators, including the gnatcatcher.

Brown-headed cowbirds have been shown to significantly reduce breeding success of gnatcatchers (Braden 1997b). An increase in the number of residential developments in Subarea 1, combined with the large areas of turf grass associated with parks and school grounds, will result in greater foraging opportunities for cowbirds. This may increase the number of adult cowbirds breeding in the Habitat Reserve. Therefore, nest parasitism of the gnatcatcher is expected to occur, especially in areas adjacent to cowbird foraging locales, such as livestock and equestrian centers, and urban parklands.

Throughout southern California, CSS is being converted to nonnative grassland and other ruderal (weedy) habitats (Allen *et al*. 1996; Allen *et al*. 1999; Minnich and Dezzani 1998; Allen 2004). Conversion of shrublands to grasslands has been attributed to a combination of factors including invasion of exotic non-native plant species (*e.g*., annual grasses), increased fire frequency, and nitrogen deposition due to air pollution. Even in reserve areas not threatened by habitat destruction, a continuous loss of suitable habitat available to the gnatcatcher is ongoing (Minnich and Dezzani 1998).

Conservation Measures

In addition to the Conservation Measures identified in the “Project Description” section of this biological opinion to address management of recreation/access, non-native species including cowbird trapping, grazing, and fire, the following conservation measures specific to and/or of particular importance to the gnatcatcher will be implemented.

Conservation and Restoration

To offset the impacts of the Covered Activities on the coastal California gnatcatcher, a total of 406 or 56 percent of the gnatcatcher locations and 12,376 ac (5,008 ha) or 60 percent of the

gnatcatcher nesting and foraging habitat (CSS) within the action area will be included in the Habitat Reserve and SOS on Prima Deshecha Landfill (Table B).

The Habitat Reserve will include 298 or 74 percent of the gnatcatcher locations in the Chiquita Canyon "major" population and about 75 or 31 percent of the gnatcatcher locations in the 11 "important" populations.

Within RMV lands alone, at least 6,740 ac (2,730 ha) or 75 percent of the CSS will be permanently conserved and adaptively managed within the Habitat Reserve (Table C). The RMV portion of the Habitat Reserve will include 315 or 80 percent of the gnatcatcher locations within RMV lands (Table B).

To offset the loss of CSS (174 ac (70 ha)) associated with the Prima Deshecha Landfill and the extension of Avenida La Pata, the County will create the same amount of CSS (174 ac; 70 ha) within a 530.7-ac (215 ha) SOS area on the landfill within 5 years of permit issuance and will manage this area for Covered Species, including the gnatcatcher, in perpetuity. The creation of 174 ac (70 ha) of CSS will occur to a standard identified in Appendix M (Attachment M-2 Prima Deshecha/Avenida La Pata Mitigation Program in the NCCP/MSAA/HCP) and will occur prior to future impacts of the landfill and road projects. In addition to habitat creation, 7 gnatcatcher locations and associated CSS habitat will be conserved in undeveloped portions of the landfill that will be included in the landfill's SOS lands (see Figure 164-M in the NCCP/MSAA/HCP). Once the CSS restoration is successfully completed, we expect gnatcatchers to establish territories and occupy the site. The amount of CSS created is expected to support or exceed the baseline number of gnatcatchers known from the site (15 locations). The County is also restoring an extra 11 ac (4 ha) of CSS in the SOS (for a total of 185 ac (75 ha)) in case 11 ac or less (≤4 ha) does not meet the CSS restoration success criteria.

In Coto de Caza (Subarea 3) conservation of the 57 ac (23 ha) of CSS and up to 8 gnatcatcher locations will depend upon the individual land owners and whether they choose to participate in the County's Coto de Caza "Opt-In-Program" for coverage under this Plan. Under the "Opt-In-Program," the landowner must avoid CSS occupied by the gnatcatcher to the maximum extent practicable and/or pay a per-acre in-lieu-fee for management of the County Parkland within the Habitat Reserve. If enough of the landowners participate in the "Opt-In-Program" and conserve some portion of the remaining CSS, Linkage F is expected to remain a viable corridor for gnatcatcher movement. However, because we cannot predict whether owners of the 17 parcels will participate in the "Opt-In-Program" and conserve some CSS on their lots, we have assumed the worst-case scenario that all 57 ac (23 ha) of CSS and all 8 gnatcatcher locations will be permanently impacted. Alternatively, infrequent gnatcatcher dispersal across the golf course south of Linkage F in the vicinity of Via Ortega/Via Coyote is likely. The golf course at this location is narrow with a riparian strip in the middle and upland habitat on either side that is suitable for gnatcatcher dispersal.

In addition to mitigation for the Covered Activities, the County has agreed to enroll 5,493 ac (2,225 ha) of CSS including 87 gnatcatcher locations into the Habitat Reserve as soon as is

practicable following signatory acceptance of the Plan, but no later than 1 year following this date. These lands are currently managed and conserved as County wilderness or regional parks.

In an attempt to offset the potential loss of CSS habitat as a result of conversion to non-native annual grassland habitat, the HRMP will establish the following goals and objectives to attain these goals: 1) protection and management of CSS to maintain approximate baseline acreage (12,191 ac (4,937 ha)), 2) restoration of CSS through implementation of the Habitat Restoration Plan upon recommendation of same by the Science Panel as a priority action, 3) management of CSS fire regimes such that a natural diversity of age-stands are maintained throughout the Habitat Reserve by implementing the Wildland Fire Management Plan, and 4) management of exotic non-native plant species, especially along the Habitat Reserve/urban interface by implementing the Invasive Species Control Plan.

To off-set temporary impacts in the Habitat Reserve, RMV will restore all areas as described in the Project Description of this document and Appendix U of the NCCP/MSAA/HCP. In addition, RMV will conduct restoration of CSS in designated areas along Chiquita and Chiquadora Ridges and in Sulphur Canyon to improve gnatcatcher habitat connectivity and carrying capacity (Page 7-70 of the NCCP/MSAA/HCP) upon recommendation of same by the Science Panel as a priority action. Similarly, SMWD and the County of Orange will restore all temporarily disturbed CSS to original or better conditions.

Reserve Design

Following implementation of the Plan, gnatcatcher populations will be conserved in approximately five areas of the Habitat Reserve including, from north to south, 1) 74 percent (298 of 404 locations) of the Chiquita Canyon/ Western Gobernadora/Chiquadora Ridge “major” population; 2) 93 percent (14 of 15 locations) of the East Caspers Wilderness Park “important” population; 3) 68 percent (28 of 41 locations) of the Lower Arroyo Trabuco “important” population, 4) 86 percent (6 of 7 locations) of the Trampas Canyon “important” population; and 5) 85 percent (11 of 13 locations) of the Upper Cristianitos Canyon “important” population. Additionally, 27 percent (14 of 52 locations) of the East Coto de Caza/Starr Ranch “important” population and 33 percent (2 of 6 locations) of the West Foothill Trabuco Specific Plan “important” population will be conserved in the Habitat Reserve.

As stated above, SOS in the action area includes 50 percent (26 of 52 locations) of the East Coto de Caza/Starr Ranch “important” population, 50 percent (3 of 6 locations) of the West Foothill Trabuco Specific Plan “important” population, 9 percent (1 of 11 locations) of the Upper Cristianitos Canyon “important” population, and 71 percent (15 of 21 locations) of the Lower Arroyo Trabuco “important” population.

Habitat connectivity for gnatcatcher dispersal within the action area will be maintained through conservation and adaptive management of the following linkages, which are under 1,500 ft (458 m) elevation and contain suitable gnatcatcher dispersal habitat (*i.e.*, CSS and riparian):

- Linkages C and G are two north-south linkages that connect Chiquita and Chiquadora ridges. Linkage C runs between PA2 and the Ladera Ranch housing development and Linkage G is located between PA2 and PA3. Linkage C connects gnatcatchers in the Lower Arroyo Trabuco "important" population with the Chiquita Ridge portion of the "major" population. Linkage G will allow gnatcatcher movement between the "major" population into San Juan Creek and south to "important" populations in San Juan Capistrano and Upper Cristianitos Canyon.
- Linkages D and I are east-west linkages that connect Arroyo Trabuco and Caspers Wilderness Park. Linkage D (the "Narrows") separates middle and lower Chiquita Canyon and runs east through the Habitat Reserve until it becomes Linkage I. Linkage I is Canada Gobernadora between Coto de Caza and the mouth of Sulphur Canyon. Linkage D facilitates gnatcatcher movement within the "major" population between Chiquita Ridge and Canada Gobernadora. Linkage I connects the "major" population with the East Caspers Wilderness Park "important" population. Gnatcatchers could also disperse northward from this linkage into the East Coto de Caza/Starr Ranch "important" population.
- Linkage J is the San Juan Creek floodplain which travels through Caspers Wilderness Park and runs southwest into Lower Chiquita Canyon. This linkage connects Chiquita Ridge and Chiquita Canyon with the Central San Juan Creek and Trampas Canyon sub-basin and aids dispersal of birds to the south via Cristianitos Canyon. Linkage J facilitates movement of gnatcatchers between the "major" population and "important" populations further south including Trampas Canyon, Upper Cristianitos, and East San Juan Capistrano.
- Linkages K and N are two north-south linkages that connect Cristianitos Canyon and the southern portion of the Chiquita sub-basin. Linkage K is habitat west of the silica mine in Trampas Canyon that provides dispersal opportunities for species between Chiquita Ridge ("major" population) and habitat in Subarea 4 (East San Juan Capistrano "important" population), as well as eastward dispersal between Trampas Canyon (Trampas Canyon "important" population) and the Talega development to the Habitat Reserve, Cristianitos Canyon (Upper Cristianitos Canyon "important" population) and MCB Camp Pendleton. Linkage N, Cristianitos Canyon, links San Juan Creek with lower Gabino Creek and MCB Camp Pendleton along lower Cristianitos/San Mateo Creek. Linkage N allows movement of gnatcatchers between "major" and "important" populations in the action area and gnatcatcher occupied habitat on MCB Camp Pendleton.

These linkages meet the Plan goal width of 2,000 ft (610 m) except the corridor that runs north-south between PA5 and Prima Deshecha Landfill, which has a minimum width of 600 ft (183 m) at its narrowest point. Although this linkage is less than the 2,000-ft-wide (610-m) Plan goal, it is expected to provide continuous suitable habitat for gnatcatcher dispersal once restoration and management activities proposed by the County are implemented.

As stated above, indirect effects associated with roads such as habitat fragmentation and edge effects will occur mostly along the proposed local arterial connector "Cristianitos Road" between Oso Parkway and PA2 and PA3 as well as along Cow Camp Road where it is proposed to cross

several of the north-south linkages described above. However, we expect both juvenile and adult gnatcatchers to occasionally disperse/fly over these new roads (Department of Parks and Recreation, San Diego County 2003) and/or where possible travel underneath bridge crossings, if suitable habitat is present. Because the Habitat Reserve design is based on maintaining large areas of CSS habitat, indirect effects such as habitat fragmentation and habitats with increased edge should be minimized.

Grazing

The Grazing Management Plan (see Appendix G of the NCCP/MSAA/HCP and "Project Description" in this biological opinion) includes the management of grazing activities and restoration of upland habitat with native grasses and CSS to help ensure that the habitat remains suitable for a wide variety of species, including the gnatcatcher. The Grazing Management Plan also describes the pastures that have been planted with barley in the San Juan watershed, including Chiquita Canyon. Chiquita Canyon has been planted with 1,000 ac (405 ha) of barley, which provides high quality forage for the free-ranging cattle. According to the NCCP/MSAA/HCP, cattle have concentrated in the barley fields and annual grasslands and have not foraged extensively in the less desirable CSS. These barley pastures and the annual grasslands will continue to be maintained.

As stated above, the re-introduction of cattle into a burned area too early can negatively affect the natural recovery process and may result in type changing the CSS vegetation to annual grassland. To avoid this potential loss of CSS, RMV will test hypotheses in coordination with the Science Advisors about when to release cattle back into burned areas in three of the major vegetation communities on RMV (CSS, grassland and oak woodland). Results of the testing of these hypotheses will help identify the optimal time that cattle can be re-introduced into a burned area to avoid habitat type conversion.

Monitoring

Monitoring will be conducted at a species-specific level and also at a habitat landscape level. The detailed monitoring program for gnatcatcher will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. The NCCP/MSAA/HCP (page 7-212 and E-44) provides a conceptual monitoring program for the gnatcatcher that proposes annual field surveys within pre-designated sample plots to monitor changes in the CSS community and gnatcatcher population size. Within two years of the Effective Date, RMV will also establish a CSS baseline in the Habitat Reserve for the purposes of long-term tracking, with the goal of maintaining the approximate existing CSS acreage in the Habitat Reserve.

In addition, RMV will monitor the proposed 32 Covered Species including the gnatcatcher, on County Park lands within the Habitat Reserve. County Parks may receive additional funding for adaptive management of Covered Species on their lands through the Coto de Caza "Opt-In-Program" and from grants; however, this funding is not assured.

The County will monitor the gnatcatcher on Prima Deshecha Landfill SOS on an annual basis in perpetuity.

Critical Habitat

The conservation and management of 6,698 ac (2,713 ha) of designated or proposed critical habitat in the Habitat Reserve will offset impacts. Gnatcatcher populations within proposed and designated critical habitat in the action area are expected to be maintained along with functional dispersal corridors between the action area and the Central and Coastal Reserve to the north and to MCB Camp Pendleton in the south. Thus, implementation of the Covered Activities will not preclude the ecological role of proposed and designated critical habitat in the survival and recovery of the species.

Analysis of Impacts and Conservation by RMV Planning Area

A summary of gnatcatcher locations and habitat that will be impacted and conserved from RMV and SMWD Covered Activities is presented in Table C below. In addition to the impacts and conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Build-out of PA1 will impact 9 ac (4 ha) of CSS and three gnatcatcher locations and result in the management and conservation of 235 ac (95 ha) of CSS and five gnatcatcher locations in the Habitat Reserve (Table C). The three impacted gnatcatcher locations are not associated with any of the “major” or “important” populations.

Upon build-out of PA2, an additional 264 ac (107 ha) of CSS and 37 gnatcatcher locations will be impacted. RMV will conserve an additional 1,064 ac (431 ha) of CSS and 146 gnatcatcher locations in the Habitat Reserve to minimize this impact (Table C). PA2 is located in the southeastern portion of the 1 identified gnatcatcher “major” population, which contains 404 gnatcatcher locations. Therefore, build-out of PA2 will impact 9 percent of the gnatcatcher locations in this “major” population. The CSS habitat conserved as a result of PA2 development, however, is almost entirely occupied by the gnatcatcher and maintains connectivity between the “major” population and the other “important” populations in the action area. Cumulatively, build-out of PA1 and PA2 will result in substantially more CSS and gnatcatcher locations conserved (1,299 ac (526 ha) and 151 locations) than would be impacted (273 ac (111 ha) and 40 locations), a conservation to impact ratio greater than 4:1 for CSS and greater than 3:1 for gnatcatcher locations.

Table C for Coastal California gnatcatcher: Coastal California Gnatcatcher habitat (CSS) and locations permanently impacted and conserved/managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Locations and Habitat Impacted (Cumulative Impacts)**		**Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	3 (3)	9 (9)	5 (5)	235 (235)
PA2	37 (40)	264 (273)	146 (151)	1,064 (1,299)
PA3	18 (58)	649 (922)	2 (153)	1,261 (2,560)
PA4	0 (58)	399 (1,321)	0 (153)	238 (2,798)
PA5	1 (59)	299 (1,620)	6 (159)	109 (2,907)
PA6 & PA7	2 (61)	47 (1,667)	0 (159)	0 (2,907)
PA8	5 (66)	395 (2,062)	17 (176)	2,665 (5,572)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	9 (75)	100[1] (2,162)	-9 (167)	-95[1] (5,477)
Ortega Rock	0 (75)	63 (2,225)		
Santa Margarita Water District Impacts (Reservoir in Upper Chiquita Conservation Area)	4 (79)	23 (2,248)	-4 (163)	-23 (5,454)
Subtotal for Proposed RMV and Associated Projects	79	2,248	163	5,454
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			152 (315)	1,286 (6,740)
TOTAL	**79**	**2,248**	**315**	**6,740**

[1] 95 ac of infrastructure impact are in the Habitat Reserve, and 5 ac are in SOS.

Build-out of PA3 will impact the most CSS habitat (649 ac (263 ha)) of all the planning areas and 18 gnatcatcher locations. With the development of PA2 and PA3, dispersal opportunities for gnatcatchers west of PA5 between the "major" population in Chiquita Canyon and the "important" populations and other occurrences south in the San Mateo Watershed will be limited to unoccupied habitat via San Juan Creek (see Figure 171-M in the NCCP/MSAA/HCP). Currently, gnatcatchers can disperse between the Upper Cristianitos "important" population or the "major" population and PA3 over a much shorter distance. Longer dispersal distances may result in increased mortality through exposure and an increased predation risk and a decrease in the number of successfully dispersing individuals between these populations. An increase in mortality of dispersing individuals may affect the fitness of these populations. To offset this loss, RMV will conserve an additional 1,261 ac (511 ha) of CSS habitat and 2 locations in the Habitat Reserve. Cumulatively, build out of PA1-PA3 will still result in more CSS and gnatcatcher locations conserved (2,560 ac (1,037 ha) and 153 locations) than will be impacted (922 ac (373 ha) and 58 locations), a conservation to impact ratio greater than 2:1 for CSS and gnatcatcher locations.

The exact location and configuration of PA4 has not been determined; however, 725 ac (294 ha) will ultimately be developed based on the projected impacts from the NCCP/MSAA/HCP.

Because the location of the development bubble has not been identified, the exact impacts to CSS could not be provided. Instead, the Plan identifies an overstated impact scenario of 399 ac (162 ha) of CSS. All of this CSS is currently unoccupied as are the 238 ac (96 ha) that will ultimately be conserved in the Habitat Reserve to offset this loss. Therefore, no direct impacts to the gnatcatcher will result from build-out of PA4. Cumulatively, build out of PA1-PA4 will result in more conservation of CSS (2,798 ac (1,133 ha)) than will be impacted (1,321 ac (535 ha)) and still maintains a conservation to impact ratio greater than 2:1 for CSS and gnatcatcher locations.

Build-out of PA5 will impact 299 ac (121 ha) of CSS and 1 gnatcatcher location in the Trampas "important" population. The Trampas "important" population will be indirectly affected by habitat fragmentation and edge effects that make smaller populations more susceptible to extirpation (Atwood and Bontrager 2001). Development of PA5 in conjunction with the development of the Prima Deshecha Landfill and the existing Talega development will create two narrow linkages (600 ft [183 m] at the narrowest point) connecting gnatcatcher populations in SOS and Habitat Reserve lands. To off-set this loss, RMV will conserve an additional 109 ac (44 ha) of CSS and 6 gnatcatcher locations in the Habitat Reserve. Cumulatively, build out of PA1-PA5 will result in more conservation of CSS (2,907 ac (1,177 ha)) than will be impacted (1,620 ac (656 ha)) and maintains a conservation to impact ratio greater than to 2:1 for gnatcatcher locations, although the habitat conservation ratio is reduced to greater than 1:1.

Development in PA6 and PA7 can occur anytime but will only impact 47 ac (19 ha) of CSS and 2 gnatcatcher locations. Cumulatively, build out of PA1-PA7 will result in more conservation of CSS (2,907 ac (1,177 ha)) than will be impacted (1,667 ac (675 ha)) and maintains a conservation to impact ratio of greater than 1:1 for CSS and greater than 2:1 for gnatcatcher locations.

Upon build out of PA8, an additional 395 ac (160 ha) of CSS and 5 gnatcatcher locations will be impacted. To offset this loss and previous losses in the San Juan watershed, an additional 2,665 ac (1,075 ha) of CSS and 17 locations will be conserved in the Habitat Reserve. Cumulatively, build out of PA1-PA8 will result in more CSS and gnatcatcher locations conserved (5,572 ac (2,256 ha) and 176 locations) than will be impacted (2,062 ac (835 ha)) and 66 locations), which increases the conservation to impact ratio to greater than 2:1 for CSS and gnatcatcher locations.

Lastly, the analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure, SMWD, and Ortega Rock in the Habitat Reserve. Impacts with these activities include: infrastructure (100 ac (40 ha) CSS and nine locations), Ortega Rock (63 ac (25 ha) CSS), and Santa Margarita Water District impacts at the Upper Chiquita Conservation Area Reservoir (23 ac (9 ha) of CSS and four locations). These impacts represent a small fraction of the total impacts that will occur over the life of this project, and they will also occur in a phased manner. In addition, there will be conservation and management of the Covered Species including 152 occurrences of gnatcatcher and 1,286 ac (521 ha) of CSS on the Prior RMV lands within 6 months of permit issuance. The Prior RMV lands add substantial value to the conservation goal of maintaining connectivity for gnatcatchers as well as additional habitat and gnatcatcher locations. Overall, the impacts from RMV/SMWD Covered Activities (2,248 ac

(910 ha) and 79 locations) are mitigated by the substantial conservation and adaptive management of 6,740 ac (2,730 ha) of CSS and 315 gnatcatcher locations, a conservation to impact ratio of 3:1 for CSS and almost 4:1 for gnatcatcher locations.

If RMV chooses to phase development by Alternative Order PA1, 3, 2, 4, 5, and 8, new conservation of CSS still exceeds impacts by a 2:1 ratio through development of PA1 and PA3; however, the number of newly conserved gnatcatcher locations lags behind the development because 21 gnatcatcher locations will be impacted but only 7 locations will be newly conserved. However, 152 gnatcatcher locations and 1,286 ac (521 ha) of CSS will be conserved and adaptively managed in the Prior RMV portions of the Habitat Reserve prior to impacts from PA3. Therefore, after build out of PA1 and PA3, there would be a total of 2,782 ac (1,127 ha) of CSS and 157 gnatcatcher locations conserved and adaptively managed in the Habitat Reserve with only 658 ac (254 ha) of CSS and 21 gnatcatcher locations impacted, which maintains the positive conservation to impact ratio for CSS and gnatcatcher locations. Upon build-out of PA2 and in all remaining phases of development, newly conserved CSS and gnatcatcher locations again exceeds the development impact by a ratio of greater than 2:1.

If RMV chooses to phase development by Alternative Order 1, 4, 3, 2, 5, and 8, the same analysis as above applies since PA4 does not impact or conserve any gnatcatcher locations and development of PA3 precedes development of PA2.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of the coastal California gnatcatcher or adversely modify designated or proposed critical habitat. We base this conclusion on the following:

1. The overall distribution of the gnatcatcher south of Ventura County remains roughly the same since the listing in 1993, but today many of the largest gnatcatcher populations are conserved and managed in the regional NCCP/HCP reserves. Additionally, within and between Orange, San Diego, and Riverside Counties, many of the gnatcatcher populations are interconnected with existing or planned linkages and corridors.

2. Only 98 coastal California gnatcatcher locations (14 percent) and a total of 2,479 ac (1,004 ha) or 12 percent of coastal California gnatcatcher nesting and foraging habitat in the action area will be permanently impacted by Covered Activities.

3. A total of 12,191 ac (4,934 ha) or 59 percent of the suitable nesting and foraging habitat for the gnatcatcher in the action area, including 399 locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 6,698 ac (2,711 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 5,493 ac (2,223 ha) of habitat is within existing County Parks. While adaptive

management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 185 ac (75 ha) of gnatcatcher nesting and foraging habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 2,061 ac (834 ha) (10 percent) of gnatcatcher nesting and foraging habitat, including 21 gnatcatcher locations, is conserved at NAS Starr Ranch.

5. Combined, 14,437 ac (5,842 ha) or 70 percent of the nesting and foraging habitat for coastal California gnatcatcher, including 427 locations (59 percent), in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.

6. Seventy-four (74) percent of the gnatcatcher locations in the Chiquita Canyon "major" population and about 31 percent of the gnatcatcher locations in the 11 "important" populations will be included in the Habitat Reserve.

7. Gnatcatcher connectivity between MCB Camp Pendleton and the Central/Coastal NCCP Reserve via RMV and County parkland will be maintained. Similarly, connectivity between all of the "major" and "important" populations will be maintained.

8. With implementation of the conservation measures, we anticipate that no adult or juvenile, or nestling gnatcatchers or eggs will be killed or injured during habitat grading or grubbing.

9. While substantial in acreage, the loss of designated/proposed critical habitat is a small proportion of the entire critical habitat designated within Units 8 and 6, respectively. This habitat loss will not impair the function of the critical habitat, as sufficient areas will remain to support gnatcatcher breeding, feeding, sheltering, and dispersal.

10. We anticipate that permanent protection of the gnatcatcher locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the gnatcatcher in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA has not been invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP//HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid for the following reasons:

1. Impacts of the Covered Activities will be reduced to the loss of 79 coastal California gnatcatcher locations and 2,248 ac (910 ha) of coastal California gnatcatcher nesting and foraging habitat, which represents 11 percent of the locations and 11 percent of the gnatcatcher habitat in the action area.

2. The conservation proposed by RMV will still be implemented such that 75 percent of the gnatcatcher nesting and foraging habitat and 80 percent of the gnatcatcher locations on RMV lands will be conserved and adaptively managed within the Habitat Reserve, including 74 percent of the gnatcatcher locations in the Chiquita Canyon "major" population and about 31 percent of the gnatcatcher locations in the 11 "important" populations. This represents a 3:1 conservation to impact ratio for gnatcatcher habitat on RMV lands.

3. The County of Orange will not implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS and County Park lands, and these lands will not be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP. However, a total of 87 gnatcatcher locations and 5,493 ac (2,225 ha) of gnatcatcher nesting and foraging habitat will remain within existing County Park lands.

4. Gnatcatcher connectivity between MCB Camp Pendleton and the Central and Coastal Reserve via RMV and County parkland will be maintained. Similarly, connectivity between all of the "major" and "important" populations will be maintained.

5. With implementation of the conservation measures, we anticipate that no adult or juvenile, or nestling gnatcatchers or eggs will be killed or injured during habitat grading or grubbing.

6. The loss of designated/proposed critical habitat, while substantial in acreage is a small proportion of the entire critical habitat designated within Units 8 and 6, respectively. This habitat loss will not impair the function of the critical habitat, as sufficient areas will remain to support gnatcatcher breeding, feeding, sheltering, and dispersal.

7. We anticipate that permanent protection of the gnatcatcher locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the gnatcatcher in the Southern Subregion and contribute to the range-wide conservation of this species.

Finally, should RMV and SMWD determine not to participate in this regional conservation effort, the Covered Activities within the action area will be reduced to only those implemented by the County of Orange. Our no jeopardy conclusion for coastal California gnatcatcher remains valid for the following reasons:

1. Covered Activities will impact 19 gnatcatcher locations and 231 ac (94 ha) of gnatcatcher nesting and foraging habitat in the action area, which represents less than 3 percent of the gnatcatcher locations and about 1 percent of the gnatcatcher habitat in the action area. None of these locations are part of "major/important" populations.

2. The County of Orange will implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS at Prima Deshecha Landfill to offset impacts to gnatcatcher from their landfill and road extension projects. Seven (7) existing gnatcatcher locations within 40 ac (16 ha) of existing CSS and 185 ac (75 ha) of created CSS in SOS on Prima Deshecha Landfill will be conserved. We expect that several gnatcatcher pairs will establish breeding territories in the restored CSS habitat on Prima Deshecha Landfill SOS. The County will monitor the gnatcatcher on Prima Deshecha Landfill SOS on an annual basis in perpetuity.

3. Gnatcatcher connectivity between Prima Deshecha Landfill SOS, Talega Open Space, and the North San Clemente "important" population will be enhanced by the CSS restoration and conservation. In addition, gnatcatcher connectivity will be maintained between Prima SOS and Trampas Canyon and other locations on RMV lands.

4. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling coastal California gnatcatcher or their eggs will be killed or injured during habitat grading or grubbing.

5. We anticipate that the conservation actions for the gnatcatcher at Prima Deshecha Landfill will help sustain gnatcatcher in the Southern Subregion and contribute to the range-wide conservation of this species.

Least Bell's Vireo

Listing Status

In response to the dramatic decline of the vireo population and widespread loss of its riparian habitat, the vireo (*Vireo bellii pusillus*) was listed as endangered on May 2, 1986 (51 FR 16474). Critical habitat was designated for the vireo on February 2, 1994 (59 FR 4845), and encompasses about 38,000 ac (15,379 ha) at 10 locations in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties. No critical habitat is within the action area. Primary constituent elements that support feeding, nesting, and sheltering are essential to the conservation of the least Bell's vireo, and include riparian woodland vegetation that generally contains both canopy and shrub layers and some associated upland habitats (59 FR 4845). A draft recovery plan was published in March 1998 (USFWS 1998b).

Species Description

The least Bell's vireo is a small migratory songbird that is olive-gray above and mostly white on its underparts, with a tinge of gray on the upper breast and yellow on the flanks (Coues 1866; USFWS 1998b). The vireo has indistinct white spectacles and two faint wing bars, with males and females having identical plumage. Male vireos are easily distinguished by their song, a rapid series of harsh, slurred notes that increase in intensity as the song progresses (Grinnell and Storer 1924; Pitelka and Koestner 1942; Barlow 1962; Beck 1996). Phrases of the vireo song are alternatively slurred upward and downward and exhibit a "question-and-answer" quality

(Grinnell and Storer 1924; Beck 1996). The least Bell's vireo is in the family Vireonidae and is one of four subspecies of Bell's vireo (*Vireo bellii*) that have been recognized (AOU 1957), with each subspecies isolated from one another throughout the year (Hamilton 1962; USFWS 1998b).

Habitat affinities

Vireos are obligate riparian breeders, typically inhabiting structurally diverse woodlands along watercourses that feature dense cover within 3-6 ft (0.9-1.8 m) of the ground and a dense, stratified canopy (Goldwasser 1981; Salata 1983; Gray and Greaves 1984; USFWS 1998b). The understory within this riparian habitat is typically dominated by mulefat, California wild rose (*Rosa californica*), poison oak (*Toxicodendron diversiloba*), sandbar willow (*Salix hindsiana*), young individuals of other willow species, and several perennial species (USFWS 1998b). Important canopy species include mature arroyo willows (*S. lasiolepis*) and black willows (*S. gooddingii*), and occasional cottonwoods (*Populus* spp.), western sycamore, or coast live oak (*Quercus agrifolia*). Vireos primarily forage and nest in riparian habitat, but they may also use adjoining upland scrub habitat (Salata 1983; Kus and Miner 1989).

Life history

Vireos primarily feed on invertebrates, especially lepidopteran larvae, within willow stands or associated riparian vegetation (Miner 1989; Brown 1993). Vireos occasionally forage in nonriparian vegetation such as coastal sage scrub, chaparral, and oak woodlands, although foraging in these other habitats usually occurs within 100 ft (30.5 m) of the edge of riparian vegetation (Salata 1983; Gray and Greaves 1984; Kus and Miner 1989). Vireo feeding behavior largely consists of gleaning prey from leaves or woody surfaces while perched or hovering and, less frequently, by capturing prey by aerial pursuit (Salata 1983; Miner 1989). Vireos concentrate most of their foraging between 0 to 20 ft (0 to 6.1 m) above ground level (Salata 1983; Miner 1989).

Vireos generally arrive in southern California breeding areas by mid-March to early April, with males arriving before females and older birds arriving before first-year breeders (USFWS 1998b). Vireos generally remain on the breeding grounds until late September, although some post-breeding migration may begin as early as late July (USFWS 1998b). Male vireos establish and defend breeding territories through singing and physically chasing intruders (Barlow 1962; Beck 1996; USFWS 1998b). Although territories typically range in size from 0.5 to 7.5 ac (0.2 to 3.0 ha) (USFWS 1998b), no relationship appears to exist between territory size and various measures of territory quality (Newman 1992).

Nest building commences a few days after pair formation, with the female selecting a nest-site location, and both sexes constructing the nest (Pitelka and Koestner 1942; Barlow 1962; USFWS 1998b). Nests are typically suspended in forked branches within 3 ft (0.9 m) above the ground with no clear preference for any particular plant species as the nest host (Nolan 1960; Barlow 1962; Gray and Greaves 1984; USFWS 1998b). Typically 3 or 4 eggs are laid on successive days shortly after nest construction (USFWS 1998b). The eggs are incubated by both parents for about 14 days with the young remaining in the nest for another 10-12 days (Pitelka and Koestner

1942; Nolan 1960; Barlow 1962). Each nest appears to be used only once with new nests constructed for each nesting attempt (Greaves 1987). Vireos may attempt up to five nests within a breeding season, but they are typically limited to one or two successful nests within a given breeding season (USFWS 1998b).

Multiple long-term monitoring studies indicate that approximately 59 percent of nests successfully produce fledglings, although on average only 1.8 chicks fledge per nest (USFWS 1998b). Although vireo nests appear to be more accessible to terrestrial predators because of their relatively low placement (Franzreb 1989), western scrub-jays (*Aphelocoma californica*) have been documented to account for the majority of documented depredation events (Peterson 2002; Peterson *et al*. 2004); depredation by jays and other avian predators may have selected for relatively low nest placement (Ferree 2002). Predation rates can exceed 60 percent of the vireo nests in a given area within a year (Kus 1999), but typical nest predation rates average around 30 percent (Franzreb 1989), which is comparable to predation rates for other North American passerines (Martin and Clobert 1996; Grishaver *et al*. 1998; Ferree 2002).

Nest parasitism by cowbirds is another major source of failure for vireo nests (Franzreb 1989; USFWS 1998b; Kus 1999, 2002; Griffith and Griffith 2000; Sharp 2002); nests that are parasitized are either abandoned or fledge cowbird chicks rather than vireos. It is believed that cowbirds did not historically occur within the vireo's range, and therefore vireos have not evolved adequate defenses to avoid loss of productivity due to parasitism (Franzreb 1989; Kus 2002). Parasitism of vireo nests may exceed 42 percent in some locations (Kus 1999), but extensive cowbird trapping and focused nest monitoring can substantially reduce parasitism or its effects (Franzreb 1989; USFWS 1998b; Griffith and Griffith 2000; Kus 2002).

Some individual vireos have been documented to live at least 7 years (Brown 1993; USFWS 1998b), but the average lifespan for this species is substantially lower. First year survivorship has been estimated to average approximately 25 percent (Greaves and Labinger 1997; USFWS 1998b), typical for small passerines, with annual survivorship in subsequent years estimated to be approximately 47 percent (USFWS 1998b). Annual survival of females appears to be slightly lower than that for males, presumably due to the higher energetic costs of egg production by females (USFWS 1998b).

Fledgling vireos expand their dispersal distances from about 35 ft (10.7 m) the first day to about 200 ft (70.0 m) several weeks after fledging (Hensley 1950; Nolan 1960). This distance has been shown to increase to at least 1 mi (1.6 km) prior to their first fall migration (Gray and Greaves 1984). Banding records indicate that while most first-year breeding vireos return to their natal drainage after winter migration, some disperse considerable distances to other breeding locations (Greaves and Labinger 1997; USFWS 1998b; Kus and Beck 1998). Movement by vireos between drainages within San Diego County is not uncommon (Kus and Beck 1998). Additionally, several vireos banded as nestlings in San Diego County have been re-sighted as breeding adults in Ventura County, and the opposite movement from Ventura to San Diego has also been observed (Greaves and Labinger 1997). The maximum dispersal distance currently documented is approximately 130 mi (209.2 km) (USFWS 1998b), but this is probably an underestimate due to the limited number of vireos that are banded and insufficient re-sighting

efforts. Although movement between sites by older birds may occur, site fidelity by vireos after the first breeding season is generally high, and most dispersal between sites occurs between the time that vireos fledge from their nest and their first breeding season (USFWS 1998b).

Population Dynamics

Causes for decline of the least Bell's vireo included destruction or degradation of habitat, river channelization, water diversions, lowered water tables, gravel mining, agricultural development, and cowbird parasitism (51 FR 16474, 59 FR 4845, USFWS 1998b). Historical habitat losses had fragmented most remaining populations into small, disjunct, widely dispersed subpopulations (Franzreb 1989). Habitat fragmentation negatively affects abundance and distribution of neotropical migratory songbirds, in part by increasing incidence of nest predation and parasitism (Whitcomb *et al*. 1981; Small and Hunter 1988; Yahner and DeLong 1992; Sharp 2002; Peterson 2002). Vireos nesting in areas containing a high proportion of degraded habitat have lower productivity (*e.g*., hatching success) than those in areas of high quality riparian woodland (Pike and Hays 1992).

Status and Distribution

The vireo historically occupied willow riparian habitats from Tehama County, in northern California, southward to northwestern Baja California, Mexico, and as far east as Owens Valley, Death Valley, and the Mojave River (Grinnell and Miller 1944; USFWS 1998b). Although originally considered to be abundant locally, regional declines of this subspecies were noticeable by the 1940s (Grinnell and Miller 1944), and the vireo was believed to have been extirpated from California's Central Valley by the early 1980s (Franzreb 1989). Except for a few outlying pairs, the vireo is currently restricted to southern California south of the Tehachapi Mountains and northwestern Baja California (Wilbur 1980; Garrett and Dunn 1981; Franzreb 1989; U. S. Geological Survey (USGS) 2002). The largest current concentrations of vireos are in San Diego County along the Santa Margarita River on MCB Camp Pendleton and in Riverside County at the Prado flood control basin (USFWS 2006).

Historically, the San Joaquin and Sacramento Valleys were considered to be the center of the vireo's breeding range (60 to 80 percent of the historic population; 51 FR 16474), but the vireo has not yet meaningfully re-colonized those areas. In 2005 and 2006, the first breeding pair of vireos detected in the San Joaquin Valley since the listing of the vireo successfully bred at the San Joaquin National Wildlife Refuge in Stanislaus County (USFWS 2006). There have been no sightings of vireos in the Sacramento Valley since prior to the listing, and it is unlikely that any breeding vireos have occurred within recent years in the Sacramento Valley.

Greater than 99 percent of the remaining vireos were concentrated in southern California (Santa Barbara County and southward) at the time of the listing in 1986 (51 FR 16474), with San Diego County containing 77 percent of the population. Greater than 99 percent still remain in southern California, although the populations are now more evenly distributed in southern California with 54 percent of the total population occurring in San Diego County and 30 percent of the population occurring in Riverside County (USFWS 2006); however, there has been only a slight

shift northward in the species' overall distribution. Thus, despite a significant increase in overall population numbers, the population remains constricted to the southern portion of its historic range.

Population Estimates

The vireo population in the U. S. has increased 10-fold since its listing in 1986, from 291 to 2,968 known territories (USFWS 2006). The population has grown during each 5-year period since the original listing, although the rate of increase has slowed over the last 10 years. Population growth has been greatest in San Diego County and Riverside County, with lesser but significant increases in Orange County, Ventura County, San Bernardino County, and Los Angeles County. The population in Santa Barbara County has declined since the listing in 1986, although it is uncertain whether this population was historically significant. Kern, Monterey, San Benito, and Stanislaus Counties have had a few isolated individuals and/or breeding pairs since the original listing, but these counties have not supported any sustained populations.

Threats and Conservation Needs

At the time of the listing, loss of habitat due to agricultural practices, urbanization, and exotic plant invasion was identified as a major threat to vireo populations. Since the listing of the vireo, destruction and modification of riparian habitat within its current range has been curtailed significantly, primarily as a consequence of protections provided by the original listing in 1986 (51 FR 16474), the subsequent designation of critical habitat in 1994 (59 FR 4845), and other Federal and State regulatory processes. Other efforts not driven by regulatory processes have also promoted increased conservation and restoration of riparian habitat since the listing of the vireo in 1986 (USFWS 2006).

Agriculture and grazing continue to threaten riparian habitat within the larger historic range, particularly the Salinas, San Joaquin, and Sacramento valleys (USFWS 1998b). Urbanization appears to have displaced former agriculture and grazing operations in many areas within southern California, thereby indirectly reducing riparian habitat degradation caused by these activities. On the other hand, occupied vireo habitat that is adjacent to highly urbanized areas or within major river systems continues to be impacted by flood control and water impoundment projects and may be subject to ongoing and future habitat loss or degradation (USFWS 2006).

Several large, regional Habitat Conservation Plans in southern California have addressed the effects of urban development on this species. These plans are expected to provide long-term protection of core occurrences of vireos in western Riverside, Orange, and San Diego counties Appendix 2). Compliance-driven and voluntary riparian restoration activities throughout the historic range may have contributed to an increase in riparian habitat since the listing of the vireo (USFWS 2006), although this cannot be established without a thorough evaluation of riparian habitat within California. The Riparian Habitat Joint Venture (RHJV; a cooperative association of Federal, State, and private organizations) plans to systematically map existing riparian habitat in California starting in 2007 (RHJV 2006), which should provide a more objective measure of ongoing changes to riparian habitat in California.

Within the past decade, control of giant reed and other exotic plants has been and continues to be systematically conducted on both the Santa Ana River and on MCB Camp Pendleton. Giant reed removal has also been initiated within several other watersheds within southern California (Natural Resources Conservation Service [NRCS] 2006; USFWS 2006). In general, giant reed removal has been effective but will require continued annual efforts to achieve local eradications and address new invasions. Although control of giant reed has made great progress since the original listing of the vireo, invasions by other exotic plants (*e.g.*, *Tamarix* species, perennial pepperweed (*Lepidium latifolium*) continue to degrade existing riparian habitat (Kus and Beck 1998; Hoffman and Zembal 2006).

The 1986 listing rule identified brood parasitism by cowbirds as a substantial threat to the vireo, and it remains the most significant threat to the recovery of the vireo (USFWS 2006). Cowbird trapping has proven a successful tool to halt vireo population declines over the short term within a limited area, but Kus and Whitfield (2005) have argued that trapping may not be the best method for long-term recovery of the vireo. It remains unclear as to the best way to manage this threat and additional research is needed to resolve this issue (USFWS 2006).

Environmental Baseline

Habitat for the least Bell's vireo within the action area was defined as southern willow scrub, arroyo willow riparian forest and black willow riparian forest. This habitat exists in portions of Gobernadora Creek, San Juan Creek, lower Arroyo Trabuco, Chiquita Creek, lower Cristianitos Creek, and in Prima Deshecha. The action area contains 1,076 ac (436 ha) of least Bell's vireo habitat throughout these drainages including 697 ac (282 ha) in Subarea 1, where most of the Covered Activities will occur. The action area contains 63 vireo nesting locations including 53 locations in Subarea 1 (Table A).

Since 2000, 27-34 least Bell's vireo pairs and 3-5 unpaired males have been documented within the action area (data as summarized by CNDDB 2006). These include:

- 2 pairs: San Juan Creek, 4,265 ft (1,301 m) from the I-5 crossing (2004).
- 8 pairs: junction of San Juan Creek and Canada Gobernadora (2003).
- 1 pair: Prima Deshecha Landfill (2002), (2005 surveys documented 9 breeding pairs of vireo in Prima Deshecha, but this information was not in the CNDDB).
- 4 pairs, 11 pairs: Arroyo Trabuco (2002, 2000).
- 3 pairs, 2 unpaired males: Talega mitigation site, 1 mi (1.6 km) west of Cristianitos Creek (1999 and 2000).
- 1 unpaired male: Talega mitigation site, 1 mi (1.6 km) west of Cristianitos Creek (2001-2003).

Table A for Least Bell's Vireo: Least Bell's vireo nesting habitat (southern willow scrub, arroyo willow riparian forest, and black willow riparian forest) and locations in the action area.

Action Area Components	**Total Amount of Least Bell's Vireo Habitat (acres)**	**Least Bell's Vireo Locations in NCCP Dataset**
Subarea 1		
Proposed RMV	512	31
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	128	12
Prima Deshecha Landfill	16	9
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park, including Ortega Rock)	41	1
Supplemental Open Space (Audubon Starr Ranch)	0	0
Subtotal for Subarea 1	***697***	***53***
Subarea 2	5	0
Subarea 3	111	2
Subarea 4	263	8
TOTAL	**1,076**	**63**

The three nesting locations in lower Cristianitos Creek are contiguous with numerous nest sites in lower Cristianitos and San Mateo creeks on MCB Camp Pendleton, which is considered a "major" population outside the action area. Although no "major" populations were identified completely within the action area, two "important" populations were identified: the first, in lower Arroyo Trabuco between Crown Valley Parkway and Avery Parkway, supported 11 pairs of vireo during 2000 surveys and the second, in Cañada Gobernadora within GERA, supported about 12-15 nesting vireo pairs based on 1998 and 2001 surveys (Map 172-M in the NCCP/MSAA/HCP).

Effects of the Action

Direct Effects

Over the 75-year term of the permits and within the action area, a total of 75 ac (30 ha) or 7 percent of least Bell's vireo nesting and foraging habitat will be permanently impacted. The permanent impact area includes 7 of the least Bell's vireo locations or 11 percent in the action area (Tables A, B).

The proposed RMV Covered Activities, including Ortega Rock, will permanently impact 57 ac (23 ha) or 9 percent of the least Bell's vireo habitat on RMV lands, which includes only 1 least Bell's vireo location (Table B). The one impacted vireo location is part of the GERA "important" population and will be impacted by the construction of a pump station.

Table B for Least Bell's Vireo: The amount of nesting habitat (southern willow scrub, arroyo willow riparian forest, and black willow riparian forest) and the number of least Bell's vireo locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the vireo in the action area.

Covered Activities and Conservation Areas	**Habitat Impacts (acres)**	**Habitat in Habitat Reserve (acres)**	**Habitat Conserved in Prima SOS[1] (acres)**	**Habitat with Status Unchanged (acres)**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations conserved in Prima SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	57	455			1	30		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		128				12		
Subtotal of impacts and conservation by RMV and SMWD	**57**	**583**			**1**	**42**		
Prima Deshecha Landfill	6		10		6		3	
Avenida La Pata	9	-9			0			
Subtotal of impacts and conservation by the County of Orange	**15**		**10**		**6**			
Subtotal of impacts and assured conservation with adaptive management	**72**	**574**	**10**		**7**	**42**	**3**	
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 3				0			
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		**41**				**1**		
No Covered Activities				**376**				**1**
TOTAL	**75**	**615**	**10**	**376**	**7**	**43**	**3**	**1**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.

The County Covered Activities at Prima Deshecha Landfill will permanently impact 6 ac (2 ha) or 38 percent of the vireo habitat at the landfill, including 6 of the 9 vireo locations (67 percent). Avenida La Pata road extension will impact an additional 9 ac (4 ha) of vireo habitat within the Habitat Reserve, but no known locations. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program" could allow the impact of up to 3 ac (1 ha) of willow riparian habitats in parcels 1-17.

According to Table 13-26 in the NCCP/MSAA/HCP, RMV road and bridge projects will result in 1.86 ac (0.7 ha) of permanent impacts and 8.74 ac (3.5 ha) of temporary impacts to vireo habitat. These road/bridge projects will impact vireo habitat in San Juan, Canada Gobernadora, and Cristianitos creeks (Map 155-M in the NCCP/MSAA/HCP and Figure 1 in EIR Response to Comments) and include from west to east:

- The widening of the bridge crossing over San Juan Creek associated with the build-out of PA1. This crossing appears to be within 150 ft (46 m) of 1 vireo location.
- The realignment of Cow Camp Road will cross Canada Gobernadora Creek just upstream of where it intersects San Juan Creek. This area, known as GERA, contains an "important" population of 12-15 breeding vireo locations. The proposed bridge crossing is approximately 300 ft (92 m) from 1 of these vireo locations.
- In the vicinity of the GERA crossing, Cristianitos Road/F Street, running north/south will cross San Juan Creek. Currently, vireos are not found in this portion of San Juan Creek;
- The extension of Avenida Pico crosses Cristianitos Creek and ends at PA8. This bridge crossing seems to be directly adjacent to the three vireo locations in Cristianitos Creek that are a part of the "major" population outside of the action area on MCB Camp Pendleton.
- The realignment of Cow Camp Road will cross San Juan Creek in a second location further east between PA3 and PA4. This crossing could potentially impact two vireo locations.

All of these major crossings will be span bridges that have both direct and indirect effects to breeding vireos (further discussed in "General Effects" section of this Biological Opinion), including habitat fragmentation and edge effects, noise, shading, and temporary loss of habitat, which could result in territory displacement as discussed below. These direct and indirect effects may result in lowered reproductive fitness for vireos that breed in proximity to these crossings.

Where vireo breeding habitat has been removed, birds returning to breed will be forced to compete for adjacent suitable habitat or to seek other habitats further away. If they remain in the same area, they may experience the possible effects of crowding. They may also be delayed in the initiation of, or prevented from, nest building, resulting in fewer nesting attempts per season, a reduced clutch size per attempt, and overall reduction in reproductive output. For example, surveys were conducted during the 2004 and 2005 breeding seasons on San Diego Creek in Orange County, where habitat had been removed to address flood risk. While we do not have information on number and productivity of territories before habitat was removed, a post-removal breeding study was conducted. Four territories where habitat had been removed produced a total of 5 young (1.25 young/pair). Two other territories, which did not have habitat removed, produced a total of 8 young (4 young/pair) (Chambers Group, Inc. 2006). During 20

years of surveys in the Prado Basin, the lowest average number of estimated young per breeding pair was 1.8 (in 1986 when only 19 pairs were present) (Pike *et al*. 2005). Thus, the San Diego Creek pairs that had habitat removed apparently experienced a reduction in productivity.

In addition to the permanent impacts associated with urban development, the construction and maintenance of bridges, trails, water storage tanks, drainage culverts, and water and sewer lines will temporarily impact 2 locations and 36 ac (15 ha) of vireo habitat: 2 locations and 25 ac (10 ha) within RMV lands and 11 ac (5 ha) within the SMWD project area. All temporary impacts will be restored to equivalent or better conditions compared to the existing condition at the time of impact (Appendix U in the NCCP/MSAA/HCP).

Other Covered Activities that may impact the least Bell's vireo, but are not expected to result in a permanent loss of habitat, include maintenance of existing infrastructure such as trails, roads, and utilities and habitat and wildlife management and monitoring activities. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance but should occur outside the vireo breeding season. Habitat management and monitoring activities could result in minor disturbance of individuals and temporary loss of habitat, but no direct loss of individuals is anticipated.

Grazing

In addition to the impacts due to development projects, grazing is a potential stressor to this species. Although cattle have been excluded from GERA in the past, grazing within GERA for fuel modification purposes once every three years between September 1 and October 31st will be a Covered Activity. As noted above, vireos prefer to nest in riparian areas that have dense cover within 3-6 ft (0.9 - 2 m) of the ground and a dense, stratified canopy. Although grazing would be restricted to the non-breeding season and only occur once every three years, it could reduce the suitability of habitat within GERA if cattle completely remove or even thin the dense understory that vireos prefer for nesting (Ohmart 1994). The cattle may not only remove sensitive vegetation important to nesting riparian birds, but they may also trample the stream banks which, when combined with erosion, widens the stream. As Ohmart (1994) explains, this eventually leads to a lowered water table, which can cause die-off of riparian vegetation and allows the invasion of upland species such as sage (*Artemisia* sp.). Thus, over time, grazing in GERA may result in the loss of suitable nesting habitat for the vireo if the habitat does not sufficiently recover during the two and a half year time period when cattle will be excluded. Because adult vireos are site tenacious to their established breeding territories, loss of habitat can result in birds crowding into the remaining habitat. The loss or degradation of habitat in GERA could result in a lowered reproductive output for this "important" population.

The re-introduction of cattle into the TRW Pasture has also been proposed between the expiration of the lease with Northrop Grumman and the development of PA8. The re-introduction of cattle into Upper Chiquita Conservation Area will require the approval of the Wildlife Agencies and be shown to benefit Covered Species. Currently 4 ac (2 ha) of riparian habitat and 1 vireo location are within Upper Chiquita and 17 ac (7 ha) of riparian habitat and 4 vireo locations are present in the TRW pasture.

Indirect Effects

Fragmentation of vireo habitat associated with road/bridge crossings may negatively affect the quality of any remaining habitat as a result of construction noise and noise from daily use of these facilities once they are constructed. Fragmentation also creates more edges around nesting sites, which favor avian predators such as the scrub jay and crow and species that parasitize nests such as the brown-headed cowbird. Brown-headed cowbirds have been shown to significantly reduce breeding success of least Bell's vireo (59 FR 4845). An increase in the number of residential developments in Subarea 1, combined with the large areas of turf grass associated with parks and school grounds, will result in greater foraging opportunities for cowbirds. This may increase the number of adult cowbirds breeding in the Habitat Reserve. Therefore, nest parasitism of the vireo is expected to occur, especially in highly fragmented landscapes and in areas adjacent to cowbird foraging locales, such as livestock and equestrian centers, and urban parklands.

In addition, the road and bridge crossings and the proposed urban developments on RMV may facilitate the invasion of exotic plant and animal species. Invasive plants such as *Arundo donax* can alter the species composition and structure of the habitat, which may make it less suitable to the vireo and also more susceptible to fire. The temporary construction of bridges and roads across GERA may affect adjacent vireo territories.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, fire, and grazing, the following conservation measures specific to and/or of particular importance to least Bell's vireo will be implemented.

Conservation and Restoration. To offset impacts to the least Bell's vireo, a total of 615 ac (249 ha) or 57 percent of the vireo nesting and foraging habitat and 46 (73 percent) of the vireo locations within the action area will be included in the Habitat Reserve and within SOS on Prima Deshecha Landfill (Table B). Within RMV lands alone, 583 ac (236 ha) or 91 percent of the vireo nesting and foraging habitat and 42 (98 percent) of the vireo locations will be conserved and adaptively managed within the Habitat Reserve.

To off set the loss of riparian habitat (15 ac (6 ha)) for vireo at the Prima Deshecha Landfill and within the Habitat Reserve due to the extension of Avenida La Pata, the County will create 6 ac (2 ha) of willow riparian habitat within a 530.7-ac (215-ha) SOS (conservation) area on the Landfill within 5 years of permit issuance and will manage this area for Covered Species, including the vireo, in perpetuity. The creation of the 6 ac (2 ha) of willow scrub will occur to a standard identified in Attachment M-2 Prima Deshecha/Avenida La Pata Mitigation Program of the NCCP/MSAA/HCP and will occur prior to future impacts resulting from the Landfill and road projects. Although six vireo locations will be permanently impacted as a result of the County's Covered Activities, three locations have been conserved in undeveloped portions of the

Landfill that have been included in the SOS lands (see Figure 164-M in the NCCP/MSAA/HCP). In addition, the County will control invasive plant species through: 1) payment of in-lieu mitigation fees totaling $600,000 to carry-out the eradication of approximately 24.3 ac (10 ha) of *Arundo donax* and other invasive plant species within the San Juan Creek portion of Caspers Wilderness Park, all as more specifically identified/depicted in Appendix J of the NCCP/MSAA/HCP; and 2) payment of $250,000 for ongoing monitoring and maintenance of areas where the invasive species control has occurred. Additionally, as supplemental mitigation, the County will restore willow riparian habitat on a 1:1 basis in Landfill SOS in accordance with the pre-mitigation concept plan set forth in Appendix M of the NCCP/MSAA/HCP. We expect that several pairs of vireo will establish breeding territories in the restored willow riparian habitat on the Landfill and that the non-native plant removal program along San Juan Creek in Caspers Wilderness Park will provide additional opportunities for vireos to establish new breeding territories.

In addition to mitigation for the Covered Activities, the County has agreed to enroll 41 ac (17 ha) of riparian habitat including one vireo location into the Habitat Reserve as soon as is practicable following signatory acceptance of the Plan, but no later than 1 year following this date. These lands are currently managed and conserved as County wilderness or regional parks.

To off-set temporary impacts in the Habitat Reserve, RMV, SMWD, and the County will restore all temporarily disturbed riparian areas as described in the "Project Description" of this Biological Opinion and Appendix U of the Plan.

Conserved lands in the Habitat Reserve will be maintained and managed in perpetuity for the benefit of Covered Species, including the least Bell's vireo. Management actions for least Bell's vireo within the Habitat Reserve will include the control of invasive species through implementation of the Invasive Species Control Plan described in the "Project Description" section of the Biological Opinion. Under this plan, vireos within the Habitat Reserve will be assessed of their risk of parasitism by the brown-headed cowbird. If cowbird parasitism is reducing vireo productivity then cowbird trapping will be implemented. Cowbird trapping has been and will continue to be conducted in lower Arroyo Trabuco in conjunction with the operation of the golf course. The Plan states that the initiation of cowbird trapping and other management actions in GERA are anticipated in conjunction with build-out of PA3 (page E-97). The Invasive Species Control Plan will also manage invasive plant species that occur in riparian habitats including *Tamarisk ramosissima* (tamarisk), *Arundo donax* (arundo), and *Ricinus communis* (castor bean). Vireo occupied habitats that will benefit from invasive plant control include San Juan Creek, Arroyo Trabuco, GERA, and Cristianitos Creek. Over time, these areas cleared of non-native plants are likely to become suitable for vireo nesting, depending on flood dynamics.

After construction of the realignment of Cow Camp Road, vireos returning from migration will likely continue to establish territories within the southern portion of GERA. We anticipate that any vireos attracted to these areas post-bridge construction will have or develop a tolerance for the noise and disturbance generated by operation of these new roads. We expect this to occur

because noise will be minimized by designing sound reduction elements into the proposed bridge across GERA.

In addition to conservation and management of Habitat Reserve areas for least Bell's vireo and restoration of temporarily impacted areas, the permittee will implement minimization measures described in Appendix U of the Plan. These measures include the removal of riparian habitat between September 15 and February 15, which is outside of the breeding season for vireo. Should habitat clearing need to take place outside this time period, focused surveys will be undertaken in the habitat for vireo ahead of the clearing, and other measures will be implemented to avoid impacts to vireo nests and young.

Grazing

To minimize impacts to riparian habitats associated with cattle grazing, cattle will continue to be excluded from Lower Cristianitos Creek via fencing around the perimeter of Donna O'Neill Conservancy. Riparian habitat in San Juan Creek may benefit from seasonal cattle exclosures for arroyo toad. Grazing for fuel modification in GERA and Donna O'Neill Land Conservancy will be monitored as described in the GMP and the results of the monitoring will be included in the annual report for the Habitat Reserve. The Science Panel will periodically review the effects of grazing for fuel modification purposes in GERA and Donna O'Neil Land Conservancy and make recommendations to maximize benefit to the Covered Species.

Monitoring

Monitoring will be conducted at a species-specific level and also at a habitat landscape level. The detailed monitoring program for least Bell's vireo will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. The NCCP/MSAA/HCP (page 7-212 and E-94) provides a conceptual monitoring program for the vireo that proposes annual field surveys within pre-designated sample plots to monitor changes in the riparian/wetland community and least Bell's vireo population size. Within 2 years of the Effective Date, RMV will also establish a riparian habitat baseline in the Habitat Reserve for the purposes of long-term tracking, with the goal of maintaining the approximate existing least Bell's vireo habitat acreage in the Habitat Reserve.

In addition, RMV will monitor the proposed 32 Covered Species including the vireo, on County Park lands within the Habitat Reserve. County Parks may receive additional funding for adaptive management of Covered Species on their lands through the Coto de Caza "Opt-In-Program" and from grants; however, this funding is not assured.

<u>Analysis of Impacts and Conservation by RMV Planning Area</u>

A summary of least Bell's vireo locations and habitat that will be impacted and conserved on RMV-owned land by planning area is presented in Table C below. In addition to the conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Table C for Least Bell's Vireo: Least Bell's vireo nesting habitat (southern willow scrub, arroyo willow riparian forest, and black willow riparian forest) and locations permanently impacted and conserved/managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Locations and Habitat Impacted (Cumulative Impacts)**		**Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	0 (0)	5 (5)	2 (2)	39 (39)
PA2	0 (0)	2 (7)	6 (8)	103 (142)
PA3	0 (0)	26 (33)	18 (26)	224 (366)
PA4	0 (0)	1 (34)	0 (26)	0 (366)
PA5	0 (0)	5 (39)	0 (26)	0 (366)
PA6 & PA7	0 (0)	2 (41)	0 (26)	0 (366)
PA8	0 (0)	2 (43)	5 (31)	103 (469)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	1 (1)	11 (54)	-1 (30)	-11 (458)
Ortega Rock	0 (1)	0 (54)		
Santa Margarita Water District Impacts (Reservoir in Upper Chiquita Conservation Area)	0 (1)	3 (57)		-3 (455)
Subtotal for Proposed RMV and Associated Projects	1	57	30	455
Prior RMV[1] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			12 (42)	128 (583)
TOTAL	**1**	**57**	**42**	**583**

[1] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Conservation of habitat and vireo locations greatly exceeds impacts from Covered Activities in each planning area (Table C). In addition to the conservation identified by planning area, there will be conservation and management of the Covered Species including 12 occurrences of vireo and 128 ac (52 ha) of vireo habitat on the Prior RMV lands within 6 months of permit issuance. As discussed above, this results in conservation of 91 percent of the vireo nesting and foraging habitat and 98 percent of the vireo locations on RMV lands and maintains both of the "important" populations identified within the action area.

Lastly, the analysis by planning area provided above does not include impacts associated with RMV's infrastructure, SMWD, and Ortega Rock in the Habitat Reserve. Infrastructure projects will permanently impact an additional 11 ac (4 ha) of vireo habitat and 1 location (Table C). The SMWD reservoir in Upper Chiquita Conservation Area and Ortega Rock projects will impact 3 ac (1 ha) of unoccupied vireo habitat. These impacts represent a small fraction of the total impacts that will occur over the life of this project, and they will also occur in a phased manner.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 or Alternative Order 1, 4, 3, 2, 5, and 8, new conservation of vireo habitat will still greatly exceed impacts from Covered Activities in all phases of development.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the SERVICE's biological opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of the least Bell's vireo. We base this conclusion on the following:

1. The least Bell's vireo population in the U. S. has increased 10-fold since its listing in 1986, from 291 to 2,968 known territories, with significant population growth documented in Southern California counties, including Orange County (USFWS 2006).

2. Only seven least Bell's vireo locations (11 percent) and a total of 75 ac (30 ha) or 7 percent of least Bell's vireo nesting and foraging habitat in the action area will be permanently impacted by Covered Activities. Six of the locations impacted are on Prima Deshecha Landfill, which is not identified as a "major" or "important" population in the action area.

3. A total of 615 ac (249 ha) or 57 percent of the suitable nesting habitat for the least Bell's vireo in the action area, including 43 locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 574 ac (232 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 41 ac (17 ha) of habitat and 1 location are within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 10 ac (4 ha) of vireo nesting habitat will be conserved and adaptively managed, including 3 vireo locations, by the County within SOS at Prima Deshecha Landfill. In addition, the County will implement and/or fund habitat creation, restoration, and enhancement actions at Prima Deshecha Landfill and within County Park lands to offset impacts to vireo from their landfill and road extension projects. We expect that several vireo pairs will establish breeding territories in the restored willow riparian habitat on Prima Deshecha Landfill SOS and that the non-native plant removal effort along San Juan Creek in Caspers Wilderness Park will provide additional opportunities for vireos to establish new breeding territories.

5. Combined, 625 ac (253 ha) or 58 percent of the suitable nesting habitat for least Bell's vireo, including 46 locations (73 percent), in the action area will be conserved.

6. One hundred (100) percent of the vireo locations in the Lower Arroyo Trabuco "important" population and 92 percent of the locations in GERA within the Lower Canada Gobernadora "important" population will be included in the Habitat Reserve.

7. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling least Bell's vireo or eggs will be killed or injured during habitat grading or grubbing.

8. We anticipate that permanent protection of least Bell's vireo locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain least Bell's vireo in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA has not been invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid for the following reasons:

1. Impacts from Covered Activities will be reduced to the loss of one vireo location and 57 ac (23 ha) of vireo nesting and breeding habitat, which represents less than 2 percent of the vireo locations and only 5 percent of the vireo habitat within the action area.

2. The County of Orange will not implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS and County Park lands, and these lands will not be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP. However, 41 ac (17 ha) of vireo nesting and foraging habitat and 1 vireo location will remain within existing County Park lands.

3. The conservation proposed by RMV will still be implemented such that 91 percent of the vireo nesting and foraging habitat and 98 percent of the vireo locations on RMV lands will be conserved and adaptively managed within the Habitat Reserve, including 100 percent of the vireo locations in the Lower Arroyo Trabuco "important" population and 92 percent of the locations in GERA within the Lower Canada Gobernadora "important" population. This represents a >10:1 conservation to impact ratio for vireo habitat on RMV lands.

4. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling least Bell's vireo or eggs will be killed or injured during habitat grading or grubbing.

5. We anticipate that permanent protection of least Bell's vireo locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain least Bell's vireo in the Southern Subregion and contribute to the range-wide conservation of this species.

Finally, should the RMV and SMWD determine not to participate in this regional conservation effort, the Covered Activities within the action area will be reduced to only those implemented by the County of Orange. Our no jeopardy conclusion for least Bell's vireo remains valid for the following reasons:

1. Covered Activities will impact 6 vireo locations and only 18 ac (7 ha) of vireo nesting and foraging habitat in the action area, which represent less than 10 percent of the vireo locations and less than 2 percent of the vireo habitat in the action area. None of these locations are part of "important" populations.

2. Three vireo locations will be conserved in SOS on Prima Deshecha Landfill and 41 ac (17 ha) of vireo habitat and one vireo location will remain in the County Park system. The County will monitor the least Bells' vireo on Prima Deshecha Landfill SOS on an annual basis in perpetuity.

3. The County of Orange will implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS at Prima Deshecha Landfill and within County Park lands to offset impacts to vireo from their landfill and road extension projects. We expect that several vireo pairs will establish breeding territories in the restored willow riparian habitat on Prima Deshecha Landfill SOS and that the non-native plant removal effort along San Juan Creek in Caspers Wilderness Park will provide additional opportunities for vireos to establish new breeding territories.

4. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling least Bell's vireo or eggs will be killed or injured during habitat grading or grubbing.

5. We anticipate that the conservation actions for the least Bell's vireo at Prima Deshecha Landfill and within the County Park system will help sustain least Bell's vireo in the Southern Subregion and contribute to the range-wide conservation of this species.

Southwestern willow flycatcher

Status of the Species

Listing Status

The southwestern willow flycatcher (*Empidonax traillii extimus*) was federally listed as endangered on February 27, 1995 (60 FR 10694) and State-listed as endangered in California on December 3, 1990. A final recovery plan for the flycatcher was issued on August 30, 2002 (USFWS 2002). Critical habitat was originally designated on July 22, 1997 (62 FR 39129), but it was vacated on May 11, 2001. It was re-proposed on October 12, 2004, and finalized on October 19, 2005. In total, approximately 120,824 ac (48,896 ha) fall within the boundaries of the critical habitat designation. Flycatcher critical habitat is located in Apache, Cochise, Gila,

Graham, Greenlee, Maricopa, Mohave, Pinal, Pima, and Yavapai counties in Arizona; Kern, Santa Barbara, San Bernardino, and San Diego counties in southern California; Clark County in southeastern Nevada; Grant, Hidalgo, Mora, Rio Arriba, Soccoro, Taos, and Valencia counties in New Mexico; and Washington County in Southwestern Utah. Primary constituent elements include thickets of riparian shrubs and small trees within 328 ft (100 m) of surface water that is present throughout the May through September breeding season (58 FR 16742). No critical habitat was designated within the action area.

Species Description

The southwestern willow flycatcher is a small, insectivorous songbird, approximately 5.75 in (15 cm) in length. Both sexes have grayish-green backs and wings, whitish throats, light gray-olive breasts, and pale, yellowish bellies. The southwestern willow flycatcher is a recognized subspecies of the willow flycatcher (*E. traillii*). Although previously considered conspecific with the alder flycatcher (*E. alnorum*), the willow flycatcher is distinguishable from that species by morphology (Aldrich 1951), song type, habitat use, structure, placement of nests (Aldrich 1953), eggs (Walkinshaw 1966), ecological separation (Barlow and MacGillivray 1983), and genetic distinctness (Seutin and Simon 1988). In turn, the southwestern willow flycatcher is one of up to five (Hubbard 1987; Unitt 1987; Browning 1993) subspecies of the willow flycatcher currently recognized. Recent research concluded that *E. t. extimus* is genetically distinct from other willow flycatcher subspecies (Paxton 2000).

Habitat Affinities

The flycatcher breeds in multiple types of dense riparian habitats, across a large geographic area (USFWS 2002). Riparian habitat provides both breeding and foraging habitat for the species. Common tree and shrub species comprising nesting habitat include willows, mulefat, boxelder, stinging nettle, blackberry, cottonwood, arrowweed, tamarisk, and Russian olive. Historically, the flycatcher nested in native vegetation such as willows, buttonbush, boxelder, and *Baccharis*, sometimes with a scattered overstory of cottonwood (Grinnell and Miller 1944; Phillips 1948; Unitt 1987). Following modern changes in riparian plant communities, the flycatcher still nests in native vegetation where available, but it also nests in thickets dominated by the non-native tamarisk and Russian olive and in habitats where native and non-native trees and shrubs are present in essentially even mixtures (Hubbard 1987; Brown 1988; Sogge *et al.* 1997a; USFWS 2002). Occupied sites usually consist of dense vegetation in the patch interior, or an aggregate of dense patches interspersed with openings. In most cases, this dense vegetation occurs within the first 10-12 ft (3-4 m) above ground. These dense patches are often interspersed with small openings, open water, or shorter/sparser vegetation, creating a mosaic that is not uniformly dense. In almost all cases, slow-moving or still surface water and/or saturated soil are present at or near breeding sites during wet or non-drought years.

Migrating flycatchers use habitats similar to breeding flycatchers, but they will also use desert washes, oases, and open canyon woodlands near watercourses (Small 1994). The migration routes of the flycatcher are not well documented. The species has been reported to sing and defend winter territories in Mexico and Central America. Wintering habitat is highly variable,

but it often includes humid to semi-arid partially open areas (*e.g.*, woodland borders) near slow-moving or still surface water (USFWS 2002).

Life History

The flycatcher is a diurnally active insectivore that forages within and above dense riparian vegetation, taking insects on the wing or gleaning them from foliage (60 FR 10694, USFWS 2002). Major prey items are small (flying ants) to large (dragonflies) flying insects, with Hymenoptera, Diptera, and Hemiptera comprising half of the prey items. Flycatchers also take non-flying species, particularly Lepidoptera larvae.

Male flycatchers generally arrive at a breeding site in early May and establish a territory by singing and interacting aggressively with other flycatchers (USFWS 2002). Females tend to arrive later (approximately a week or two). Flycatchers are strongly territorial and will sing almost constantly when establishing territories. Female flycatchers sing, although not as often as males and possibly more quietly. Male flycatchers sing most persistently early in the breeding season and early in each nesting cycle. Song rate declines as the season progresses, particularly once the male finds a mate and nesting efforts begin (Braden and McKernan 1998). Estimated breeding territory sizes range from 0.3-5.7 ac (0.1-2 ha) (Sogge 1995; Whitfield and Enos 1996; Skaggs 1996; Sogge *et al.* 1997b). Adults leave the breeding territory in mid-August to mid-September (USFWS 2002). Although most flycatchers return to former breeding areas in subsequent years, flycatchers regularly move among sites within and between years. Both males and females move within and between sites, with males showing slightly greater site fidelity (Netter *et al.* 1998).

Flycatchers are usually monogamous, but polygyny rates of 5-20 percent have been documented, with polygynous males typically having two females in their territory (USFWS 2002). Between-year mate fidelity is low, and during a breeding season, some flycatcher pairs break up and subsequently pair and breed with other individuals. Clutches contain three or four eggs, which are incubated for 12-13 days. Nestlings fledge 12-15 days after hatching. Fledglings typically stay in the general nest area a minimum of 14-15 days after fledging. Second clutches within a single breeding season are uncommon if the first nest is successful. Most renesting attempts occur only if young fledge from the first nest by late June or early July. Renesting is common, however, if the first nest is lost or abandoned due to predation, parasitism, or disturbance; a female may attempt as many as four nests per season.

Flycatchers use thickets of trees and shrubs for nesting that range in height from 5-100 ft (1.5-30 m) (USFWS 2002). Nest sites typically have dense foliage from the ground level up to approximately 12 ft (4 m) above ground, although dense foliage may exist only at the shrub level, or as a low dense canopy. Nest sites typically have a dense canopy, but nests may be placed in a tree at the edge of a habitat patch, with sparse canopy overhead. Nests are usually placed in the upright fork of a shrub, but they occasionally may be placed on horizontal limbs within trees and shrubs (Terres 1980; USFWS 2002).

Predation can be the single largest cause of nest failure in some years (Whitfield and Enos 1996; Paradzick *et al.* 1999), with documented predation on eggs, nestlings, fledglings and adults by a variety of snakes, birds, and mammals (USFWS 2002). Cowbirds effectively function as predators because they remove flycatcher eggs and/or nestlings before depositing their own eggs in the host nest.

Distribution

The breeding range of the southwestern willow flycatcher includes southern California, southern Nevada, Arizona, New Mexico, western Texas, southwestern Colorado, and extreme northwestern Mexico (Hubbard 1987; Unitt 1987; Browning 1993). Once considered a widespread common breeder in southern California, the flycatcher has declined precipitously throughout its range during the last 50 years (Unitt 1987). Current numbers remain significantly reduced from historical levels.

Rangewide Trends and Current Threats

As of the 2001 breeding season, a minimum of 986 flycatcher territories were documented over its entire range (USFWS 2002). At 194 territories, the California population represents approximately 20 percent of the entire population (Kus *et al.* 2003). Based on the likelihood of undiscovered individuals, a reasonable estimate of the total flycatcher population across its entire range is 1,200-1,300 pairs/territories (USFWS 2002). The drainages in California that support permanent breeding populations include the Kern, Santa Ana, Santa Margarita, and San Luis Rey rivers.

Between1999-2001, Kus *et al.* (2003) documented that 90 percent of flycatcher populations in California consisted of five territories or less. Although these smaller populations are likely more susceptible to stochastic events, some do persist, and all are important to the recovery of the species. The Santa Margarita and San Luis Rey River populations likely act as source populations for outlying flycatcher breeding territories in coastal southern California and thus contribute to the potential expansion of this species' range.

The major threats to the flycatcher are the destruction and modification of habitat and nest parasitism by the cowbird (60 FR 10694). Human induced changes in riparian plant communities have resulted in the elimination and degradation of nesting habitat, which has reduced the range, distribution, and population size of this species. Loss and modification of riparian habitats has been caused by urban and agricultural development, water diversion and impoundment, channelization, phreatophyte control, livestock grazing, fire, off-road vehicle and other recreational uses, and hydrological changes resulting from these and other land uses (60 FR 10694, USFWS 2002). Exotic plant invasion has also reduced the quantity and quality of habitat available to the flycatcher (USFWS 2002).

Cowbird parasitism negatively affects the flycatcher by reducing reproductive success, which can lead to a reduction in population size (USFWS 2002). The use of cowbird control as a management tool for several populations of southwestern willow flycatchers in southern

California has done little to increase numbers of breeding pairs (Sedgwick 2000). While cowbird control may help stabilize existing populations, recovery of the species will require restoration and maintenance of riparian habitat.

The primary threats to flycatchers in Southern California, including the action area are habitat loss and degradation due to the authorized and unauthorized modification of hydrological and fluvial processes, sand mining, flood control activities (mowing, channelization), ground water withdrawal, recreational activities, agriculture grazing, infestations of exotic plant species (*i.e.*, giant reed), cowbird parasitism, loss of native habitat buffers, and edge effects from upland development (Kus *et al*. 2003).

Conservation Needs

Range-wide data regarding the dispersal of the species are limited, and virtually no information is available on the dynamics of the dispersal of birds within California populations (USFWS 2002). Thus, in the absence of more definitive data, the conservation of the species likely depends on the conservation and management of the existing populations and the successful maintenance or possible enhancement of: 1) existing suitable occupied and unoccupied habitats, 2) existing or potentially restorable habitat corridors, and 3) the ecosystems in which these habitats and habitat corridors are found. Kus *et al.* (2003:18) concluded that habitat availability continues to limit populations, particularly where populations have increased and then stabilized and that management actions can only be effective in enhancing productivity if there is sufficient suitable habitat available for occupation.

Environmental Baseline

Habitat for the willow flycatcher within the action area was defined as southern willow scrub, arroyo willow riparian forest, and black willow riparian forest. This habitat exists in portions of Gobernadora Creek, San Juan Creek, lower Arroyo Trabuco, Chiquita Creek, lower Cristianitos Creek, and at Prima Deshecha Landfill. The action area contains 1,076 ac (436 ha) of suitable flycatcher habitat throughout these drainages, including 697 ac (283 ha) in Subarea 1; 5 ac (2 ha) in Subarea 2; 111 ac (45 ha) in Subarea 3; and 263 ac (107 ha) in Subarea 4 (Table A). The action area contains seven willow flycatcher nesting locations, six locations in Subarea 1 and one location in Subarea 4. Recent observations of flycatchers in the action area include one nesting pair in GERA and one nesting pair in the Talega development open space in 2000. A calling male was detected in 1998 in lower Chiquita Canyon.

The GERA location is the only “important” population of willow flycatcher in the planning area and is also considered a “key” location for the species. Although recent observations suggest that only one pair of flycatchers are currently nesting in GERA, the Plan includes all six historic breeding locations that have been documented in GERA in the “important” population dataset.

Table A: Southwestern willow flycatcher nesting habitat (southern willow scrub, arroyo willow riparian forest, and black willow riparian forest) and locations in the action area.

Action Area Components	**Total Amount of Southwestern Willow Flycatcher Habitat (acres)**	**Southwestern Willow Flycatcher Locations in NCCP Dataset[1]**
Subarea 1		
Proposed RMV	512	6
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	128	0
Prima Deshecha Landfill	16	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park, including Ortega Rock)	41	0
Supplemental Open Space (Audubon Starr Ranch)	0	0
Subtotal for Subarea 1	***697***	***6***
Subarea 2	5	0
Subarea 3	111	0
Subarea 4	263	1
TOTAL	**1,076**	**7**

[1] Locations are confirmed nesting areas.

According to data summarized by CNDDB (2006), the flycatcher breeds at only one location in the action area, San Juan Creek south of Canada Gobernadora. One breeding pair was documented at this site in the summer of 2003. In the summer of 2001, two males were heard calling near this location; however, they were only observed twice and were thought to be unpaired (data as summarized by CNDDB 2006).

The Recovery Plan (USFWS 2002) states that the San Juan Creek watershed including Canada Gobernadora and Trabuco Creek, are specific river reaches where recovery efforts should be focused. The action area is included in the Coastal California Recovery Unit for this species.

Effects of the Action

Direct Effects

Over the 75-year term of the permits, a total of 75 ac (30 ha) or 7 percent of the willow flycatcher nesting and foraging habitat in the action area will be permanently impacted (Tables A, B). The impact area does not include any of the seven flycatcher locations documented in the action area (Tables A, B).

Table B: The amount of nesting habitat (riparian) and the number of southwestern willow flycatcher locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the flycatcher in the action area.

Covered Activities and Conservation Areas	**Habitat Impacts (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS[1] (acres)**	**Habitat with Status Unchanged (acres)**	**Locations Impacted**	**Locations in Reserve**	**Locations in Prima SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	57	455			0	6		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		128				0		
Subtotal of impacts and conservation by RMV and SMWD	**57**	**583**			**0**	**6**		
Prima Deshecha Landfill	6		10		0		0	
Avenida La Pata on RMV Land	9	-9			0			
Avenida La Pata in Subarea 4	0				0			
Subtotal of impacts and conservation by the County of Orange	**15**		**10**		**0**			
Subtotal of impacts and assured conservation with adaptive management	**72**	**574**	**10**		**0**	**6**		
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 3				0			
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		41				**0**		
Remaining area not effected by Covered Activities				**376**				**1**
TOTAL	**75**	**615**	**10**	**376**	**0**	**6**	**0**	**1**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.

[2] For the purposes of this analysis, the maximum impacts are assumed for Subarea 3 under the "Opt-In-Program."

[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.

The proposed RMV Covered Activities, including Ortega Rock, will permanently impact 57 ac (23 ha) or 9 percent of the willow flycatcher habitat on RMV lands. The RMV impact area avoids all six flycatcher locations on RMV lands (Table B).

The County Covered Activities at Prima Deshecha Landfill will permanently impact 6 ac (2 ha) or 38 percent of the flycatcher habitat at the landfill. Avenida La Pata road extension will impact an additional 9 ac (4 ha) of flycatcher habitat within the Habitat Reserve. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program" could allow impact of up to 3 ac (1 ha) of willow riparian habitat in parcels 1-17. No known flycatcher locations will be impacted by these Covered Activities.

According to Table 13-26 in the Plan, RMV road and bridge projects will result in 1.86 ac (0.7 ha) of permanent impacts and 8.74 ac (3.5 ha) of temporary impacts to flycatcher habitat. These road/bridge projects will impact flycatcher habitat in San Juan Creek and Canada Gobernadora Creek (Map 155-M in the NCCP/MSAA/HCP) and include from west to east:

- A bridge crossing over San Juan Creek associated with the build-out of PA1.
- The realignment of Cow Camp Road will cross Canada Gobernadora Creek where it intersects San Juan Creek. This area, known as GERA, contains the only "important" population and recent breeding location of flycatcher in the action area.
- In the vicinity of the GERA crossing, Cristianitos Road/F Street, running north/south will cross San Juan Creek. Currently, flycatchers are not found in this portion of San Juan Creek.
- Cow Camp Road will cross San Juan Creek in a second location between PA3 and PA4. No flycatchers have been documented in this area.

All of these major crossings will be span bridges that have both direct and indirect effects to breeding flycatchers as discussed in "General Effects" of the Action section above), including habitat fragmentation and edge effects, noise, shading, and temporary loss of habitat. These direct and indirect effects may result in lowered reproductive fitness for flycatchers that breed in proximity to these crossings.

In addition to the permanent impacts associated with urban development, the construction and maintenance of bridges, trails, water storage tanks, drainage culverts, and water and sewer lines will temporarily impact 36 ac (15 ha) of unoccupied flycatcher habitat: 25 ac (10 ha) within RMV lands and 11 ac (5 ha) within the SMWD project area. All temporary impacts will be restored to equivalent or better conditions compared to the existing condition at the time of impact (Appendix U of the Plan).

Other Covered Activities that may impact the flycatcher, but are not expected to result in a permanent loss of habitat, include maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and should occur outside the flycatcher breeding

season. Habitat management and monitoring activities could result in minor disturbance of individuals and temporary loss of habitat, but no direct loss of individuals is anticipated.

Grazing

In addition to the impacts due to development projects, grazing is a potential stressor to this species. Although cattle have been excluded from GERA in the past, grazing within GERA for fuel modification purposes once every three years between September 15 and October will be a Covered Activity. As noted above, flycatchers prefer to nest in riparian areas that have a dense, stratified canopy. Although grazing will be restricted to the non-breeding season and only occur once every three years, it could reduce the suitability of habitat within GERA if cattle completely remove or even thin the dense understory that flycatchers prefer for nesting and foraging. For example, Taylor and Littlefield (1986) found that willow flycatchers were more numerous on transects with high shrub volume and which were either undisturbed or rarely used by cattle. They were in low numbers or absent on transects with low shrub volume and heavy cattle use. They conclude that any actions that improve riparian brush habitat in the temperate latitudes would likely cause an increase in population numbers for this species.

The re-introduction of cattle into the TRW Pasture has also been proposed between the expiration of the lease with Northrop Grumman and the development of PA8. The re-introduction of cattle into Upper Chiquita Conservation Area will require the approval of the Wildlife Agencies and be shown to benefit Covered Species. Currently 4 ac (2 ha) of riparian habitat are within Upper Chiquita and 17 ac (7 ha) of riparian habitat is present in the TRW pasture.

Indirect Effects

Fragmentation of flycatcher habitat associated with road/bridge crossings may negatively affect the quality of remaining habitat from construction noise and noise from daily use of these facilities once they are constructed. Fragmentation also creates more edges around nesting sites, which favor avian predators such as the scrub jay and crow and species that parasitize nests such as the brown-headed cowbird. Brown-headed cowbirds have been shown to significantly reduce breeding success of the willow flycatcher (Sogge *et al*. 1997b; 60 FR 10694). An increase in the number of residential developments in Subarea 1, combined with the large areas of turf grass associated with parks and school grounds, will result in greater foraging opportunities for cowbirds. This may increase the number of adult cowbirds breeding in the Habitat Reserve. Therefore, nest parasitism of the willow flycatcher is expected to occur, especially in highly fragmented landscapes and in areas adjacent to cowbird foraging locales, such as livestock and equestrian centers, and urban parklands.

In addition, the road and bridge crossings and the proposed urban developments on RMV may facilitate the invasion of exotic plant and animal species. Invasive plants such as *Arundo donax* can alter the species composition and structure of the habitat, which may make it less suitable to the willow flycatcher and also more susceptible to fire.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, fire, and grazing, the following conservation measures specific to and/or of particular importance to southwestern willow flycatcher will be implemented.

Conservation and Restoration: To offset impacts to the flycatcher, a total of 615 ac (249 ha) or 57 percent of flycatcher nesting and foraging habitat and 6 (86 percent) of the flycatcher locations within the action area will be included in the Habitat Reserve (Table C). Within RMV lands alone, 583 ac (236 ha) or 91 percent of the flycatcher nesting and foraging habitat and 6 (100 percent) of the flycatcher locations will be conserved and adaptively managed within the Habitat Reserve.

To offset the loss of riparian habitat (15 ac (6 ha)) for flycatcher at the Prima Deshecha Landfill and within the Habitat Reserve due to the extension of Avenida La Pata, the County will create 6 ac (2 ha) of willow riparian habitat within a 530.7-ac (215-ha) SOS (conservation) area on the Landfill within 5 years of permit issuance and will manage this area for Covered Species, including the flycatcher, in perpetuity. The creation of the 6 ac (2 ha) of willow scrub will occur to a standard identified in Attachment M-2 Prima Deshecha/Avenida La Pata Mitigation Program of the NCCP/MSAA/HCP and will occur prior to future impacts resulting from the Landfill and road projects. In addition, the County will control invasive plant species through: 1) payment of in-lieu mitigation fees totaling $600,000 to carry-out the eradication of approximately 24.3 ac (10 ha) of *Arundo donax* and other invasive plant species within the San Juan Creek portion of Caspers Wilderness Park, all as more specifically identified/depicted in Appendix J of the NCCP/MSAA/HCP; and 2) payment of $250,000 for ongoing monitoring and maintenance of areas where the invasive species control has occurred. Additionally, as supplemental mitigation, the County will restore willow riparian habitat on a 1:1 basis in Landfill SOS in accordance with the pre-mitigation concept plan set forth in Appendix M of the NCCP/MSAA/HCP.

In addition to mitigation for the Covered Activities, the County has agreed to enroll 41 ac (17 ha) of riparian habitat into the Habitat Reserve as soon as is practicable following signatory acceptance of the Plan, but no later than 1 year following this date. These lands are currently managed and conserved as County wilderness or regional parks.

To off-set temporary impacts in the Habitat Reserve, RMV, SMWD, and the County will restore all temporarily disturbed riparian areas as described in the "Project Description" of this Biological Opinion and Appendix U of the Plan.

Conserved lands in the Habitat Reserve will be maintained and managed in perpetuity for the benefit of Covered Species, including the southwestern willow flycatcher. Management actions for the flycatcher within the Habitat Reserve will include the control of invasive species through implementation of the Invasive Species Control Plan described in the "Project Description" section of the Biological Opinion. Under this plan, flycatchers within the Habitat Reserve will

be assessed of their risk of parasitism by the brown-headed cowbird. If cowbird parasitism is reducing willow flycatcher productivity then cowbird trapping will be implemented. Cowbird trapping has been and will continue to be conducted in lower Arroyo Trabuco in conjunction with the operation of the golf course. The Plan states that the initiation of cowbird trapping and other management actions in GERA are anticipated in conjunction with build-out of PA3 (page E-97). The Invasive Species Control Plan will also manage invasive plant species that occur in riparian habitats including *Tamarisk ramosissima* (tamarisk), *Arundo donax* (arundo), and *Ricinus communis* (castor bean). GERA, the only known occupied site in the Habitat Reserve will benefit from invasive plant control. Over time, areas within San Juan Creek cleared of non-native plants may become suitable for flycatcher nesting, depending on flood dynamics.

In addition to conservation and management of Habitat Reserve areas for the flycatcher and restoration of temporarily impacted areas, the permittee will implement minimization measures described in Appendix U of the Plan. These measures include the removal of riparian habitat between September 15 and February 15, which is outside of the breeding season for the flycatcher. Should habitat clearing need to take place outside this time period, focused surveys will be undertaken in the habitat for the flycatcher ahead of the clearing, and other measures will be implemented to avoid impacts to flycatcher nests and young.

Grazing: To minimize impacts to riparian habitats associated with cattle grazing, cattle will continue to be excluded from Lower Cristianitos Creek via fencing around the perimeter of Donna O'Neill Conservancy. Riparian habitat in San Juan Creek may benefit from seasonal cattle exclosures for arroyo toad. Grazing for fuel modification in GERA and Donna O'Neil Land Conservancy will be monitored as described in the GMP and the results of the monitoring will be included in the annual report for the Habitat Reserve. The Science Panel will periodically review the effects of grazing for fuel modification purposes in GERA and Donna O'Neil Land Conservancy and make recommendations to maximize benefit to the Covered Species.

Monitoring: Monitoring will be conducted at a species-specific level and also at a habitat landscape level. The detailed monitoring program for willow flycatcher will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. The Plan (page 7-212 and E-123) provides a conceptual monitoring program for the flycatcher that proposes annual field surveys within pre-designated sample plots to monitor changes in the riparian/wetland community and willow flycatcher population size. Within two years of the Effective Date, RMV will also establish a riparian habitat baseline in the Habitat Reserve for the purposes of long-term tracking, with the goal of maintaining the approximate existing flycatcher habitat acreage in the Habitat Reserve.

In addition, RMV will monitor the proposed 32 Covered Species, including the flycatcher, on County Park lands within the Habitat Reserve. County Parks may receive additional funding for adaptive management of Covered Species on their lands through the Coto de Caza "Opt-In-Program" and from grants; however, this funding is not assured.

Analysis of Impacts and Conservation by RMV Planning Area

A summary of southwestern willow flycatcher locations and habitat that will be impacted and conserved on RMV-owned land is presented in Table C below. In addition to the conservation identified by planning area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Table C for Southwester Willow Flycatcher: Southwestern willow flycatcher nesting habitat (willow riparian scrub and forest) and locations permanently impacted and conserved/managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Locations and Habitat Impacted (Cumulative Impacts)**		**Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	0	5 (5)	0 (0)	39 (39)
PA2	0	2 (7)	0 (0)	103 (142)
PA3	0	27 (34)	6 (6)	224 (366)
PA4	0	0 (34)	0 (6)	0 (366)
PA5	0	5 (39)	0 (6)	0 (366)
PA6 & PA7	0	2 (41)	0 (6)	0 (366)
PA8	0	2 (43)	0 (6)	103 (469)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	0	11 (54)		-11 (458)
Ortega Rock	0	0 (54)		
Santa Margarita Water District Impacts (Reservoir in Upper Chiquita Conservation Area)	0	3 (57)		-3 (455)
Subtotal for Proposed RMV and Associated Projects	0	57	0 (6)	455
Prior RMV[1] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			0 (6)	128 (583)
TOTAL	**0**	**57**	**6**	**583**

[1] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Conservation of habitat and flycatcher locations greatly exceeds impacts from Covered Activities in each planning area (Table C). In addition to the conservation identified by planning area, there will be conservation and management of the Covered Species including 128 ac (52 ha) of flycatcher habitat on the Prior RMV lands within 6 months of permit issuance. As discussed above, this results in conservation of 91 percent of the flycatcher nesting and foraging habitat and 100 percent of the flycatcher locations on RMV lands.

Lastly, the analysis by planning area provided above does not include impacts associated with RMV's infrastructure, SMWD, and Ortega Rock in the Habitat Reserve. Infrastructure projects will permanently impact an additional 11 ac (4 ha) of unoccupied flycatcher habitat (Table C).

These impacts represent a small fraction of the total impacts that will occur over the life of this project, and they will also occur in a phased manner.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 or Alternative Order 1, 4, 3, 2, 5, and 8, new conservation of flycatcher habitat still greatly exceed impacts from Covered Activities in all phases of development.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of the southwestern willow flycatcher. We base this conclusion on the following:

1. The willow flycatcher population throughout the southwest likely consists of 1,200 - 1,300 pairs. Southern California makes up at least 20 percent of this overall number but almost entirely from populations outside of Orange County.

2. No known willow flycatcher locations will be impacted in the action area by Covered Activities.

3. Only a total of 75 ac (30 ha) or 7 percent of willow flycatcher nesting and foraging habitat in the action area will be permanently impacted by Covered Activities.

4. A total of 615 ac (249 ha) or 57 percent of the suitable nesting habitat for the southwestern willow flycatcher in the action area, including 6 locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 574 ac (232 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 41 ac (17 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

5. An additional 10 ac (4 ha) of willow flycatcher habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill.

6. Combined, 625 ac (253 ha) or 58 percent of the suitable nesting habitat for willow flycatcher, including 6 locations (86 percent), in the action area will be conserved.

7. One hundred (100) percent of the willow flycatcher locations in the Lower Canada Gobernadora "important" population in a "key" location will be included in the Habitat Reserve.

8. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling willow flycatchers or eggs will be killed or injured during habitat grading or grubbing.

9. We anticipate that permanent protection of southwestern willow flycatcher locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain southwestern willow flycatcher in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA has not been invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid for the following reasons:

1. Impacts from Covered Activities will be reduced to the loss of 57 ac (23 ha) of flycatcher nesting and breeding habitat, which represents only 5 percent of the flycatcher habitat within the action area.

2. The County of Orange will not implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS and County Park lands, and these lands will not be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP. However, 57 ac (23 ha) of flycatcher nesting and foraging habitat will remain at Prima Deshecha Landfill and within existing County Park lands.

3. The conservation proposed by RMV will still be implemented such that 91 percent of the flycatcher nesting and foraging habitat and 100 percent of the flycatcher locations on RMV lands will be conserved and adaptively managed within the Habitat Reserve.

4. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling southwestern willow flycatchers or eggs will be killed or injured during habitat grading or grubbing.

5. We anticipate that permanent protection of southwestern willow flycatcher locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain southwestern willow flycatcher in the Southern Subregion and contribute to the range-wide conservation of this species.

Listed Invertebrates

Riverside Fairy Shrimp

Status of the Species

Listing Status

The Service listed the Riverside fairy shrimp (*Streptocephalus woottoni*) as endangered on August 3, 1993 (58 FR 41391). A vernal pool recovery plan that includes Riverside fairy shrimp was published in September 1998 (USFWS 1998a). Critical habitat was designated for the species on May 30, 2001 (66 FR 29384); however, this designation was vacated on October 30, 2002, by order of the Federal District Court for the District of Columbia. Critical habitat for the Riverside fairy shrimp was re-proposed on April 27, 2004, and the final rule was issued April 12, 2005 (70 FR 19154).

Species and Critical Habitat Description

The Riverside fairy shrimp is a small freshwater crustacean in the Family Streptocephalidae of the Order Anostraca. The species was first collected in 1979 by Dr. Clyde Erickson and formally described as a new species in 1990 (Eng *et al.* 1990). The Riverside fairy shrimp is distinguished from similar species by its red-colored cercopods (anterior appendages), which occur on all of the ninth and 30 to 40 percent of the eighth abdominal segments (Eng *et al.* 1990). Adult fairy shrimp may grow to a length of 0.5 to 1.0 in (1.3 to 2.5 cm) (Eng *et al.* 1990).

There are 4 designated critical habitat units for the Riverside fairy shrimp that include 306 ac (124 ha) of State/local and private land in Ventura, Orange, and San Diego counties (70 FR 19154). Unit 2 of the final critical habitat designation is located within Subarea 4 of the Action Area and encompasses approximately 39 ac (16 ha) within O'Neill Regional Park and 10 ac (4 ha) of adjacent private land.

The primary constituent elements for Riverside fairy shrimp are those habitat components that are essential for the primary biological needs of foraging, sheltering, reproduction, and dispersal. These primary constituent elements are found in areas that support vernal pools or other ephemeral ponds and depressions and their associated watersheds. The primary constituent elements are: (1) vernal pools, swales, and other ephemeral wetland features of appropriate sizes and depths that typically become inundated during winter rains and hold water for sufficient lengths of time necessary for the Riverside fairy shrimp to complete their life cycle; and (2) the geographic, topographic, and edaphic features that support aggregations or systems of hydrologically interconnected pools, swales, and other ephemeral wetlands and depressions within a matrix of immediately surrounding upslope areas that together form hydrologically and ecologically functional units called vernal pool complexes (70 FR 19154).

Habitat Affinities

Fairy shrimp are restricted to vernal pools and vernal pool-like ephemeral basins. Vernal pools are ephemeral wetlands that occur from southern Oregon through California into northern Baja California, Mexico (USFWS 1998a). They require a unique combination of climatic, topographic, geologic, and evolutionary factors for their formation and persistence. They form in regions with Mediterranean climates where shallow depressions fill with water during fall and winter rains and then dry up when the water evaporates in the spring (Collie and Lathrop 1976; Holland 1976; Holland and Jain 1977, 1988; Thorne 1984).

Downward percolation of water within the pools is prevented by an impervious subsurface layer consisting of claypan, hardpan, or volcanic stratum (Holland 1976, 1988). Seasonal inundation makes vernal pools too wet for adjacent upland plant species adapted to drier soil conditions, while rapid drying during late spring makes pool basins unsuitable for typical marsh or aquatic species that require a more persistent source of water. Local upland vegetation communities associated with vernal pools include needlegrass grassland, annual grassland, coastal sage scrub, maritime succulent scrub and chaparral (USFWS 1998a).

Riverside fairy shrimp prefer deep (greater than 10 in (25 cm) in depth) vernal pools that range in temperature from 10 degrees to 25 degrees Celsius and remain filled for extended periods of time (Eng *et al.* 1990; Eriksen and Belk 1999). Water within pools supporting fairy shrimp may be clear, but more commonly, it is moderately turbid (Eriksen and Belk 1999). Typically, pools supporting this species have low total dissolved solids and alkalinity (means of 77 and 65 parts per million, respectively), in association with pH at neutral or just below (7.1-6.4) (Eng *et al.* 1990; Gonzalez *et al.* 1996; Eriksen and Belk 1999).

Riverside fairy shrimp may also be found in disturbed vernal pool habitats where basins have been compacted or artificially deepened and therefore hold water for longer periods of time. Although basins supporting populations often appear to be artificially created or enhanced, such basins are located within soils that are capable of seasonal ponding and are often surrounded by naturally occurring vernal pool complexes. These “artificial basins” function in the same manner as naturally occurring vernal pools by filling with late fall, winter and/or spring rains that gradually dry up during the spring and/or summer (USFWS 1998a).

Life History

Riverside fairy shrimp are non-selective filter-feeders that filter suspended solids from the water column. Detritus, bacteria, algal cells, and other items between 0.3 to 100 microns may be filtered and ingested. Riverside fairy shrimp are preyed upon by a wide variety of wildlife, including beetles, dragonfly larvae, other arthropods, frogs, salamanders, toad tadpoles, shorebirds, ducks and other migratory birds, and even other fairy shrimp (Eriksen and Belk 1999).

Freshwater crustaceans, including the Riverside fairy shrimp, have a two-stage life cycle and spend the majority of their life cycle in the cyst stage (Templeton and Levin 1979; Schaal and

Leverich 1981; Herzig 1985; Hairston and De Stasio 1988; Venable 1989). After hatching, Riverside fairy shrimp require 48 to 56 days to reach sexual maturity in contrast with other fairy shrimp that can reach maturity in less than 2 weeks (Hathaway and Simovich 1996). Fairy shrimp mate upon reaching maturity, and female Riverside fairy shrimp produce between 17 and 427 cysts (eggs) over their lifetime (Simovich and Hathaway 1997). The cysts are either dropped by the females to settle into the mud at the bottom of the pool or they remain in the brood sac until the female dies and sinks to the bottom (Eriksen and Belk 1999). Fairy shrimp cysts may persist in the soil for several years until conditions are favorable for successful reproduction (Simovich and Hathaway 1997). The cysts will hatch in 7 to 12 days when water temperatures are between 10 and 20 degrees Celsius (Hathaway and Simovich 1996). Not all cysts are likely to hatch in a season, thus providing a mechanism for survival if the inundation period is too short in a given year (Simovich and Hathaway 1997).

Distribution

The range of the Riverside fairy shrimp includes Ventura, Los Angeles, Orange, San Diego, and Riverside counties in southern California, and Bajamar in Baja California, Mexico (USFWS 1998a; Brown *et al.* 1993). With the exception of the Riverside populations, all populations are within 10 mi (16 km) of the coast over a north-south distance of approximately 125 mi (40 km).

In Ventura County, Riverside fairy shrimp were previously known from a single large pool in a grassland area within the Tierra Rejada Vernal Pool Preserve; however, wet season surveys conducted each year between 2002 and 2006 failed to locate any adults (Mountains Recreation and Conservation Authority 2006).

Riverside fairy shrimp habitat located on approximately 198 ac (80 ha) of open space in Los Angeles County was recently removed in conjunction with the Los Angeles International Airport Master Plan Project (USFWS 2004) and Operations and Maintenance Activities Project (USFWS 2005b) at Los Angeles International Airport (LAX). Cysts from LAX may be transferred to Madrona Marsh Preserve in the City of Torrance once pools have been restored for this species. A small number of Riverside fairy shrimp cysts, but no adults, have been found in Madrona Marsh (Angelos 2003). The species was previously reported from Cruzan Mesa; however, recent surveys found only vernal pool fairy shrimp (*Branchinecta lynchi*) at this location (Glenn Lukos Associates 2004).

In Orange County, extant pools create a chain of Riverside fairy shrimp habitat along the Orange County foothills. From north to south, Riverside fairy shrimp occur on the former Marine Corps Air Station, El Toro (HELIX 2005); Southern California Edison's (SCE) Viejo Substation (PCR 1998); Live Oak Plaza (Glenn Lukos Associates 1997); Saddleback Meadows (HELIX 2000); adjacent to the northern boundary of O'Neill Regional Park (CNDDB occurrence #17, 2001), Tijeras Creek (Glenn Lukos Associates 2001); and within the San Juan Creek watershed at Chiquita Ridge and Radio Tower Road (Dudek and Associates 2001b). An additional pool is being created on Marine Corps Air Station El Toro by Los Angeles World Airports for impacts at LAX.

In Riverside County, the species has been documented at the Skunk Hollow Pool in the Barry Jones Wetland Mitigation Bank (Center for Natural Lands Management 2006b); the Field Pool, 0.25 mi (0.4 km) southeast of Skunk Hollow Pool (Eriksen 1988); the Australia Pool in Lake Elsinore back basin (Jones 1998); the Schleuniger Pool, north of La Estrella Road (Hayworth 1998); March Air Reserve Base (Patterson and Ayers 1998); Scott Pool, northeast of the intersection of Scott Road and Menifee Road (HELIX 2002); a stock pond at the east end of Rancho California Road (Black 2004a); Rainbow Canyon (Tom Dodson & Associates 2003a,b); Pechanga Pool on the Pechanga Indian Reservation (Wegscheider 2006); and within created pools on Johnson Ranch (Neudecker 2003). In addition, Riverside fairy shrimp will be introduced to created pools on Clayton Ranch once habitat conditions are adequate to support the species (USFWS 2003).

Occupied pools in Riverside County at Grizzle Ranch (Wegscheider 2004), the Garbani property (Michael Brandman Associates 2006), and Temecula Education Complex Project site (Western Riverside County Regional Conservation Authority 2006) will be filled in conjunction with approved and mitigated development projects.

In north coastal San Diego County, the Riverside fairy shrimp occurs in vernal pools on MCB Camp Pendleton (Recon 2001; Black 2004b; URS 2005) and at the Poinsetta Land Station in the City of Carlsbad (Dudek and Associates 1998b). In central San Diego County there is a single occupied pool on Marine Corps Air Station Miramar (The Branchiopod Research Group 1996). In southern San Diego County the species occurs in numerous pools on Otay Mesa near the U.S./Mexico border (City of San Diego 2003).

Rangewide Trends and Current Threats

Many populations of Riverside fairy shrimp have likely been extirpated or have experienced drastic declines due to the substantial loss of habitat in southern California. The majority of the vernal pools within the range of the Riverside fairy shrimp were destroyed prior to 1990 (USFWS 1998a). Extensive vernal pool habitat once occurred on the coastal plain of Los Angeles and Orange counties (Mattoni and Longcore 1997). There has been a near total loss of vernal pool habitat in these areas (Keeler-Wolf *et al.* 1998). Loss of habitat in San Diego County is estimated at 95 to 97 percent (Bauder 1986; Oberbauer 1990). Significant losses of vernal pools supporting this species have also occurred in Riverside County (66 FR 29384).

The Riverside fairy shrimp faces threats throughout its range. These threats can be divided into three major categories: 1) direct destruction of vernal pools and vernal pool habitat as a result of construction, vehicle traffic, dumping, deep plowing, and in some cases domestic animal grazing; 2) indirect threats which degrade or destroy vernal pools and vernal pool habitat over time including altered hydrology (*e.g.*, damming or draining), invasion of alien species, habitat fragmentation, and associated deleterious effects resulting from adjoining urban land uses; and 3) long-term threats including the effect of isolation on genetic diversity and locally adapted genotypes, air and water pollution, climatic variations, and changes in nutrient availability (Bauder 1986; 58 FR 41391).

Several incidental take permits pursuant to Section 10(a)(1)(B) of the Act have been issued for the Riverside fairy shrimp addressing the effects of urban development on this species. These plans have created large reserve systems that include substantial habitat for Riverside fairy shrimp and requirements for monitoring and management actions beneficial to the long-term conservation of the species (Appendix 2).

Conservation Needs

Conservation efforts for the Riverside fairy shrimp should address habitat loss and degradation resulting from both direct and indirect impacts to vernal pools, which are the major causes of decline for the species. The Riverside fairy shrimp is especially vulnerable to alteration in hydrology, thus the protection of watershed function is critical to its survival. Existing vernal pools and their watersheds should be secured from further loss and degradation in a configuration that maintains habitat function and species viability (USFWS 1998a).

Environmental Baseline

Within the action area, Riverside fairy shrimp are found in a total of 15 pools, including 9 on Saddleback Meadows (HELIX 2000), 1 adjacent to the northern boundary of O'Neill Regional Park (CNDDB occurrence #17, 2001), 2 in Tijeras Creek (Glenn Lukos Associates 2001), 1 on Chiquita Ridge (Dudek and Associates 2001b), and 2 along Radio Tower Road (Dudek and Associates 2001b). All Riverside fairy shrimp locations in the action area are considered "important" populations in "key" locations due to the rarity of the species in the region.

The Saddleback Meadows property (located in Subarea 2) has historically been, and remains, subject to livestock grazing (HELIX 2006). Six of the nine pools on this site appear to have been created within existing ephemeral streams by the construction of earthen berms at their downstream extent. Likely these pools were created to provide drinking water for livestock. Two of the berms have been breached such that the pools no longer hold water. The remaining pools are located in upland areas, and it is not clear if they were created or occur in natural depressions. The basin area for the 9 pools is 0.76 ac (0.31 ha), including the two breached pools totaling 0.27 ac (0.11 ha).

The O'Neill Regional Park pool (located in Subarea 4) is included in Unit 2 of designated critical habitat for the Riverside fairy shrimp (70 FR 19154). The pool is surrounded by grassland and coastal sage scrub (CNDDB occurrence #17, 2001). It is located less than 200 ft (61 m) from an existing telecommunication facility.

The two Tijeras Creek pools (located in Subarea 4) have a total basin area of 0.8 ac (0.32 ha) and are located on either side of a large stockpond (Glenn Lukos Associates 2001). The area surrounding the pools is relatively undisturbed and vegetation consists of native grassland, coastal sage scrub, oak woodland, and riparian habitat.

There are three pools along Chiquita Ridge in Subarea 1 with a total basin area of 1.305 ac (0.53 ha) that previously contained Riverside fairy shrimp (USFWS 1996b). Wet season surveys

conducted in 2001 recorded adults in one of the three pools (Pool Number 4, Dudek and Associates 2001b). The pools are surrounded by native and non-native grassland and were historically subject to cattle grazing. All three pools are protected within the Ladera Open Space.

Radio Tower Road pools are located in the Sierra and Rinconada pastures (Plan, Appendix G) in Subarea 1 and contained signs of trampling and cattle feces during surveys conducted in 2001 (Dudek and Associates 2001b). Vegetation within the watershed for the pools is mainly native and non-native grassland with some coastal sage scrub. The basin area of the two occupied pools (Pool Numbers 2 and 7) totals 0.11 ac (0.04 ha). Riverside fairy shrimp were not observed in a third pool (Pool Number 1), which shares its watershed with Pool Number 2 in a complex of highly disturbed and smaller pools also in the vicinity of Radio Tower Road (Pool Complex 8, Dudek and Associates 2001b).

Two previous section 7 consultations addressing impacts to the Riverside fairy shrimp have occurred within the Subregion. Formal consultation, completed October 16, 1996, for the construction of a 4.7 mi (7.6 km) extension of Antonio Parkway (1-6-97-F-2) resulted in the fill of one pool occupied by Riverside fairy shrimp. To offset the loss of this pool the County of Orange was to acquire and fence off 20.9 ac (8.5 ha) of property on Chiquita Ridge, including two pools occupied by Riverside fairy shrimp and restore a third pool on Chiquita Ridge, also occupied by Riverside fairy shrimp. Initial restoration efforts negatively impacted the pool such that it no longer retains water for sufficient duration for fairy shrimp cysts to hatch (USFWS 2001); however, plans are currently being developed to reconstruct this pool in the summer of 2007 (Vihn Tran, County of Orange, pers. comm.. to Chris Medak, CFWO, October 31, 2006). The County of Orange has also agreed to manually remove non-native grasses adjacent to the three Chiquita Ridge pools following completion of the vernal pool reconstruction project (Kubasek 2006). The fencing around the pools has been completed.

Formal consultation for Saddleback Meadows Residential Development Project was completed October 26, 2001 (1-6-01-F-1023). The original project proposed to fill five of the nine pools on site including the two breached pools. To offset the loss of these pools, four ephemeral pools would be created, and along with the remaining four avoided pools, be preserved within a 97.4 ac (39 ha) biological open space area on the project site. This project was not implemented and has since been redesigned with a reduced project footprint (HELIX 2006). The revised project footprint would increase the total number of functional ponds impacted from three to four and increase the loss of functioning pond basin area on site from 49 percent to 59 percent; however, the most natural of the ponds onsite (Pond E) would be avoided. In addition, a total of 0.87 ac (0.35 ha) of ephemeral ponds would be created and preserved within a 124-ac (50 ha) biological open space area.

Effects of the Action

Planning Area Development

No direct impacts to vernal pools occupied by Riverside fairy shrimp are anticipated in conjunction with proposed development within the Planning Areas, and all pools within Subarea 1 will be included within the Habitat Reserve; however, vernal pools within the Habitat Reserve may be vulnerable to degradation from changes in water quality/hydrological regime, exotic plant invasion, prescribed burns/wildfire, unauthorized recreation, and continued livestock grazing at the Radio Tower Road pools. In addition, the species may be impacted by habitat and wildlife management and monitoring activities such as exotic species removal, surveys for the species, and collection of water quality data.

Riverside fairy shrimp are not currently documented at Prima Deshecha Landfill. In the event that this species is identified at the Landfill during the 75-year term of permit(s), the County of Orange has agreed to fully minimize and mitigate any negative impacts to this species through the minor amendment process (draft Permit Condition #16 for the County of Orange).

Water Quality and Quantity

Water quality degradation may occur in association with continued livestock grazing in the Radio Tower Road pools as discussed below.

Exotic plant invasion

A long history of livestock grazing in the Subregion has contributed to the predominance of non-native annual grasslands in the vicinity of the Chiquita Ridge and Radio Tower Road vernal pools (Plan, Chapter 3, page 20). A vernal pool's inundation period can be substantially reduced by an over-abundance of vegetation within the watershed (Marty 2005), particularly non-native vegetation that tends to have higher water requirements than native flora. Landscaping associated with Ladera Ranch and proposed residential development in Planning Area 5 may also contribute additional non-native plant species into the conserved watersheds of the Chiquita Ridge and Radio Tower Road vernal pools.

Grazing

Livestock grazing is a Covered Activity and will continue in the vicinity of the Radio Tower Road vernal pools in accordance with the Grazing Management Plan (Plan, Appendix U). No grazing will occur in the vicinity of the Chiquita Ridge pools unless grazing is authorized by a minor amendment (RMV draft Permit Condition #14). Cattle will be held in the Sierra and Rinconada pastures from October through May, which corresponds with the vernal pool wet season and reproductive period for the Riverside fairy shrimp. Continued grazing at current levels has the potential to both benefit and impact the Riverside fairy shrimp.

Livestock grazing in the watershed surrounding the Radio Tower Road pools may benefit the Riverside fairy shrimp by increasing the inundation period of the pools through reduction of vegetation (particularly non-native grasses) in the watershed (Marty 2005) and compaction of the soil, which reduces infiltration (Gifford and Hawkins 1978). Because Riverside fairy shrimp require 48 to 56 days to reach sexual maturity following hatching, a longer inundation period increases the likelihood of successful reproduction.

Negative impacts to Riverside fairy shrimp associated with livestock grazing include destruction of cysts and reduced water quality. Riverside fairy shrimp cysts can be easily damaged by small forces (less than 0.5 Newtons), particularly when wet (Hathaway *et al.* 1996); therefore if cattle move across or congregate in a vernal pool, particularly when wet, we anticipate trampling will crush or otherwise bury individual cysts and reduce the number of adults available to contribute to the reproductive population. Additionally, if livestock congregate in wet vernal pools or their watersheds, the water quality within these vernal pools may be degraded through deposition of manure and urine, which can lead to pool eutrophication (*i.e.*, increased algal production and associated dissolved oxygen demand leading to anaerobic conditions and subsequent animal death and decay) (Carpenter *et al.* 1998; Robins and Vollmar 2002; Bowling and Jones 2003).

Because Riverside fairy shrimp have co-existed with livestock in the Radio Tower Road vernal pools since 1882 and no changes to current grazing practices are proposed for the Sierra and Rinconada pastures prior to development of Planning Area 5, we expect the species will continue to occupy the Radio Tower Road pools.

Prescribed Burning/Wildfire

Prescribed burning is proposed in the vicinity of the Radio Tower Road vernal pools to reduce fuel loads and the number of unplanned fires adjacent to development in PA5. As with livestock grazing, reduction of non-natives with prescribed burning is anticipated to benefit Riverside fairy shrimp by increasing the inundation period of the vernal pool. Cysts are expected to survive fire (Wells *et al.* 1997); however, depending on the intensity of the fire, prescribed burns conducted in the vicinity of an inundated pool have the potential to increase water temperatures in the pool, which would be detrimental to adults. Prescribed burns could also result in temporary habitat degradation due to runoff of ash and sediment into the pools following the burn.

Similarly, wildfire has the potential to negatively impact the population if it occurs at a time when adults are present. We expect the potential wildfire ignition sources will increase in association with development of the surrounding area.

Recreation

Public access to the Habitat Reserve will largely be prohibited, except for special events, docent lead tours and limited trails. A community trail is proposed within Ladera Open Space, east of the Chiquita Ridge pools (Plan, Figure 186-M). The existing fencing around the Chiquita Ridge pools should discourage unauthorized entry. No recreational trails are proposed immediately

adjacent to the Radio Tower Road pools; therefore, recreational impacts are not anticipated to contribute significantly to degradation of the Radio Tower Road pools.

Critical Habitat

No Covered Activities are proposed within Unit 2 of designated critical habitat for the Riverside fairy shrimp; therefore, we do not anticipate any impacts to critical habitat for the Riverside fairy shrimp from implementation of the proposed Plan.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, fire, and grazing, the following conservation measures specific to and/or of particular importance to Riverside fairy shrimp will be implemented.

The vernal pools supporting Riverside fairy shrimp and their contributing hydrological resources on Chiquita Ridge and on Radio Tower Road will be permanently conserved and adaptively managed in the Habitat Reserve. The adaptive management program for Riverside fairy shrimp will focus on maintaining the existing vernal pools and Riverside fairy shrimp in the Habitat Reserve by maintaining water quality/quantity, controlling non-native invasive species, managing livestock grazing, and minimizing human access and disturbance (Plan, Appendix E, page 365).

Development within Planning Area 5 will be designed to avoid impacts to the vernal pool occupied by Riverside fairy shrimp (Pool 7) and its hydrological sources (Plan, Appendix E, page 354). All existing and proposed development areas are or will be located at least 1,000 ft (305 m) from vernal pools known to be occupied by Riverside fairy shrimp and at lower elevation; therefore, the Plan does not anticipate hydrological alterations in the vernal pools within the Habitat Reserve (Plan, Chapter 7, page 178). To assist with evaluation of other potential sources of water quality degradation and ensure conditions are adequate to maintain existing populations of Riverside fairy shrimp, water quality monitoring will be conducted throughout the life of the permit.

Management tools will be developed specifically for controlling non-native plant species in the watersheds of the Chiquita Ridge and Radio Tower Road vernal pools. In the vicinity of the Chiquita Ridge pools, non-native species control will be limited to manual or mechanical removal unless grazing is authorized by a minor amendment (RMV draft Permit Condition #14) because livestock are currently restricted from Ladera Open Space and prescribed burns are not feasible due to the proximity of this area to Ladera Ranch Development. In the vicinity of the Radio Tower Road pools, non-native species will be controlled with livestock grazing and potentially prescribed burns as discussed below. In addition, plants identified by the California Exotic Pest Plant Council as an invasive risk in southern California will be excluded from development and fuel management zones adjacent to the Habitat Reserve (Plan, Appendix U, page 7).

Livestock grazing is not anticipated to result in the loss of Riverside fairy shrimp populations from currently occupied Radio Tower Road vernal pools; however, it has the potential to negatively impact the populations. Regular monitoring of the Radio Tower Road vernal pools, following dedication of this area to the Habitat Reserve (see Monitoring section below), will allow the Science Advisors to make informed recommendations regarding grazing practices. If recommended by the Science Panel, cattle will be seasonally excluded from the Radio Tower Road pools, following dedication of this area to the Habitat Reserve. Temporary fencing will be erected around specified pools once water in the pools reaches 1 in (2.54 cm) for 24 hours to discourage cattle from entering until pools are sufficiently dry that cattle hooves do not result in soil disturbance and compaction (Plan, Appendix U, page 8). Monitoring will be conducted on a weekly basis while fencing is in place to determine the effectiveness of exclusionary fencing.

Properly timed prescribed burning can be an effective management tool for control of non-native plant species in vernal pool watersheds (Pollak and Kan 1998). Because cysts are expected to survive fire, timing of prescribed burns outside of the inundation period of the pool would likely avoid direct impacts to Riverside fairy shrimp. We anticipate the Science Advisors will review proposed prescribed burns with the potential to impact Riverside fairy shrimp adults and include any necessary impact avoidance and minimization measures to ensure the populations of Riverside fairy shrimp will be maintained in currently occupied Radio Tower Road vernal pools. Implementation of the Wildland Fire Management Plan will assist in reducing the number of unplanned fires through use of maintained fuel breaks and prescribed burns (Plan, Appendix N, page N1-4).

The adaptive management plan for Riverside fairy shrimp will address the potential for unauthorized recreation within Ladera Open Space. Although fencing has already been established around Chiquita Ridge vernal pools, as discussed in the Environmental Baseline section above, additional interpretive signage will be posted if necessary to further reduce disturbance (Plan, Chapter 7, page 178).

Monitoring

Regular monitoring of the Chiquita Ridge and Radio Tower Road vernal pools for the life of the permit will allow for the Reserve Manager to track the status of the Riverside fairy shrimp, water quality conditions, and need for specific management actions. Annual monitoring will occur every year for the first five years following initiation of monitoring once occupied areas are dedicated to the Habitat Reserve and every three years thereafter (Plan, Chapter 7, Table 7-17). Monitoring will be initiated in the Chiquita Ridge pools in 2007 and Radio Tower Road pools following dedication of this area to the Habitat Reserve, in approximately 2018 (Plan, Chapter 7, page 214). All pools identified during previous surveys conducted within the Plan Area by Dudek and Associates in 2001 (Pools 1, 2, 4, 5, 6, 7, and 8) will be included (Plan, Chapter 7, page 177).

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of the Riverside fairy shrimp. We base this conclusion on the following:

1. Three vernal pools containing Riverside fairy shrimp will be permanently conserved and adaptively managed in the Habitat Reserve. The remaining vernal pools in the action area will not be affected by Covered Activities under this Plan.

2. Development within Planning Area 5 will be located a minimum of 1000 ft (305 m) from the Radio Tower Road pools and at lower elevation so as not to effect the hydrological sources for these pools.

3. Implementation of the Adaptive Management Plan should increase the quality of vernal pool habitat conserved for the species and ensure long-term protection for existing populations of Riverside fairy shrimp within the Habitat Reserve by addressing potential habitat degradation associated with changes in water quality/hydrological regime, exotic plant invasion, continued livestock grazing, prescribed burns/wildfire, and unauthorized recreation.

4. Seasonal exclusion of grazing from the Radio Tower Road vernal pools during the wet season will be implemented if recommended by the Science Advisors.

5. We anticipate that permanent protection of Chiquita Ridge and Radio Tower Road vernal pools combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the species in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the Implementation Agreement is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for Riverside fairy shrimp remains valid because the impacts and conservation will not change.

San Diego Fairy Shrimp

Status of the Species

Listing Status

The San Diego fairy shrimp (*Branchinecta sandiegonenis*) was federally listed as endangered on February 3, 1997 (62 FR 4925). A vernal pool recovery plan, which includes San Diego fairy shrimp was published in September 1998 (USFWS 1998a). Critical Habitat was designated for this species an October 23, 2000 (65 FR 63437). On June 11, 2002, the U. S. District Court, Central District of California ordered us to reconsider the economic impacts of the designation and publish a new final designation. Critical habitat was re-proposed for this species on April 22, 2003 (68 FR 19887).

Species Description and Proposed Critical Habitat

The San Diego fairy shrimp is a small freshwater crustacean in the family Branchinectidae of the Order Anostraca. The species was originally described by Fugate (1993) from samples collected on Del Mar Mesa, San Diego County. Male San Diego fairy shrimp are distinguished from males of other species of Branchinecta by differences found at the distal (located far from the point of attachment) tip of the second antennae. Females are distinguishable from females of other species of Branchinecta by the shape and length of the brood sac, the length of the ovary, and by the presence of paired dorsolateral (located on the sides, toward the back) spines on five of the abdominal segments (Fugate 1993). Adult male San Diego fairy shrimp range in size form 0.35 to 0.63 in (9 to 16 mm) and adult females are 0.31 to 0.55 in (8 to 14 mm) long.

There are five designated critical habitat units for the San Diego fairy shrimp that include 4,025 ac (1,629 ha) of Federal, State, local, and private land in Orange, and San Diego counties (65 FR 63437); however, the action area is not located in an area designated as critical habitat for the San Diego fairy shrimp. Proposed San Diego fairy shrimp critical habitat includes 6,098 ac (2,468 ha) within 5 units in the same two counties (68 FR 19887). Unit 1 of the proposed critical habitat designation includes 363 ac (147 ha) within Orange County and habitat located within Subarea 1 of the action area. Because this unit represents the northern extent of the species' currently known distribution, the function of this unit is to maintain the ecological distribution and genetic variability of the species on a broad geographical scale.

The primary constituent elements for the San Diego fairy shrimp are those habitat components that are essential for the primary biological needs of foraging, sheltering, reproduction, cyst (egg) dormancy, dispersal, and genetic exchange. These primary constituent elements are found in those areas that support vernal pools or other ephemeral depressional wetlands. The primary constituent elements are: small to large pools with moderate to deep depths that hold water for sufficient lengths of time necessary for fairy shrimp incubation and reproduction, but not necessarily every year; the associated watershed(s) and other hydrologic features that support pool basins and their related pool complexes; flat or gently sloping topography; and any soil type

with a clay component and/or an impermeable surface or subsurface layer known to support vernal pool habitat (68 FR 19887).

Habitat Affinities

Fairy shrimp are restricted to vernal pools and vernal pool-like ephemeral basins. Vernal pools are ephemeral wetlands that occur from southern Oregon through California into northern Baja California, Mexico (USFWS 1998a). They require a unique combination of climatic, topographic, geologic, and evolutionary factors for their formation and persistence. They form in regions with Mediterranean climates where shallow depressions fill with water during fall and winter rains and then dry up when the water evaporates in the spring (Collie and Lathrop 1976; Holland 1976; Holland and Jain 1977, 1988; Thorne 1984).

Downward percolation of water within the pools is prevented by an impervious subsurface layer consisting of claypan, hardpan, or volcanic stratum (Holland 1976; Holland and Jain 1988). Seasonal inundation makes vernal pools too wet for adjacent upland plant species adapted to drier soil conditions, while rapid drying during late spring makes pool basins unsuitable for typical marsh or aquatic species that require a more persistent source of water. Local upland vegetation communities associated with vernal pools include needlegrass grassland, annual grassland, coastal sage scrub, maritime succulent scrub and chaparral (USFWS 1998a).

San Diego fairy shrimp tend to inhabit shallow, small vernal pools and vernal pool-like depressions (*e.g.*, ruts in dirt roads) that range in temperature from 10 degrees to 26 degrees Celsius. They are ecologically dependent on seasonal fluctuations in their habitat, such as absence or presence of water during specific times of the year, duration of inundation, and other environmental factors that likely include specific salinity, conductivity, dissolved solids, and pH levels. Gonzalez *et al.* (1996) found water chemistry as an important factor in determining the distribution of the San Diego fairy shrimp.

Life History

San Diego fairy shrimp are non-selective filter-feeders that filter suspended solids from the water column. Detritus, bacteria, algal cells, and other items between 0.3 to 100 microns may be filtered and ingested. San Diego fairy shrimp are preyed upon by a wide variety of wildlife, including beetles, dragonfly larvae, other arthropods, frogs, salamanders, toad tadpoles, shorebirds, ducks and other migratory birds, and even other fairy shrimp (Eriksen and Belk 1999).

Freshwater crustaceans, including the San Diego fairy shrimp, have a two-stage life cycle and spend the majority of their life cycle in the cyst stage (Templeton and Levin 1979; Schaal and Leverich 1981; Herzig 1985; Hairston and De Stasio 1988; Venable 1989). After hatching, San Diego fairy shrimp reach sexual maturity in about 7 to 17 days, depending on water temperature and persist for about 4 to 6 weeks (Hathaway and Simovich 1996). Fairy shrimp mate upon reaching maturity, and female San Diego fairy shrimp produce between 164 and 479 cysts (eggs) over their lifetime (Simovich and Hathaway 1997). The cysts are either dropped by the females

to settle into the mud at the bottom of the pool, or they remain in the brood sac until the female dies and sinks to the bottom (Eriksen and Belk 1999). Fairy shrimp cysts may persist in the soil for several years until conditions are favorable for successful reproduction (Simovich and Hathaway 1997). The cysts will hatch in 3 to 5 days when water temperatures are between 10 and 20 degrees Celsius (Hathaway and Simovich 1996). Not all cysts are likely to hatch in a season, thus providing a mechanism for survival if the inundation period is too short in a given year (Simovich and Hathaway 1997).

Distribution

The range of the San Diego fairy shrimp includes Orange and San Diego counties in southern California, and northwestern Baja California, Mexico (USFWS 1998a; Brown *et al.* 1993). A single isolated female was previously reported from vernal pools in Isla Vista, Santa Barbara County, California; however, directed surveys have not located any additional individuals (62 FR 4925).

In Orange County, the San Diego fairy shrimp has been documented at Newport Banning Ranch (Glenn Lukos Associates 2000), North Ranch Policy Plan Area (Harmsworth Associates 2001b, 2004) (now Irvine Ranch Land Reserve), Fairview Park (CNDDB occurrence #11, 1996), and within the San Juan Creek watershed at Chiquita Ridge and Radio Tower Road (Dudek and Associates 2001b).

In San Diego County, the species occurs in vernal pools from MCB Camp Pendleton, inland to Ramona and south through Del Mar Mesa, Proctor Valley, and Otay Mesa, San Diego County, California. A minimum of 246 pools on MCB Camp Pendleton are known to be occupied (SWDIV 2001, RECON 2001). Based on surveys of approximately 60 percent of the 2,856 vernal pool basins located on Marine Corps Air Station Miramar, 1,303 are occupied by San Diego fairy shrimp (MCAS Miramar 2006). Of the 62 vernal pool complexes mapped by the City of San Diego (2003), 29 were found to be occupied by San Diego fairy shrimp[4] and occur at the following localities: Del Mar Mesa (1), Carmel Mountain (1), Mira Mesa (6), Nobel Drive (3), Kearny Mesa (3), Mission Trails Regional Park (1), and Otay Mesa (14).

Additional occupied vernal pool complexes in San Diego County, outside of the survey area for City of San Diego's Vernal Pool Inventory, are located in Carlsbad, San Marcos, Ramona, Poway, Santee, Rancho Santa Fe, Murphy Canyon, Otay Lakes, Imperial Beach, East Otay Mesa, Marron Valley (CFWO survey report database), and Proctor Valley (CNDDB occurrence # 27, 2001).

Rangewide Trends and Current Threats

Many populations of San Diego fairy shrimp have likely been extirpated or have experienced drastic declines due to the substantial loss of habitat in southern California. Urban and water development, flood control, and highway and utility projects, as well as conversion of wild lands

[4] The City of San Diego conducted non-protocol surveys for San Diego fairy shrimp. Therefore this inventory may under-represent the true number of vernal pools with occurrences of San Diego fairy shrimp.

to agricultural use, have eliminated or degraded vernal pools and/or their watersheds (Jones and Stokes Associates 1987). The majority of the vernal pools within the range of the San Diego fairy shrimp were lost prior to 1990 (USFWS 1998a). Extensive vernal pool habitat once occurred on the coastal plain of Los Angeles and Orange counties (Mattoni and Longcore 1997). There has been a near total loss of vernal pool habitat in these areas (Keeler-Wolf *et al.* 1998). Loss of habitat in San Diego County is estimated at 95 to 97 percent (Bauder 1986; Oberbauer 1990).

The San Diego fairy shrimp faces threats throughout its range. These threats can be divided into three major categories: 1) direct destruction of vernal pools and vernal pool habitat as a result of construction, vehicle traffic, domestic animal grazing, dumping, and deep plowing; 2) indirect threats which degrade or destroy vernal pools and vernal pool habitat over time including altered hydrology (*e.g*., damming or draining), invasion of alien species, habitat fragmentation, and associated deleterious effects resulting from adjoining urban land uses; and 3) long-term threats including the effect of isolation on genetic diversity and locally adapted genotypes, air and water pollution, climatic variations, and changes in nutrient availability (Bauder 1986; USFWS 1998a).

Several incidental take permits pursuant to Section 10(a)(1)(B) of the Act have been issued for the San Diego fairy shrimp addressing the effects of urban development on this species. These plans have created large reserve systems that include substantial habitat for San Diego fairy shrimp and requirements for monitoring and management actions beneficial to the long-term conservation of the species (Appendix 2).

Conservation Needs

Conservation efforts for the San Diego fairy shrimp should address habitat loss and degradation resulting from both direct and indirect impacts to vernal pools, which are the major causes of decline for the species. The San Diego fairy shrimp is especially vulnerable to alteration in hydrology, thus the protection of watershed function is critical to its survival. Existing vernal pools and their watersheds should be secured from further loss and degradation in a configuration that maintains habitat function and species viability (USFWS 1998a).

Environmental Baseline

In the Southern Subregion, San Diego fairy shrimp are found in a total of four pools including one on Chiquita Ridge and three along Radio Tower Road (Dudek and Associates 2001b). All San Diego fairy shrimp locations in the action area are considered “important” populations in “key” locations due to the rarity of the species in the region.

There are three pools (Pool Numbers 4, 5, and 6) along Chiquita Ridge (located in Subarea 1), which are currently protected within Ladera Open Space. These pools are located in Unit 1d of proposed critical habitat for San Diego fairy shrimp, which includes 84 ac (34 ha) in Subarea 1 (68 FR 19887). Wet season surveys conducted in 2001 recorded adults in one of the three pools (Pool Number 4, Dudek and Associates 2001b). The Plan also identifies a second pool on Chiquita Ridge (Pool Number 6) as occupied; however, San Diego fairy shrimp have not been

recorded in this pool since 1996 (T. Bomkamp, Glenn Lukos Associates, pers. comm.. to P. Behrends, Dudek and Associates, December 12, 2006). The pools are surrounded by native and non-native grassland and were historically subject to cattle grazing.

Radio Tower Road pools are located in the Sierra and Rinconada pastures (Plan, Appendix G) in Subarea 1 and contained signs of trampling and cattle feces during surveys conducted in 2001 (Dudek and Associates 2001b). Three vernal pools (Pool Numbers 1, 2, and 7) occupied by San Diego fairy shrimp and an unoccupied complex of highly disturbed and smaller pools (Pool Complex 8) have been identified in this area (Dudek and Associates 2001b). These pools are located in Unit 1e of proposed critical habitat for San Diego fairy shrimp, which includes 133 ac (54 ha) in Subarea 1 (68 FR 19887). Vegetation within the watershed for the pools is mainly native and non-native grassland with some coastal sage scrub. The basin area of the three pools totals 0.15 ac (0.06 ha). Pool Numbers 1 and 2 share the same watershed and may occasionally connect during high rainfall years (Dudek and Associates 2001b).

One previous section 7 consultation regarding the San Diego fairy shrimp occurred within the Subregion. Formal consultation, completed October 16, 1996, for the construction of a 4.7 mi (7.6 km) extension of Antonio Parkway (1-6-97-F-2) resulted in the fill of one 0.5 ac (0.2 ha) pool. To offset the loss of this pool, the County of Orange was to acquire and fence off 20.9 ac (8.5 ha) of property on Chiquita Ridge, including the three Chiquita Ridge vernal pools, one of which would be expanded and restored. Initial restoration efforts negatively impacted the pool such that it no longer retains water for sufficient duration for fairy shrimp cysts to hatch (USFWS 2001); however, plans are currently being developed to reconstruct this pool in the summer of 2007 (Vihn Tran, County of Orange, pers. comm. to Chris Medak, CFWO, October 31, 2006). The County of Orange has also agreed to manually remove non-native grasses adjacent to the three pools following completion of the vernal pool reconstruction project (Kubasek 2006). The fencing around the pools has been completed.

Effects of the Action

Planning Area Development

No direct impacts to vernal pools occupied by San Diego fairy shrimp are anticipated in conjunction with proposed development within the Planning Areas, and all pools within Subarea 1 will be included within the Habitat Reserve; however, vernal pools within the Habitat Reserve may be vulnerable to degradation from changes in water quality/hydrological regime, exotic plant invasion, prescribed burns/wildfire, unauthorized recreation, and continued livestock grazing at the Radio Tower Road pools. In addition, the species may be impacted by habitat and wildlife management and monitoring activities such as exotic species removal, surveys for the species, and collection of water quality data.

San Diego fairy shrimp are not currently documented at Prima Deshecha Landfill. In the event that this species is identified at the Landfill during the 75-year term of permit(s), the County of Orange has agreed to fully minimize and mitigate any negative impacts to this species through the minor amendment process (draft Permit Condition #16 for the County of Orange)..

Water Quality and Quantity

Water quality degradation may occur in association with continued livestock grazing in the Radio Tower Road pools as discussed below.

Exotic plant invasion

A long history of livestock grazing in the Subregion has contributed to the predominance of non-native annual grasslands in the vicinity of the Chiquita Ridge and Radio Tower Road vernal pools (Plan, Chapter 3, page 20). A vernal pool's inundation period can be substantially reduced by an over-abundance of vegetation within the watershed (Marty 2005), particularly non-native vegetation that tends to have higher water requirements than native flora. Landscaping associated with Ladera Ranch and proposed residential development in Planning Area 5 may also contribute additional non-native plant species into the conserved watersheds of the Chiquita Ridge and Radio Tower Road vernal pools.

Grazing

Livestock grazing is a Covered Activity and will continue in the vicinity of the Radio Tower Road vernal pools in accordance with the Grazing Management Plan (Plan, Appendix U). No grazing will occur in the vicinity of the Chiquita Ridge pools unless grazing is authorized by a minor amendment (RMV draft Permit Condition #14). Cattle will be held in the Sierra and Rinconada pastures from October through May, which corresponds with the vernal pool wet season and reproductive period for the San Diego fairy shrimp. Continued grazing at current levels has the potential to both benefit and impact the San Diego fairy shrimp.

Livestock grazing in the watershed surrounding the Radio Tower Road pools may benefit the San Diego fairy shrimp by increasing the inundation period of the pools through reduction of vegetation (particularly non-native grasses) in the watershed (Marty 2005) and compaction of the soil, which reduces infiltration (Gifford and Hawkins 1978). Although San Diego fairy shrimp reach sexual maturity fairly quickly (7 to 17 days) after hatching, extension of the inundation period during below average rainfall years would increase the likelihood of successful reproduction during those years.

Negative impacts to San Diego fairy shrimp associated with livestock grazing include destruction of cysts and reduced water quality. San Diego fairy shrimp cysts can be easily damaged by small forces (less than 0.5 Newtons), particularly when wet (Hathaway *et al.* 1996); therefore if cattle move across or congregate in a vernal pool, particularly when wet, we anticipate trampling will crush or otherwise bury individual cysts and reduce the number of adults available to contribute to the reproductive population. Additionally, if livestock congregate in wet vernal pools or their watersheds, the water quality within these vernal pools may be degraded through deposition of manure and urine, which can lead to pool eutrophication (*i.e.*, increased algal production and associated dissolved oxygen demand leading to anaerobic

conditions and subsequent animal death and decay) (Carpenter *et al.* 1998; Robins and Vollmar 2002; Bowling and Jones 2003).

Because San Diego fairy shrimp have co-existed with livestock in the Radio Tower Road vernal pools since 1882 and no changes to current grazing practices are proposed for the Sierra and Rinconada pastures prior to development of Planning Area 5, we expect the species will continue to occupy the Radio Tower Road pools.

Prescribed Burning/Wildfire

Prescribed burning is proposed in the vicinity of the Radio Tower Road vernal pools to reduce fuel loads and the number of unplanned fires adjacent to development in PA5. As with livestock grazing, reduction of non-natives with prescribed burning is anticipated to benefit San Diego fairy shrimp, particularly during years with below average rainfall, by increasing the inundation period of the vernal pool. Cysts are expected to survive fire (Wells *et al.* 1997); however, depending on the intensity of the fire, prescribed burns conducted in the vicinity of an inundated pool have the potential to increase water temperatures in the pool, which would be detrimental to adults. Prescribed burns could also result in temporary habitat degradation due to runoff of ash and sediment into the pools following the burn.

Similarly, wildfire has the potential to negatively impact the population if it occurs at a time when adults are present. We expect the potential wildfire ignition sources will increase in association with development of the surrounding area.

Recreation

Public access to the Habitat Reserve will largely be prohibited, except for special events, docent lead tours and limited trails. A community trail is proposed within Ladera Open Space, east of the Chiquita Ridge pools (Plan, Figure 186-M). The existing fencing around the Chiquita Ridge pools should discourage unauthorized entry. No recreational trails are proposed immediately adjacent to the Radio Tower Road pools; therefore, recreational impacts are not anticipated to contribute significantly to degradation of the Radio Tower Road pools.

Proposed Critical Habitat

Implementation of the Covered Activities will not permanently impact proposed critical habitat for San Diego fairy shrimp within the action area. Units 1d and 1e, including occupied and unoccupied pools on Chiquita Ridge and Radio Tower Road (Pools Numbered 1, 2, 4, 5, 6, 7, and 8) will be conserved and managed within the Habitat Reserve. In addition, the adaptive management program for the San Diego fairy shrimp will address potential sources of habitat degradation (described above) to ensure existing pools within Unit 1d and 1e are maintained such that Unit 1 of the proposed critical habitat will continue to maintain the ecological distribution and genetic variability of this species on a broad geographical scale.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, fire, and grazing, the following conservation measures specific to and/or of particular importance to San Diego fairy shrimp will be implemented.

The vernal pools supporting San Diego fairy shrimp and their contributing hydrological resources on Chiquita Ridge and on Radio Tower Road will be permanently conserved and adaptively managed in the Habitat Reserve. The adaptive management program for San Diego fairy shrimp will focus on maintaining the existing vernal pools and San Diego fairy shrimp in the Habitat Reserve by maintaining water quality/quantity, controlling non-native invasive species, managing livestock grazing, and minimizing human access and disturbance (Plan, Appendix E, page 377).

Development within Planning Area 5 will be designed to avoid impacts to Vernal Pool Number 7, occupied by San Diego fairy shrimp and its hydrological sources (Plan, Appendix E, page 366). All existing and proposed development areas are or will be located at least 1,000 ft (305 m) from vernal pools known to be occupied by San Diego fairy shrimp and at lower elevation; therefore, the Plan does not anticipate hydrological alterations in the vernal pools within the Habitat Reserve (Plan, Chapter 7, page 178). To assist with evaluation of other potential sources of water quality degradation and ensure conditions are adequate to maintain existing populations of San Diego fairy shrimp, water quality monitoring will be conducted throughout the life of the permit.

Management tools will be developed specifically for controlling non-native plant species in the watersheds of the Chiquita Ridge and Radio Tower Road vernal pools. In the vicinity of the Chiquita Ridge pools, non-native species control will be limited to manual or mechanical removal unless grazing is authorized by a minor amendment (RMV draft Permit Condition #14) because livestock are currently restricted from Ladera Open Space and prescribed burns are not feasible due to the proximity of this area to Ladera Ranch Development. In the vicinity of the Radio Tower Road pools, non-native species will be controlled with livestock grazing and potentially prescribed burns as discussed below. In addition, plants identified by the California Exotic Pest Plant Council as an invasive risk in southern California will be excluded from development and fuel management zones adjacent to the Habitat Reserve (Plan, Appendix U, page 7).

Livestock grazing is not anticipated to result in the loss of San Diego fairy shrimp populations from currently occupied Radio Tower Road vernal pools; however, it has the potential to negatively impact the populations. Regular monitoring of the Radio Tower Road vernal pools, following dedication of this area to the Habitat Reserve (see Monitoring section below), will allow the Science Advisors to make informed recommendations regarding grazing practices. If recommended by the Science Panel, cattle will be seasonally excluded from the Radio Tower Road pools, following dedication of this area to the Habitat Reserve. Temporary fencing will be erected around specified pools once water in the pools reaches 1 in (2.54 cm) for 24 hours to

discourage cattle from entering until pools are sufficiently dry that cattle hooves do not result in soil disturbance and compaction (Plan, Appendix U, page 8). Monitoring will be conducted on a weekly basis while fencing is in place to determine the effectiveness of exclusionary fencing.

Properly timed prescribed burning can be an effective management tool for control of non-native plant species in vernal pool watersheds (Pollak and Kan 1998). Because cysts are expected to survive fire, timing of prescribed burns outside of the inundation period of the pool would likely avoid direct impacts to San Diego fairy shrimp. We anticipate the Science Advisors will review proposed prescribed burns with the potential to impact San Diego fairy shrimp adults and include any necessary impact avoidance and minimization measures to ensure the populations of San Diego fairy shrimp will be maintained in currently occupied Radio Tower Road vernal pools. Implementation of the Wildland Fire Management Plan will assist in reducing the number of unplanned fires through use of maintained fuel breaks and prescribed burns (Plan, Appendix N, page N1-4).

The adaptive management plan for San Diego fairy shrimp will address the potential for unauthorized recreation within Ladera Open Space. Although fencing has already been established around Chiquita Ridge vernal pools, as discussed in the Environmental Baseline section above, additional interpretive signage will be posted if necessary to further reduce disturbance (Plan, Chapter 7, page 178).

Monitoring

Regular monitoring of the Chiquita Ridge and Radio Tower Road vernal pools for the life of the permit will allow for the Reserve Manager to track the status of the San Diego fairy shrimp, water quality conditions, and need for specific management actions. Annual monitoring will occur every year for the first five years following initiation of monitoring once occupied areas are dedicated to the Habitat Reserve and every three years thereafter (Plan, Chapter 7, Table 7-17). Monitoring will be initiated in the Chiquita Ridge pools in 2007 and Radio Tower Road pools following dedication of this area to the Habitat Reserve, in approximately 2018 (Plan, Chapter 7, page 214). All pools identified during previous surveys conducted within the Plan Area by Dudek and Associates in 2001 (Pools 1, 2, 4, 5, 6, 7, and 8) will be included (Plan, Chapter 7, page 177).

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of the San Diego fairy shrimp. We base this conclusion on the following:

6. Four vernal pools containing San Diego fairy shrimp will be permanently conserved and adaptively managed in the Habitat Reserve. The remaining vernal pools in the action area will not be affected by Covered Activities under this Plan.

7. Development within Planning Area 5 will be located a minimum of 1000 ft (305 m) from the Radio Tower Road pools and at lower elevation so as not to effect the hydrological sources for these pools.

8. Implementation of the Adaptive Management Plan should increase the quality of vernal pool habitat conserved for the species and ensure long-term protection for existing populations of San Diego fairy shrimp within the Habitat Reserve by addressing potential habitat degradation associated with changes in water quality/hydrological regime, exotic plant invasion, continued livestock grazing, prescribed burns/wildfire, and unauthorized recreation.

9. Seasonal exclusion of grazing from the Radio Tower Road vernal pools during the wet season will be implemented if recommended by the Science Advisors.

10. We anticipate that permanent protection of Chiquita Ridge and Radio Tower Road vernal pools combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the species in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the Implementation Agreement is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for San Diego fairy shrimp remains valid because the impacts and conservation will not change.

Listed Plants

Thread-leaved brodiaea

Status of the Species

Listing Status

Thread-leaved brodiaea was listed as endangered by the State of California in January 1982 and was federally listed as threatened on October 13, 1998 (63 FR 54975). Critical habitat was designated on January 12, 2006 (70 FR 73820).

Species Description

Thread-leaved brodiaea is a perennial herb in the Lily family (Liliaceae) with dark-brown, fibrous-coated corms. The flower stalks (scapes) are 8-16 in (2-4 dm) tall with several narrow leaves that are shorter than the scape. The flowers are bell-shaped and violet in color (Munz 1974), bloom from March to June (CNPS 2001), and are arranged in a loose umbel. The fruit is a capsule (Munz 1974; Keator 1993; 63 FR 54975).

Thread-leaved brodiaea is one of 13 species of the genus *Brodiaea*, a genus largely restricted to California (Keator 1993). Thread-leaved brodiaea belongs to the subgenus *Filifoliae*, a small group of three species (Niehaus 1971). Thread-leaved brodiaea can be distinguished from other species of *Brodiaea* that occur within its range (*Brodiaea orcuttii*, *Brodiaea jolonensis*, and *Brodiaea terrestris kernensis*) by its narrow, pointed staminodia, rotate perianth lobes (*i.e.*, a saucer-shaped flower), and a thin perianth tube, which is split by developing fruit (Niehaus 1971; Munz 1974).

Habitat Affinities

This species typically occurs on gentle hillsides, valleys, and floodplains in semi-alkaline mudflats, vernal pools, mesic southern needlegrass grassland, mixed native-nonnative grassland and alkali grassland plant communities in association with clay, or alkaline silty-clay soils. Localities occupied by this species are frequently intermixed with, or near, vernal pool complexes (63 FR 54975; CNDDB 2003).

Critical Habitat

Critical habitat for thread-leaved brodiaea includes four units/subunits encompassing 597 ac (242 ha) in Los Angeles and San Diego counties (70 FR 73819); thus, the action area is not located in an area designated as critical habitat for the thread-leaved brodiaea. Within Los Angeles County, critical habitat was designated on private lands in the City of Glendora (96 ac (39 ha)) and on private and Federal lands (198 ac (80 ha)) on the boundary between the cities of Glendora and San Dimas. Within San Diego County, critical habitat was designated on the Cleveland National Forest in Devil Canyon (249 ac (101 ha)) and on privately owned land in the City of San Marcos (54 ac (22 ha)). These four units contain habitats with combinations of appropriate elevation and clay or clay associated soils, and vegetative habitats that provide the primary constituent elements essential to the conservation of this species including space for growth, food, water, air, light, minerals and other nutritional or physiological requirements (70 FR 73819).

Life History

The annual growth cycle of this species begins with the above-ground appearance of a few grass-like leaves from each corm. The corms function similarly to bulbs in storing water and nutrients during the dormant season (Smith 1997). While corms are the principal means of perpetuation from one growing season to another (Niehaus 1971), the species also sets seeds. Thread-leaved

brodiaea blooms from March through June (CNPS 2001). Upon maturity, the ovaries' three lobes split, revealing many small (0.8-1 in (2-2.5 mm) long) black seeds (Munz 1974). The seeds are then dispersed as wind rattles the capsules and releases the seeds (Smith 1997).

Brodiaea are self-incompatible, and pollination between individuals must take place in order to produce seed. A broad spectrum of insects visit *Brodiaea* flowers, but only tumbling flower beetles (Mordellidae) and sweat bees (Helictidae) were found to transport pollen between flowers (Niehaus 1971). The introduction of non-native honeybees, which tend to be species-generalists, may have increased the potential for hybridization (63 FR 54975). The Miller Mountain population in San Diego County, which occupies about 45 percent of the total occupied habitat for thread-leaved brodiaea, may represent a hybrid swarm between thread-leaved brodiaea and Orcutt's brodiaea (*Brodiaea orcuttii*) (Boyd *et al.* 1992).

Individuals require several years to mature. The total number of individuals within a population is difficult to estimate. Frequently, only a fraction of the mature individuals flower in a given year (Taylor and Burkhart 1992). The size and extent of populations of brodiaea within suitable habitat also vary in response to the timing and amount of rainfall, as well as temperature patterns.

Status and Distribution

Thread-leaved brodiaea is endemic to southwestern cismontane California, ranging from the foothills of the San Gabriel Mountains at Glendora (Los Angeles County), east to Arrowhead Hot Springs in the western foothills of the San Bernardino Mountains (San Bernardino County), and south through eastern Orange and western Riverside counties to Carlsbad and just south of Lake Hodges in northwest San Diego County, California (Munz 1974; Keator 1993; CNDDB 2003). This species occurs from 130-4,000 ft (40-1220 m) in elevation (CNPS 2001).

At the time of the listing in 1998, 48 populations of thread-leaved brodiaea had been reported, with 9 populations having been extirpated, mostly from San Diego County, and 39 populations were presumed extant. About half of the extant populations occurred in northern San Diego County or the Santa Rosa Plateau in southwestern Riverside County. Over its entire range, the species occupied about 825 ac (334 ha) of suitable habitat at the time of the listing, with fewer than 2,000 individuals being observed at most populations. Most of these populations occupied less than 13 ac (5 ha) each (63 FR 54975).

Between 16,450 and 18,450 individual plants have been estimated from populations found in Orange County on RMV (approximately 9,300 plants), Aliso-Woods Park (approximately 2,000 to 3,000 plants), Talega and Forster Ranch developments (5,000 to 6,000 plants) and at the Arroyo Trabuco golf course (80 plants) (Plan, Appendix E, page 446). The populations on RMV and Aliso-Wood Park are extant, and the population at Arroyo Trabuco was avoided during golf course project construction. The populations at Talega and Forster Ranch developments were transplanted; at Forster Ranch approximately 2,245 blooming brodiaea were documented from transplantation of the approximately 5,100 to 9,000 corms (Natural Resource Consultants 2001).

The 250 transplanted corms at Talega have also bloomed, but the project is still in the early stages of success evaluation.

In Los Angeles County, two locations have been detected, in Glendora and San Dimas, with up to 6,000 plants found at the San Dimas location. In San Bernardino County, two populations of thread-leaved brodiaea are presumed extant, at Waterman Canyon (a few dozen plants in 1993) and Arrowhead Springs (1,000 plants in 1993) (CNDDB 2003).

In San Diego County, thread-leaved brodiaea has been reported from MCB Camp Pendleton, Oceanside, Carlsbad, Vista, San Marcos and unincorporated areas in the northern portion of the County; nearly 25 percent of the extant populations occur within the Multiple Habitat Conservation Program of Oceanside, San Marcos, and Carlsbad. The largest population of 342,000 individuals was found in San Marcos in San Diego County on an isolated 40-ac (16-ha) parcel; this population falls within an area of San Marcos where conservation planning has been deferred and would require a Major Amendment to the MHCP (SANDAG 2003). There are approximately 22 general locations of thread-leaved brodiaea on MCB Camp Pendleton, with up to 2,000 individuals at some locations (Dudek and Associates 1993). The largest extant population in Riverside County is about 30,000 individuals on about 38 ac (15 ha) on the Santa Rosa Plateau (63 FR 54975).

Rangewide Trends and Current Threats

This species and its habitat are threatened by habitat destruction and fragmentation from urban and agricultural development, pipeline construction, alteration of hydrology and floodplain dynamics, excessive flooding, channelization, off-road vehicle activity, trampling by cattle and sheep, weed abatement, fire suppression practices (including discing and plowing), and competition from exotic plant species (63 FR 54975).

The Service has issued four landscape-scale multi-species programmatic biological opinions to the Forest Service that address potential adverse effects to thread-leaved brodiaea on Forest Service lands. These programmatic biological opinions include (1) the Land and Resource Management Plan Opinions (1-6-00-F-773.2), (2) The Cleveland National Forest Service Grazing Opinion (1-6-01-F-1694), (3) the San Bernardino National Forest Service Grazing Opinion (FWS-SB-1464.2) and (4) the Revised Land and Resource Management Plan Opinions (1-6-00-F-773.9). In addition, in 2005 the Service issued biological and conference opinions on the Revised Land and Resource Management Plans for the four southern California national forests. These Plans included strategic direction in the form of land use zoning and standards. (USFWS 2005a).

The only known occurrences on national forest lands are on the Cleveland National Forest in the Miller Mountain area. The Cleveland National Forest implements seasonal restrictions on grazing to protect thread-leaved brodiaea (USFWS 2005a). Thread-leaved brodiaea is protected from impacts due to most other ongoing or future activities on Forest Service lands, since most thread-leaved brodiaea at the Miller Mountain area is within the San Mateo Wilderness Area (USFWS 2005a).

Permits for five large-scale habitat conservation plans have been issued in southern California, which included thread-leaved brodiaea as a Covered Species (Table Appendix 2). The Service issued permits to San Diego Gas and Electric in 1995, to the City of San Diego in 1997, for the San Diego County Multiple Species Conservation Plan in 1998 for unincorporated lands in the southeastern portion of the county, for the Multiple Habitat Conservation Plan for northwestern San Diego County in 1998, and for the Western Riverside County MSHCP in 2004. These plans have created large reserve systems that include substantial habitat for thread-leaved brodiaea and requirements for monitoring and management actions beneficial to the long-term conservation of the species (Appendix 2).

Conservation Needs

Thread-leaved brodiaea is associated with the alkaline silty-clay soils and other clay soil associations. The presence of undisturbed or minimally disturbed soils is a significant factor in the long-term persistence of this species. Conservation of remaining high quality habitat is necessary to ensure the long-term survival of the species; therefore, the species requires protection from urbanization, conversion of undisturbed or minimally disturbed areas to farming or grazing, and discing for weed and fire control.

In addition to habitat conservation, thread-leaved brodiaea needs the persistence of hydrologic processes that maintain the successional state of alkali playa, grasslands and vernal pool habitats. Preservation of hydrologic processes in occupied and suitable habitats is essential to the conservation of this species. The species also would benefit from the presence and persistence of native insect pollinators.

Environmental Baseline

Within the action area, thread-leaved brodiaea is associated with purple needlegrass grasslands and grassland/sage scrub ecotone areas. In many instances, the needlegrass grasslands exhibit low densities of native bunch grasses and support non-native English ryegrass and artichoke thistle. In all cases, thread-leaved brodiaea is associated with clay soils.

In total, about 9,540 individuals occur within the action area (Table A). Most of these are in Subarea 1 and proposed RMV lands. A small number occur within Subarea 4. Thread-leaved brodiaea occurs in four areas in Orange County, including on RMV lands. On RMV land, it is found in eight locations: 1) the translocated population at Forster Ranch; 2) Chiquadora Ridge; 3) Trampas Canyon sub-unit; 4) Cristianitos Canyon; 5) lower Cristianitos Canyon/lower Gabino Canyon; 6) middle Gabino Canyon; 7) Talega ridgeline east of Northrop Grumman; and 8) just east of Trabuco Creek in the Arroyo Trabuco Golf Course. The following summarizes the size and distribution of thread-leaved brodiaea within RMV and identifies “major” and “important” populations:

1. Cristianitos sub-basin is an “important” population with 13 locations that contain from 1-120 flowering stalks each. These locations potentially provide connectivity between

offsite locations to the south in San Onofre State Park and MCB Camp Pendleton with locations to the north (*i.e.*, Chiquadora Ridge). They could also link to occurrences in the west including Donna O'Neill Conservancy lands.

2. A "major" population occurs in the southern portion of Cristianitos Canyon on the boundary between the Cristianitos and Gabino and Blind canyon sub-basins and includes about 6,100 individuals.
3. The Talega sub-basin on the mesa east of Northrop Grumman near the boundary with Gabino and Blind canyons sub-basin has about 288 flowering stalks and is considered an "important" population.
4. Five locations occur on Chiquadora Ridge southeast of the treatment plant, including the eastern portion of the Chiquita sub-basin and the western portion of the Gobernadora sub-basin. Four of the five locations are small (73, 2, 3, and 7 individuals), but the easternmost location on the ridge has about 2,000 individuals. These five locations comprise a "major" population.
5. The slope east of Trabuco Creek contains about 80 individuals and is considered an "important" population.
6. The southeastern portion of the Trampas Canyon subunit of the Central San Juan and Trampas Canyon sub-basin is an "important" population with about 250 individuals.
7. The western portion of the middle Gabino subunit of the Gabino and Blind Canyons sub-basin is an "important" population with 183 individuals.

Table A for Thread-leaved Brodiaea: Thread-leaved brodiaea individuals in the action area.

Action Area Components	**Total Thread-leaved Brodiaea Individuals in NCCP Dataset**
Subarea 1	
Proposed RMV	9,312
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	80
Avenida La Pata	0
Prima Deshecha Landfill	3
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park, including Ortega Rock)	0
Supplemental Open Space (Audubon Starr Ranch)	0
Subtotal for Subarea 1	***9,395***
Subarea 2	0
Subarea 3	0
Subarea 4	~145[1]
TOTAL	**9,540[1]**

[1] The estimated total individuals in Subarea 4 is uncertain because of the variable counts in the translocated/restored Forster Ranch population (*e.g.*, 5,000 stalks in 2001, but only a few stalks in 2002, attributed to poor rainfall) and the status of translocated populations associated with the Talega Development. The 9,540 individuals are from the

Draft NCCP/MSAA/HCP baseline based on the information available when the Plan was prepared in winter/spring 2006.

Other locations of thread-leaved brodiaea in the action area include:

1) The translocated/restored Forster Ranch population with about 5,000 individuals in 2001, but none in 2002 due to poor rainfall (not included in the 9,540 total for the action area);
2) One location on the Donna O'Neill Conservancy at RMV;
3) Two locations, with 100 and 150 individuals, respectively, occur within the planned Talega Development (USFWS 2001). These locations will be lost in association with the Talega Development, but corms from these locations will be translocated to offset this loss. Another location of about 300 individuals occurs in Talega Open Space; and
4) Three individuals in the Prima Deschecha Landfill GDP area.

Effects of the Action

Direct Effects

Over the 75-year term of the permits, a total of only 147 individuals (less than 2 percent) of thread-leaved brodiaea in the action area are anticipated to be permanently impacted by Covered Activities, primarily by urban development and associated infrastructure construction (Table B). The impact area includes 147 individuals out of 9,395 individuals in Subarea 1 of the action area. Of the 147 individuals impacted, 144 individuals are on RMV lands and 3 individuals are on the Prima Deschecha Landfill site. Most of the impacts will be to the Chiquadora Ridge "major" population.

In addition to the permanent impacts associated with urban development, the construction and maintenance of bridges, trails, water storage tanks, drainage culverts, and water and sewer lines will result in temporary impacts to about four individuals. All temporary impacts will occur on RMV lands and will be restored to equivalent or better conditions compared to the existing condition at the time of impact (Appendix U of the Plan).

In addition to the impacts due to development projects, grazing is a potential stressor to this species. The general effects of grazing on plants are described in the "General Effects of the Action" section above. General potential effects include the introduction or augmentation of non-native plant competitors and direct consumption of plants prior to setting seed. Cattle are a potential stressor on thread-leaved brodiaea at the Chiquadora Ridge and lower Cristianitos Canyon populations. Grazing at Chiquadora Ridge is focused on the barley fields and outside the blooming and seed-setting period for thread-leaved brodiaea. Grazing at lower Cristianitos Canyon occurs during the thread-leaved brodiaea growing and flowering periods. However, some grazing has the potential to reduce the impacts of invasive species, the species has persisted with grazing, and monitoring and adaptive management will occur as described below to insure the maintenance of thread-leaved brodiaea on Habitat Reserve lands.

Table B: Thread-leaved brodiaea individuals permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed in the action area.

Covered Activities and Conservation Areas	**Thread-leaved Brodiaea Individuals Impacted**	**Thread-leaved Brodiaea Individuals in Habitat Reserve (acres)**	**Thread-leaved Brodiaea Individuals in SOS (acres)**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	144	9,168	
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		80	
Subtotal of impacts and conservation by RMV and SMWD		**9,248**	
Prima Deshecha Landfill	3		0
Avenida La Pata	0		
Subtotal of impacts and conservation by the County of Orange	**3**		**0**
Subtotal of impacts and assured conservation with adaptive management	**147**	**9,248**	**0**
[1]Subarea 3 Coto de Caza Parcels 1-17			
[2]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		0	
TOTAL	**147**	**9,248**	**0**

[1] For the purpose of this analysis, the maximum impact area is assumed for Subarea 3 under the "Opt in" program.
[2] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, fire, and grazing, the following conservation measures specific to and/or of particular importance to thread-leaved brodiaea will be implemented.

Conservation and Restoration. The Habitat Reserve lands will include 9,248 thread-leaved brodiaea individuals or 97 percent of the individuals within the action area and 98 percent of the individuals on RMV lands. The Habitat Reserve would include all 6,105 individuals in the Cristianitos Canyon/Lower Gabino Canyon "major" population, 341 individuals (85 percent) in the Cristianitos Canyon "important" population, 288 individuals in the East Talega "important" population, 80 individuals in the Lower Arroyo Trabuco "important" population, 183 individuals in the Middle Gabino "important" population, and 250 individuals in the Trampas Canyon "important" population. In addition, the Chiquadora Ridge "major" population will maintain approximately 2,000 individuals. Of the 9,248 individuals conserved in the Habitat Reserve,

9,168 individuals are located in proposed RMV lands and 80 individuals are located in previously dedicated Ladera Open Space (prior RMV lands).

These lands will be maintained and managed in perpetuity for the benefit of Covered Species including thread-leaved brodiaea. Management actions for thread-leaved brodiaea within the Habitat Reserve would include the control of invasive species. Artichoke thistle control occurs on RMV lands and is expected to continue into the future. Other control methods may also be implemented including prescribed burning, mowing, manual removal, and herbicide treatment.

In addition to the management of thread-leaved brodiaea populations in the Habitat Reserve, translocation and propagation of thread-leaved brodiaea would be conducted to the extent feasible and appropriate. Potential restoration areas would focus in areas targeted for coastal sage scrub and coastal sage scrub/valley needlegrass grassland restoration, including Chiquita Ridge and Chiquadora Ridge. The Translocation, Propagation and Management Plan for Special-Status Plants (Appendix I of the Plan) describes the various methods for restoration of thread-leaved brodiaea, including seed collection, receptor site selection and preparation, greenhouse propagation, translocation, introduction, direct seeding, and long-term maintenance. Appendix I of the Plan also provides success criteria to evaluate the effectiveness of the restoration of thread-leaved brodiaea in areas of temporary impacts.

In addition, thread-leaved brodiaea potentially affected by land fill operations on Prima Deshecha will be transplanted to one or more sites in accordance with a mitigation plan approved by the Service. Recipient sites can accommodate up to 300 plants. Impacts in excess of 300 plants can be approved through an amendment to the NCCP/MSAA/HCP or under the provisions of Section 7 or 10 of the ESA.

In addition to conservation and management of Habitat Reserve areas for thread-leaved brodiaea and restoration of temporarily impacted areas, the permittee will implement minimization measures described in Appendix U of the Plan. For each construction project, the applicant will develop and implement a BRCP which provides for resource protection and establishes monitoring requirements. The BRCP will contain specific measures for the protection of thread-leaved brodiaea during construction including erosion and siltation control measures, dust control measures, grading techniques, construction area limits, identification and quantification of habitats to be removed, and protective fencing around conserved and construction staging areas.

Monitoring

Monitoring of thread-leaved brodiaea would be focused on the Chiquadora Ridge and Cristianitos Canyon populations. This would account for about 88 percent of the counted individuals in the Habitat Reserve. Monitoring would use direct counts or estimates of flower stalks as the index of population size. Because there are more corms than flowering stalks, these counts are likely to underestimate population size. Complete counts or estimates to the nearest 100 would occur for each area. Smaller populations would be counted to the nearest 10 stalks. In addition, information would be gathered regarding non-native species, observations of

pollinators, and signs of disturbance. Annual monitoring would occur every year for the first five years and thereafter in intervals as determined by the Reserve Manager and Science Panel.

Analysis of Impacts and Conservation by Planning Area

A summary of thread-leaved brodiaea individuals that will be impacted and conserved is presented in Table C below. In addition to the conservation identified by Planning Area, there will be conservation and management of the Covered Species including 80 individuals of thread-leaved brodiaea on prior RMV lands from the date of permit issuance.

Build-out of PA6 and PA7 can occur at any time during the 75-year timeframe of Plan implementation. Since the build-out of PA6 and PA7 involve impacts to thread-leaved brodiaea and no conservation, we assume for the purposes of this analysis that these impacts could happen prior to PA1 as a worst-case scenario. Build-out of PA6 and PA7 would impact 59 individuals of thread-leaved brodiaea. The loss of 59 individuals upon build-out of PA6 and PA7 would leave about 9,481 individuals in the action area, although not in the Habitat Reserve. The loss of the 59 individuals associated with PA6 and PA7 will be offset by the monitoring and management of the 80 individuals associated with Prior RMV lands upon permit issuance.

Table C for Thread-leaved Brodiaea: Thread-leaved brodiaea individuals permanently impacted and conserved/managed as a result of Covered Activities by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Thread-leaved Brodiaea Individuals Impacted (Cumulative Impacts)**	**Thread-leaved Brodiaea Individuals Conserved and Managed (Cumulative Conservation)**
PA1	0 (0)	0 (0)
PA2	85 (85)	2,000[1] (2,000)
PA3	0 (85)	250 (2,250)
PA4	0 (85)	0 (2,250)
PA5	0 (85)	0 (2,250)
PA6 & PA7	59 (144)	0[1] (2,250)
PA8	0 (144)	6,918[1] (9,168)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	0 (144)	
Santa Margarita Water District Impacts in Gobernadora Multipurpose Basin	0 (144)	
Subtotal for Proposed RMV and Associated Projects	144	9,168
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		80 (9,248)
TOTAL	**144**	**9,248**

[1] Assumes 100% avoidance of major populations/key locations on Chiquadora Ridge and Crisitiantios/Lower Gabino Canyon

[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA1 will not impact thread-leaved brodiaea. Build-out of PA2 will impact 85 individuals and result in the conservation and management of 2,000 individuals. Both impacts and associated conservation for PA2 will be at Chiquadora Ridge. Build-out of PA3 will not impact thread-leaved brodiaea and result in the conservation and management of 250 individuals. Build-out of PA4 and PA5 will not impact thread-leaved brodiaea. Build-out of PA8 will not impact thread-leaved brodiaea, but result in the conservation and management of 6,918 individuals. Conservation associated with PA8 will include the Cristianitos Canyon, Lower Gabino Canyon, East Talega and Middle Gabino populations.

Build-out of PA2 includes the conservation of a large number of thread-leaved brodiaea individuals, with a relatively small number destroyed. Upon build-out of PA2, 2,000 individuals will be conserved, with 85 individuals impacted. Thus, if RMV voluntarily terminates their permit following the grading of PA2 or subsequent Planning Areas, a large number of individuals will already be permanently conserved with a relatively low level of impact.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8, thread-leaved brodiaea will be conserved without associated impacts in PA3 prior to the impacts in PA2. Thus, this order could only be an improvement from the order analyzed above. Likewise, if RMV chooses to phase development by Alternative Order 1, 4, 3, 2, 5, and 8, this order also could only be an improvement since conservation would occur in PA3 without the associated impacts before the impacts in PA2.

Conclusion

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of thread-leaved brodiaea. We base this conclusion on the following:

1. In total, 9,247 individuals or about 97 percent of thread-leaved brodiaea individuals in the action area will be permanently conserved within the Habitat Reserve. These locations will be monitored and actively managed for the benefit of thread-leaved brodiaea.

2. One-hundred forty-seven individuals of thread-leaved brodiaea will be destroyed, which represents less than 2 percent of thread-leaved brodiaea individuals in the action area. Eighty-five individuals will be destroyed in the Chiquadora Ridge "major" population. This population should be able to sustain the loss of the anticipated 85 individuals without being compromised since the population would retain about 2,000 individuals. Also, the impacts to the 59 individuals in the Cristianitos Canyon "important" population would leave most of the individuals in this population as conserved. Three-hundred forty-one individuals (85 percent) would be retained in the Habitat Reserve from this population.

3. All 6,105 individuals in the Cristianitos Canyon/Lower Gabino Canyon "major" population, 288 individuals in the East Talega "important" population, 80 individuals in the Lower Arroyo Trabuco "important" population, 183 individuals in the Middle Gabino "important" population, and 250 individuals in the Trampas Canyon "important" population will be in the Habitat Reserve.

4. Monitoring and management associated with the Plan should help address the threat of competition with non-native species.

5. This species ranges from the foothills of the San Gabriel Mountains at Glendora (Los Angeles County), east to the western foothills of the San Bernardino Mountains (San Bernardino County), and south through eastern Orange and western Riverside counties to Carlsbad and just south of Lake Hodges in northwest San Diego County, California; thus, the impacts associated with Plan implementation will occur over a small portion of this species' range.

6. We anticipate that permanent protection of thread-leaved brodiaea locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain thread-leaved brodiaea in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid because County lands only support three individuals out of approximately 9,500 in the action area. The County lands represent a very small portion of thread-leaved brodiaea in the action area and range-wide.

Likewise, should RMV and SMWD determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid because the anticipated impacts will be reduced to the loss of only 3 individual thread-leaved brodiaea plants, which represents 0.03 percent of the individuals in the action area and an insignificant loss of individuals across this species range. More importantly, the reduced project will not impact any "major" or "important" populations identified in the action area or across this species range, and any thread-leaved brodiaea potentially affected by land fill operations on Prima Deshecha will be transplanted in accordance with a mitigation plan approved by the Service.

Unlisted Amphibians

Western Spadefoot Toad

Status of the Species

Listing Status

The western spadefoot toad (*Spea hammondii*) is designated as a Species of Special Concern by the California Department of Fish and Game, with a CNDDB rank of G3S3 (restricted/rare throughout its range and in California). This species is not federally listed. *Spea hammondii* was previously in the genus *Scaphiopus,* but it is currently recognized as a species of the genus *Spea*.

Species Description

This species is 1.5 – 2.5 in (4 to 6.5 cm) long, dusky-green or gray on its dorsal side, whitish on its ventral side and has pale gold eyes with vertical pupils. The hind feet each have a wedge-shaped glossy black spade used for burrowing (Stebbins 2003). Eggs are laid in irregular clusters with 10 to 42 eggs attached to vegetation or other objects in temporary or permanent water that is still or slow-moving. Tadpoles are generally medium-gray to brown, with eyes that are close together on top of their head and a body that is widest just behind the eyes. Some tadpoles develop into predaceous/cannibalistic individuals that have a small beak on their upper mandible (Stebbins 2003).

Habitat Associations

Adult western spadefoot toads use uplands for foraging, burrowing, and aestivating. Upland habitat types include coastal sage scrub, chaparral, alluvial fans, washes, floodplains, and grasslands (Holland and Goodman 1998, Stebbins 2003). Ephemeral/intermittent pools found within or adjacent to suitable upland habitat are used for breeding. A variety of ephemeral/intermittent pools can be used for breeding including vernal pools, road ruts, man-made ponds, or quiet water in washes or riparian habitats (Holland and Goodman 1998). The required water temperature for reproduction is between 48 to 86 degrees Fahrenheit. Pools must persist for more than 35 days (*i.e.*, 4 to 5 days for eggs to hatch and at least 30 days for larval development) for successful metamorphosis (Morey 1998).

Observations of this species and the closely related southern spadefoot toad (*Spea multiplicatus*) have shown that spadefoot toads generally burrow and aestivate in soils that are sandy or gravelly, and they sometimes use small mammal burrows as well (Jennings and Hayes 1994, Ruibal *et al*. 1969; Stebbins 2003). Spadefoot toads have also been observed buried in soil that has dried and hardened but must have been soft and muddy when the toad created the burrow (Ruibal *et al.* 1969). Recent metamorphs will seek shelter in cracks in the mud and under rocks and wood near the breeding pond before moving to a suitable aestivation site.

Life History

Western spadefoot toads spend 8 to 10 months of the year aestivating in underground burrows (Dimmitt and Ruibal 1980; Jennings and Hayes 1994; Holland and Goodman 1998), emerging from their burrows and becoming active on the surface following relatively warm rains in late winter to spring and fall (Jennings and Hayes 1994). Typically they emerge from January through March, but they may emerge in any month between October and April if rain thresholds are met (Morey and Guinn 1992; Jennings and Hayes 1994; Holland and Goodman 1998). While on the surface, this species is primarily nocturnal (Holland and Goodman 1998).

Western spadefoot toads generally breed during rainy nights in late winter or spring, within quiet streams or temporary pools (Zeiner *et al*. 1988; Stebbins 2003). They select temporary pools or quiet water in riparian areas, and the males vocalize to attract mates. Breeding sites will often contain large numbers of calling males. Breeding females deposit eggs in irregular small clusters attached to vegetation or pieces of detritus in the water (Jennings and Hayes 1994; Stebbins 2003). Western spadefoot toad eggs generally hatch in 4 to 5 days, and larvae generally need at least 30 days to complete metamorphosis (Morey 1998). Larvae can accelerate metamorphosis in response to the reduction of water volume (Denver *et al*. 1998), but toads that spend more time developing emerge larger and are believed to have higher survivorship (Morey 1998).

Once western spadefoot toads emerge from the pool they move into adjacent uplands for foraging and aestivation. Recently metamorphosed spadefoot toads will initially shelter under rocks and wood or in cracks in the soil immediately surrounding the breeding pond (Weintraub 1980), and aestivation sites for adults and larger metamorphs are located in suitable soils in the vicinity of the breeding site. The western spadefoot toad is able to survive the long duration of time in underground burrows by absorbing water through its skin from the soil and maintaining an osmotic concentration equal to the soil moisture tension (Ruibal *et al*. 1969).

In general, western spadefoot tadpoles are algae and detritus feeders, but they will occasionally eat fairy shrimp, mosquitoes, and smaller tadpoles. Tadpoles that become predator and/or cannibalistic tend to develop a small beak on their upper mandible, which presumably aids in predation (Pfennig 1990). Adult spadefoot toads generally eat insects, worms, and other invertebrates (Jennings and Hayes 1994). As with other amphibian species, tadpoles are vulnerable to most aquatic predators, such as insect larvae and non-native predators such as fish, bullfrogs, and crayfish. When not aestivating, adults are also vulnerable to these non-native aquatic predators and to a wide variety of terrestrial predators.

Status and Distribution

The range of the western spadefoot toad includes the central valley of California and surrounding foothills and the Coast Range south of San Francisco Bay down into northwestern Baja California (Stebbins 2003). Its known elevation range extends from near sea level to 4,470 ft (1,362 m) (Zeiner *et al.* 1988). Although it is still present throughout most of its range, approximately 80 percent of the western spadefoot toad's habitat in southern California and approximately 30 percent of its habitat in northern California has been developed or converted to uses incompatible with its survival (Jennings and Hayes 1994).

Rangewide Trends and Current Threats

The western spadefoot toad is susceptible to a wide variety of threats due to its wide ranging status in California and reliance on both seasonal pools and terrestrial habitat to complete its life cycle. Loss of breeding pools and surrounding upland habitat as a result of development and agriculture is the primary threat to this species.

Urban and suburban developments contribute to habitat fragmentation and create barriers to western spadefoot toad dispersal. Roads, in particular, fragment habitat, and the western spadefoot toad is highly susceptible to road mortality. Holland and Goodman (1998) reported that during normal overland movements, this species crosses and even aggregates on roads at night after rain events. In addition, they found that mortality on a single mile of road may exceed 10 to 20 animals per night.

Development within the watershed can also affect water and habitat quality. As watersheds are developed, runoff from developed areas often contains increased organic matter, pesticides, fertilizers, heavy metals and other debris, which flows into streams and wetlands (U. S. Environmental Protection Agency 1993). The decrease in water quality can have profound negative impacts on native amphibians and other wetland vertebrates.

Non-native predators, such as fish, bullfrogs, crayfish, and African clawed frogs, are another substantial threat to spadefoot toads. These predators are generally found in pools that persist throughout most of the year, but many of the pools remaining in undeveloped open space have been bermed or excavated so that they hold water year-round. In the absence of non-native predators, western spadefoot toads have been observed breeding in these modified habitats, but they are often absent in pools that have been invaded by exotic fish and bullfrogs (Morey 1998).

Cattle and sheep grazing is another potential threat, as livestock can trample eggs and larvae in breeding pools and reduce water quality (Holland and Goodman 1998). However, recent study of Central California vernal pools suggests a complex relationship between vernal pool hydrology, wherein some cases cattle grazing may enhance pool duration and the likelihood of vernal pool species completing their reproductive cycle (Pyke and Marty 2005; Marty 2005).

Several large-scale habitat conservation plans have been implemented in southern California in recent years. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 1998, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. In 2004, the Service issued a permit for the Western Riverside County MSHCP.

The western spadefoot toad is a Covered Species in the Central/Coastal Orange County NCCP/HCP and the Western Riverside County MSHCP, but not in the two plans in San Diego County. After implementation of the Western Riverside County MSHCP and the Central/Coastal Orange County NCCP/HCP, 23 of 31 occurrences (74 percent) within the Western Riverside Plan Area and 10 of 12 occurrences (83 percent) within the Central/Coastal

Orange County Plan Area will be conserved. The occurrences outside the conservation area are anticipated to be impacted. In addition to the habitat conserved in association with the Central/Coastal Orange County NCCP/HCP, The Irvine Company has voluntarily conserved an estimated 11,596 ac (4,696 ha) within the subarea, including an unknown number of western spadefoot toad occurrences.

It is anticipated that western spadefoot toads in southern California will benefit from the conservation and habitat management practices, such as control of invasive plant species and non-native predators, in reserve lands associated with the four large-scale habitat conservation plans mentioned above.

Conservation Needs

The conservation needs for this species include conserving large blocks of suitable aquatic and upland habitat and conserving connections between the conservation areas. In addition, suitable habitat needs to be maintained and restored. Based on the available information, management activities should address the threats described above, including maintaining connectivity by providing suitable habitat linkages for dispersal and controlling non-native aquatic predators such as fish, bullfrogs, crayfish, and African clawed frogs and public access control and education to reduce harassment and collection of specimens. Because of the potential threat posed by road mortality, measures such as the installation of low-lying fine-mesh fence or barrier fencing in areas likely to be used by spadefoot toads may be help minimize this source of mortality.

Environmental Baseline

Distribution in the Plan Area

Western spadefoot toads have been observed scattered throughout much of the action area. The NCCP database contains a total of 24 western spadefoot toad locations in the action area (Table A), including the following "important" populations: Chiquita Ridge, Radio Tower Road, San Juan Creek, Upper Cristianitos, and Lower Gabino Creek. An additional population is located on the Prima Deshecha Landfill property.

The CNDDB (2006) contains four occurrences of western spadefoot toad in the action area, including observations near San Juan Creek, Talega Canyon, Canada Gobernadora, and an area east of Trabuco Creek that has since been developed as the Ladera Ranch development. The observations in the CNDDB appear to be in proximity to the observations in the NCCP database and do not add substantial additional information regarding the distribution of the species in the action area. Therefore, only the occurrences in the NCCP database are used in our analysis to determine which locations will be impacted and conserved under the Plan.

Because western spadefoot toads spend so much time aestivating underground and appear only sporadically for above-ground breeding and foraging activities, some of the smaller breeding pools in the Plan Area (both inside and outside of the Habitat Reserve) were probably missed during surveys. However, based on the number of surveys conducted, and the fact that they were

focused in those areas most likely to support larger spadefoot toad populations, all of the major breeding sites/populations have likely been documented.

Table A for Western Spadefoot Toad: Western spadefoot toad locations in the action area

Action Area Components	**Western Spadefoot Toad Locations**[1]
Subarea 1	
Proposed RMV	15
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	5
Avenida La Pata	0
Prima Deshecha Landfill	2
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park, including Ortega Rock)[1]	1
Supplemental Open Space (Audubon Starr Ranch)	1
Subtotal for Subarea 1	***24***
Subarea 2	0
Subarea 3	0
Subarea 4	0
TOTAL	**24**

[1] The conservation analysis for the western spadefoot toad reported in these tables focuses on documented breeding sites.

Spadefoot toads are generally found in upland habitat in proximity to their breeding pools, but the capability of western spadefoot toads for longer distance dispersal has not been well-studied. Nevertheless, it can reasonably be assumed that under suitable conditions western spadefoot toads are capable of dispersing through upland habitat and drainages, and since all of the spadefoot toad observations in the action area are currently connected by undeveloped open space there is likely a high degree of connectivity between the observed populations.

Effects of the Action

Direct Effects

The impact area includes four of the western spadefoot toad locations in the action area (Table B). Two locations will be impacted by the development of the RMV PAs, and two will be impacted by the expansion of Prima Deshecha Landfill. One location anticipated to be impacted by Prima Deshecha Landfill is outside the landfill footprint, but only 150 ft (46 m) from the edge of the impact area, likely resulting in inadequate protection of surrounding upland habitat to support toads at this location.

The RMV PAs will impact two of the five western spadefoot toad locations in the San Juan Creek "important" population. The locations that will be impacted are in upland habitat on the western end of RMV. A substantial amount of upland habitat for western spadefoot toad along San Juan Creek will be impacted, but most of the upland habitat and almost all of the wide, sandy channel and will remain. Thus, temporary breeding pools should continue to form along

most of the creek, and sufficient upland habitat should remain for foraging and aestivating. The Chiquita Ridge, Radio Tower Road, Upper Cristianitos, and lower Gabino Creek "important" populations will not be impacted. Both locations in the Prima Deshecha Landfill population will be impacted, so this population will likely be eliminated.

Several Covered Activities will not impact any known western spadefoot toad locations but will permanently impact potential upland habitat. These projects include RMV infrastructure, Ortega Rock Quarry, Avenida La Pata extension, Coto de Caza Parcels 1-17, and Santa Margarita Water District projects (Table B).

Table B for Western Spadefoot Toad: Western spadefoot toad locations permanently impacted by Covered Activities and the corresponding sites that will be conserved and adaptively managed.

Covered Activities and Conservation Areas	**Western Spadefoot Toad Location Impacts**	**Western Spadefoot Toad Locations in Habitat Reserve**	**Western Spadefoot Toad Locations in SOS**
Proposed RMV (Planning Areas and infrastructure)	2	13[2]	
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		5	
Subtotal of impacts and conservation by RMV and SMWD	**2**	**18**	
Prima Deshecha Landfill	2		0
Avenida La Pata	0		
Subtotal of impacts and conservation by the County of Orange	**2**		
Subtotal of impacts and assured conservation with adaptive management	**4**	**18**	
Subarea 3 Coto de Caza Parcels 1-17	0		
[2]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	0	1	
TOTAL	**4**	**19**	**0**

[1] Three locations in vernal pools within the PA 5 development area on Radio Tower Road Mesa will be conserved and managed.
[2] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.

We anticipate that all of the breeding pools and foraging and aestivating habitat in the areas impacted by Covered Activities will be destroyed. In addition, any toads that are foraging or aestivating within the impact area will likely be crushed or buried by construction equipment and ground disturbing activities.

Other Covered Activities that may impact western spadefoot toads but will not result in a permanent or quantifiable loss of potential habitat include cattle grazing, prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities such as pitfall trapping and removal of invasive species.

Cattle grazing may result in disturbance of breeding pools and occasional trampling of western spadefoot toads, eggs, and larvae. Prescribed burns could result in the death of western spadefoot toads in the burn area and the temporary degradation of breeding pools due to runoff of ash and sediment into the pools following the burn. Maintenance of infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may occasionally kill or injure western spadefoot toads in the project area. Habitat management and species' monitoring activities may occasionally kill or injure western spadefoot toads that are within active restoration areas or that are trapped and handled during monitoring efforts.

Indirect Effects

The western spadefoot toad will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion. Of particular note is the western spadefoot toad's susceptibility to changes in hydrology such as surface flow, erosion, and groundwater levels in areas surrounding western spadefoot toad breeding pools. These factors can affect the tendency of water to form breeding pools that persist long enough for toads to complete their life cycle. Other potentially important indirect effects include the possibility that increased recreational use of the Habitat Reserve along San Juan Creek will facilitate the spread of non-native predators such as bullfrogs, fish, and crayfish, which people can transport and introduce to new locations. Increased access along San Juan Creek may increase the potential for collection. Also, because of their susceptibility to mortality and fragmentation due to roads, the western spadefoot toad is likely to be vulnerable to indirect effects (*e.g.*, increased vehicle strikes) associated with roads.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access and non-native species and to minimize the effects of construction activities, the following conservation measures specific to and/or of particular importance for western spadefoot toads will be implemented.

<u>Conservation and Restoration:</u> The Habitat Reserve contains 19 western spadefoot toad locations, including 6 locations in existing conserved lands that will be managed for Covered Species and 13 locations on RMV lands that are not currently conserved.

<u>Reserve Design:</u> The Habitat Reserve will conserve 19 of the 24 western spadefoot toad locations in the action area and all five of the "important" populations (Chiquita Ridge, San Juan Creek, Radio Tower Road, upper Cristianitos Canyon, and lower Gabino Creek). The San Juan Creek population is considered conserved because three of five western spadefoot toad locations, most of the potential upland habitat, and almost all potential breeding habitat will be conserved, so we anticipate that the population will persist.

The Chiquita Ridge, San Juan Creek, and Radio Tower Road populations are within the San Juan Creek watershed, and the upper Cristianitos Canyon and lower Gabino Canyon populations are

in the San Mateo Creek watershed. The Habitat Reserve maintains connectivity between the conserved populations, as described below.

The population on Chiquita Ridge will be connected to the occurrences on the downstream stretch of San Juan Creek by a wide swath of conserved habitat between PA2 and Ladera Ranch, identified as Linkage C in the Plan. The distance between the vernal pools on Chiquita Ridge and the nearest occurrence associated with San Juan Creek is about 1.3 mi (2 km), and Linkage C is about 0.7 mi (1 km) wide at its narrowest point. The habitat in Linkage C consists of grassland, coastal sage scrub, barley fields, and riparian vegetation along Chiquita Creek.

Western spadefoot toads have been observed in or adjacent to San Juan Creek near the western boundary of RMV and near the northeastern boundary of RMV, separated by a distance of about 4 mi (6 km). The occurrences associated with the San Juan Creek will be connected by the creek and surrounding upland habitat, identified as Linkage J in the Plan. The development of PA2, PA3, and PA5 will eliminate much of the upland habitat surrounding the creek, but a corridor at least 1,310 ft wide (about 0.25 miles) (400 m or 0.4 km) will be maintained along the length of the creek. Covered Activities include recreation trails and utilities on the banks of San Juan Creek within the corridor and the construction of two new bridges over San Juan Creek and improvement of an existing bridge, but the bridges will span most of the creek, and direct impacts will be primarily from the support columns and shading effects. Therefore, western spadefoot toads should be able to disperse along the wide, sandy stream channel bottom and maintain connectivity between occurrences along the creek.

Spadefoot toad occurrences in San Juan Creek near the western edge of RMV are separated from the Radio Tower Road population by about a mile. Following implementation of the Plan, the two populations will be connected by Habitat Reserve consisting primarily of grassland. The existing State Route 74 (SR74) is a barrier to dispersal between these two locations. There are drainage culverts under SR74 that could be used by dispersing toads, including a large corrugated steel pipe measuring 13 ft by 54 ft (4 m by 16 m) that crosses under SR74 at Radio Tower Road. Other than Ortega Highway, there will be no intervening barriers or constrictions between these two locations.

The population in upper Cristianitos Canyon and lower Gabino Canyon (the two populations identified in the San Mateo Creek watershed) will be separated by about 1.7 miles (2.7 km) of Habitat Reserve consisting of grassland, riparian habitat, chaparral, and coastal sage scrub. Cristianitos Road runs along Cristianitos Canyon following roughly the “path of least resistance” between the two western spadefoot toad populations. However, this existing two lane ranch access road is not proposed for an increase in traffic volume except as an emergency evacuation route for PA8 and thus is not expected to contribute to additional mortality.

The potential linkages between the San Juan Creek population and Radio Tower Road population (in the San Juan Creek watershed) and the upper Cristianitos Canyon population (in the San Mateo Creek watershed) are more circuitous. Toads dispersing from the upper Cristianitos Canyon population could move northwest through conserved habitat to San Juan Creek, a minimum distance of about 1.2 mi (2 km) but roughly 1.6 to 1.7 mi (2.6 to 2.7 km) following a path of least resistance. Cristianitos Road follows a potential dispersal route

between the two watersheds, and dispersing toads would have to cross SR74 to enter San Juan Creek, so both of these roads could be a source of mortality for dispersing toads. There are no known western spadefoot toad occurrences in the stretch of San Juan Creek closest to the upper Cristianitos Canyon population, but once in the creek, toads could disperse upstream to the occurrences near the northeastern boundary of RMV (about 1.4 additional mi (2.2 km)), downstream to the occurrences near the western boundary of RMV (about 2.5 additional mi (4 km)), or around PA 5 and up to the Radio Tower Road population (about 1.7 additional mi (3 km)).

Grazing Management Plan. The Grazing Management Plan (see Appendix G of the Plan and Project Description in this document) includes the management of grazing activities and restoration of upland habitat with native grasses and coastal sage scrub to help ensure that the habitat remains suitable for a wide variety of species, including the western spadefoot toad.

In addition, the Grazing Management Plan requires exclusion of cattle from active arroyo toad breeding pools and adjacent sand bars and benches in San Juan Creek. Although western spadefoot toads are not specifically targeted by this measure, it could prevent disturbance of spadefoot toad breeding pools in or adjacent to the creek. If recommended by the Science Panel, cattle will be seasonally excluded from the Radio Tower Road vernal pools. Cattle are already excluded from Ladera Open Space, which contains vernal pools and western spadefoot toads, and grazing will only be allowed here if this activity is authorized by a minor amendment (RMV draft permit condition #14). Thus, the Grazing Management Plan may help reduce the trampling of eggs and larvae and temporary degradation of breeding pools by cattle at certain locations.

Management of Non-Native Aquatic Predators. The Invasive Species Control Plan (see Project Description) will result in removal of non-native plant species that degrade aquatic habitats and should increase the quality and possibly the number of pools that are used for breeding by western spadefoot toads, particularly in pools along San Juan Creek. The Invasive Species Control Plan also includes a bullfrog and crayfish control program within permanent and semi-permanent water bodies in San Juan Creek, identification of other bullfrog and crayfish breeding areas that may pose a risk to the spadefoot, and implementation of additional control programs where necessary. The removal of non-native aquatic predators will benefit the western spadefoot toad by reducing predation pressure on all life history stages, particularly the vulnerable eggs and larvae. The Invasive Species Control Plan is anticipated to offset the possible spread of non-native species within the Habitat Reserve by new residents.

Hydrology. Through the Water Quality Management Plans summarized in the project description, flow duration (which influences channel morphology) and water quality will be maintained such that hydrologic conditions of concern such as erosion or sedimentation or pollutants of concern will be addressed. This measure should help maintain the existing breeding pools essential for the persistence of western spadefoot toads in the action area.

Public Access Control and Education. General public access to the habitat reserve will largely be prohibited, except for special events, docent led tours and limited trails/bikeways. Public education of the future Ranch Plan residents about the sensitive habitats and species will also

occur. It is anticipated that the combination of public education and public access control of public access will minimize the potential for the unregulated collection of specimens.

Monitoring. Monitoring will be conducted at a species-specific level and also at a habitat landscape level. The detailed monitoring program for western spadefoot toad will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. HCP, Chapter 7, Table 7-17 provides a conceptual monitoring schedule for western spadefoot toad that proposes periodic monitoring of spadefoot toads on average every three years through year 2025. The implemented monitoring schedule will be subject to adjustment by the Reserve Manager, with assistance by the Science Panel, as noted above. The monitoring is anticipated to identify potential threats and opportunities to enhance western spadefoot toad populations and habitat and to guide management activities accordingly.

Analysis of Impacts and Conservation by Planning Area

A summary of western spadefoot toad occurrences that will be impacted and conserved is presented in Table C below.

Build-out of PA1 will impact two locations of western spadefoot toad and will conserve a substantial amount of potential upland habitat but no known western spadefoot toad locations. Nevertheless, the PA1 conservation area contains habitat in proximity to breeding pools in both San Juan Creek and the Radio Tower Road vernal pools and provides important connectivity between these two populations. The PA1 conservation area in combination with the additional management provided for the six western spadefoot toad locations on existing conserved lands is anticipated to offset the impacts to two locations associated with the PA1 development.

Build-out of PA2 will impact no known locations and will conserve two locations of western spadefoot toad. The PA2 conservation area includes potential breeding habitat along a short stretch San Juan Creek and by conserving Chiquita Canyon and the surrounding uplands, it will enhance connectivity between breeding sites along San Juan Creek and those along Chiquita Ridge in the Ladera Open Space along the eastern edge of PA2. Combined, build-out of PA 1 and 2 will result in conservation of two of the four western spadefoot toad locations in these Planning Areas.

Build-out of PA3 will impact no known locations and will conserve one location of western spadefoot toad. The PA3 conservation area includes potential breeding and dispersal habitat along most of San Juan Creek (the portion not conserved in association with PA2). Although PA3 will result in substantial impacts to potential upland habitat, there are no known locations within the proposed impact area, and the conservation of San Juan Creek and nearby upland habitat will maintain a potential dispersal corridor for toad populations observed along the creek in RMV and in Caspers Wilderness Park to the northeast. Combined, build-out of PA 1, 2, and 3 will result in conservation of three of the five western spadefoot toad locations in these Planning Areas.

Table C for Western Spadefoot Toad: Western Spadefoot Toad Permanently Impacted and Conserved/Managed as a Result of Covered Activities by Planning Area

Proposed RMV (Phased Dedication) and Associated Projects	**Western Spadefoot Toad Locations Impacted (Cumulative Impacts)**	**Western Spadefoot Toad Locations Conserved and Managed (Cumulative Conservation)**
PA1	2 (2)	0 (0)
PA2	0 (2)	2 (2)
PA3	0 (2)	1 (3)
PA4	0 (2)	3 (0)
PA5	0 (2)	5 (8)[1]
PA6 & PA7	0 (2)	0 (8)
PA8	0 (2)	5 (13)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	0 (2)	
Ortega Rock	0 (2)	
Santa Margarita Water District Impacts	0 (2)	
Subtotal for Proposed RMV and Associated Projects	2	13
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		5 (18)
TOTAL	**2**	**18**

[1] Assumes conservation and management of three vernal pools in PA 5 on Radio Tower Road mesa.
[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA4 will impact and conserve no known locations of western spadefoot toad. Most of PA4 (both the impact area and the conservation area) is topographically diverse as opposed to the flat areas that tend to support ponds and spadefoot toad populations. Combined, build-out of PA1 through PA4 will result in the conservation of three of the five western spadefoot toad locations in these Planning Areas.

Build-out of PA5 will impact no known locations and will conserve five locations of western spadefoot toad. The western spadefoot toad locations in PA 5 are associated with vernal pools near Radio Tower Road and are clustered near the northwest edge of the mapped development footprint. Three of these locations are within the mapped development footprint for PA5 and two are just outside the development footprint, but all five locations, including the breeding pools and their associated watershed, will be avoided and conserved. The conserved breeding pools and their watershed will be contiguous with the surrounding conservation area. Build-out of PA5 will create a barrier between the western spadefoot toad locations near Radio Tower Road and those in the San Mateo Creek watershed, but there will still be the potential for dispersal along San Juan Creek and through the conservation area associated with PA3. Combined, build-out of PA 1 through PA5 will result in the conservation of eight of the ten western spadefoot toad locations in these Planning Areas. If RMV voluntarily terminates their permit following the commencement of grading PA5, the large conservation area associated with PA8 (see below) will be conserved, which will further offset project-associated impacts.

The expansion of agricultural activities in PA6 and 7 will not impact or conserve any western spadefoot toad locations. PA6 contains a stock pond that serves as a breeding pool for western

spadefoot toads, but the pond will be avoided by future agricultural activities. The expansion of agricultural activities by 50 acres in PA6 and 7 is not anticipated to interfere with the dispersal of western spadefoot toads within the San Mateo Creek watershed.

Build-out of PA8 will impact no known locations and will conserve five western spadefoot toad locations. In addition, the PA8 conservation area includes a large portion of the San Mateo Creek watershed on RMV property, which will provide connectivity between western spadefoot toad locations in the San Mateo Creek and San Juan Creek watersheds. Combined, build-out of PA1 through PA8 will result in the conservation of 13 of the 15 western spadefoot toad locations in RMV.

In addition to the conservation identified by Planning Area, there will be conservation and management of the Covered Species including five locations of spadefoot toad on the Prior RMV lands from the date of permit issuance. There are no known locations of western spadefoot toad within the areas anticipated to be impacted by RMV's infrastructure in the Habitat Reserve. Any unanticipated impacts associated with such infrastructure will likely be insignificant because of the small amount of habitat impacted and because these impacts will be spread throughout the life of the project. Lastly, the western spadefoot toad location within the action area at Starr Ranch will remain within these existing conserved SOS lands.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 or Alternative Order 1, 4, 3, 2, 5, and 8, (*i.e.*, implement PA3 before PA2 or implement PA4 and PA3 before PA2), the conservation will still offset the impacts at each phase in the development because PA3 and PA4 are both anticipated to provide a net benefit for western spadefoot toad.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the western spadefoot toad. We base this conclusion on the following:

1. Western spadefoot toads are distributed from the central valley of California and surrounding foothills and the Coast Range south of San Francisco Bay down into northwestern Baja California, so the action area for this Plan represents a small portion of the species' entire distribution.

2. Four of the 24 known western spadefoot toad locations (including associated breeding and upland foraging and aestivating habitat) in the action area will be impacted, which represents about 17 percent of the locations in the action area and a small portion of the population and habitat range-wide.

3. A total of 19 western spadefoot toads locations (including associated breeding and upland foraging and aestivating habitat) will be permanently conserved and managed within the Habitat Reserve, and an additional location will remain within existing conserved SOS

lands at NAS Starr Ranch; combined, about 83 percent of the western spadefoot toad locations, including all 5 of the "important" populations, in the action area will be conserved following implementation of the Plan.

4. The Habitat Reserve will include newly conserved habitat supporting 13 known occurrences of western spadefoot toad and additional management of habitat supporting five known locations of western spadefoot toad on prior RMV lands. While adaptive management of these County Park Lands is not assured, the one western spadefoot toad location on County Park Lands will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

5. The design of the Habitat Reserve will help maintain habitat connectivity between western spadefoot toad populations in the action area and surrounding areas.

6. We anticipate that permanent protection of western spadefoot toad locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain western spadefoot toad in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for western spadefoot toad remains valid for the following reasons:

1. Only 2 of the 24 known western spadefoot toad locations (including associated breeding and upland foraging and aestivating habitat) in the action area will be impacted, which represents about 8 percent of the locations in the action area and a small portion of the population and habitat range-wide.

2. A total of 18 western spadefoot toads locations (including associated breeding and upland foraging and aestivating habitat) will be permanently conserved and managed within the Habitat Reserve, and 2 additional locations will remain within existing conserved SOS lands, one location within County Parks[4] and one at NAS Starr Ranch; combined, about 83 percent of the western spadefoot toad locations, including all 5 of the "important" populations, in the action area will still be conserved or remain in dedicated open-space lands following implementation of the Plan.

3. The Habitat Reserve will include newly conserved habitat supporting 13 known occurrences of western spadefoot toad and additional management of habitat supporting 5 known locations of western spadefoot toad on prior RMV lands, which represents 90 percent of the locations on RMV lands.

[4] Cooperative management on County lands will not occur; thus, these lands will not be included in the Habitat Reserve and are now considered SOS by this analysis.

4. The design of the Habitat Reserve will help maintain habitat connectivity between western spadefoot toad populations in the action area and surrounding areas.

5. We anticipate that permanent protection of western spadefoot toad locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain western spadefoot toad in the Southern Subregion and contribute to the range-wide conservation of this species.

Unlisted Birds

Burrowing owl

Status of the Species

Listing Status

The burrowing owl (*Athene cunicularia*) is a SERVICE Migratory Non-game Bird of Management Concern and is listed on the Federal Birds of Conservation Concern list. It is designated a California Species of Special Concern by the California Department of Fish and Game. It is not listed under the Federal Endangered Species Act.

Species Description

The burrowing owl is a small, ground-dwelling owl. The burrowing owl underwent several taxonomic changes until placed in its current genus *Athene* (Clark *et al.* 1997; American Ornithologists' Union 1998). Two subspecies of burrowing owl occur in North America: the western burrowing owl (*A. c. hypugaea*) and the Florida burrowing owl (*A. c. floridana*) (Klute *et al.* 2003).

Habitat Affinities

In North America, the burrowing owl occurs primarily in prairies, grasslands, shrub-steppe, desert, agricultural lands and open man-made areas such as golf courses, airports, roadside right-of-ways and vacant lots (Haug *et al.* 1993). They require large, sparsely vegetated, open expanses on gently rolling or level terrain. The presence of a nest burrow appears to be the critical habitat requirement for the western burrowing owl. They typically require a mammal burrow, but when these are not available they have been known to use pipes and natural rock and lava cavities. Currently, little is known about wintering habitat requirements beyond what the species uses during the breeding season (Klute *et al*. 2003).

Life History

The burrowing owl is an opportunistic forager, primarily feeding on arthropods, small mammals, birds, amphibians and reptiles (Haug *et al.* 1993). The burrowing owl's diet varies by season, with vertebrates occurring more commonly in the winter diet and arthropods in the summer diet.

The burrowing owl breeds from March through August, depending on the location of its breeding grounds. Typically, this species uses old burrows dug by mammals such as ground squirrels. Burrowing owls lay 6-11 eggs per clutch. Young emerge from the burrow at 2 weeks of age, forage for themselves by 4 weeks and can fly by 6 weeks (Zarn 1974). Burrowing owl families often switch burrows every 2 weeks when the young are 3 to 4 weeks old. They remain as a loose-knit group until early fall when the young begin to disperse to nearby burrows (Haug *et al.* 1993; Dechant *et al.* 1999). Home ranges vary from one-tenth to four ac (0.04 - 2 ha) with an average distance between burrows of 435 ft (133 m) (Thomsen 1971; Martin 1973). Territory size is directly proportional to habitat quality and burrow availability.

Predators of burrowing owls include coyotes, American crows, domestic dogs and cats, prairie falcons, and red-tailed, Swainson's, and ferruginous hawks (Martin 1973). Collisions with vehicles are also a common cause of mortality as the owls habitually sit and hunt on roads at night (Bent 1937; Ratcliffe 1987).

Distribution

The burrowing owl breeds from southern interior British Columbia (nearly extirpated), southern Alberta, southern Saskatchewan (extirpated from portion of province), and southern Manitoba (extirpated from portion of province), south through eastern Washington, central Oregon, and California to Baja California, east to western Minnesota, northwestern Iowa, eastern Nebraska, central Kansas, Oklahoma, eastern Texas, and Louisiana, and south to central Mexico. The winter range is similar to the breeding range, except that most burrowing owls vacate the northern areas of the Great Plains and Great Basin (Haug et al. 1993). The burrowing owl winters south regularly to El Salvador (AOU 1983).

In California, burrowing owls are restricted to the central valley extending from Redding south to the Grapevine, east through the Mojave Desert and west to San Jose, the San Francisco Bay area, the outer coastal foothills area, which extends from Monterey south to San Diego, and the Sonoran desert (Grinnell and Miller 1944). Historically, it was a resident in the open lowland areas throughout southern California (Garrett and Dunn 1981).

Rangewide Trends and Current Threats

The burrowing owl was formerly common in appropriate habitats throughout California, but population numbers have markedly declined in recent decades (Zeiner *et al.* 1990). The species appears to be threatened with extirpation from central western and southern California (DeSante and Ruhlen 1995). Statewide surveys conducted from 1986 to 1991 showed up to a 52 percent decrease in population groups and up to a 27 percent decrease in the number of breeding pairs throughout the State (DeSante *et al.* 1997; Klute *et al.* 2003). The burrowing owl has been severely reduced as a breeding species in the five coastal counties of southern California (Comrack and Mayer 2003).

Within Los Angeles County, the burrowing owl has been extirpated as a breeder from the coastal and interior basin areas, while only a few individuals are detected in this area each winter. The high desert area of Antelope Valley provides the only remaining habitat for this species in Los

Angeles County. A small breeding population (20-50 pairs) and a core wintering population of unknown size can still be found there; however, these owls are located on private lands that are likely to be developed (Comrack and Mayer 2003).

In Orange County, the burrowing owl is nearing extirpation as a breeding species and is very rare in winter with less than 50 individuals remaining (Comrack and Mayer 2003). The remaining nesting colony is located at Seal Beach Naval Weapons Station. In May of 2003, 10-14 individuals and two active nests were located at this site.

Within San Diego County, burrowing owls are nearing extirpation as a breeding species. Only two "colonies" (defined as more than five breeding pairs) of burrowing owls remain in the county: North Island Naval Air Station and East Otay Mesa Border area (Comrack and Mayer 2003). Outside of these two locations, there may be fewer than 5 and probably no more than 15 breeding pairs throughout the County.

A small number of pairs still persist within western Riverside County, with at least 12 sites thought to support breeding burrowing owls. A minimum of six pairs of burrowing owls with 20 young were observed within the Prado/Chino Basins during the 2003 breeding season (USFWS 2004). These birds are thought to be part of a larger, increasingly important, population of burrowing owls within northwestern Riverside County and adjacent southwestern San Bernardino County.

The primary threats to burrowing owls include the loss and fragmentation of their habitat due to intense agricultural and urban development and habitat degradation due to declines in populations of colonial burrowing mammals (Haug *et al.* 1993; Sheffield 1997; Dundas and Jensen 1994/95; Dechant *et al*. 1999). Elimination of burrowing rodents through control programs has been a primary factor in the recent and historical decline of burrowing owl populations throughout the United States (Butts and Lewis 1982; Pezzolesi 1994; Desmond and Savidge 1996; Toombs 1997; Dechant *et al.* 1999; Desmond *et al.* 2000; Murphy *et al.* 2001). Use of insecticides and rodenticides in burrowing owl habitat has also contributed to this species' decline. These chemicals not only reduce their food supply but may also be toxic to the owls, reducing their reproductive success and overall health (Klute *et al.* 2003). Other threats include the crushing of owl burrows by heavy equipment and ground maintenance machinery, collisions with vehicles (Haug *et al.* 1993), and shooting. Owl survival can also be adversely affected by disturbance from humans and pets (Thomsen 1971; Comrack and Mayer 2003).

Several large-scale habitat conservation plans have been implemented in southern California in recent years. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 1998, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. In 2004, the Service issued a permit for the Western Riverside County MSHCP. These plans have created large reserve systems that include substantial amounts of suitable habitat for the burrowing owl and requirements for monitoring and management actions beneficial to the long-term conservation of the species (Appendix 2).

Conservation Needs

Given the apparent rarity of the species in coastal southern California, conservation of this species depends on the protection and management of extant burrowing owl colonies and populations in the region. Prudent management and conservation measures should enable, or drive, the increased growth of individual colonies by providing for additional or enhanced foraging or nesting habitat to maximize reproductive success and facilitate the dispersal of individual birds. As this species appears to have evolved as a colonial species in association with burrowing mammal communities, protection of these communities is essential. Colonies should also be buffered from human disturbance as burrowing owls are sensitive to human impacts. Active management, including the construction of artificial burrows, and the preservation of significant foraging areas, is also necessary for the burrowing owl to persist long-term in the urban landscapes of southern California.

Environmental Baseline

There are no recent (last 20 years) records for nesting burrowing owls in the action area. However, there are records for wintering owls in this time frame. According to the Plan individual burrowing owls were located in Cristianitos Canyon and east of the Prima Deshecha Landfill in 1989 and 1990, but neither was confirmed to be nesting. In 1995, wintering owls were located in upper Chiquita Canyon on both the SOCTIIP (FTC-S) BX and CP alignments and in recent years in upper Cristianitos Canyon and in grassland south of San Juan Creek west of the BX alignment (MBA 1998).

The conservation analysis for the burrowing owl was based on habitat conservation and impacts, site-specific observations of wintering owls, and the refined habitat block analysis. This analysis assumes that the burrowing owl could use any grassland and barley field habitat in Subarea 1 for foraging. The action area contains an estimated 18,759 ac (7,591 ha) of suitable burrowing owl habitat, with about 67 percent of this occurring in Subarea 1 (Table A).

Effects of the Action

Direct Effects

The action area includes 18,759 ac (7,591 ha) of suitable habitat (grassland, alkali meadow, agriculture) for the burrowing owl (Table A). The proposed Covered Activities will result in permanent impacts to 3,769 ac (1,525 ha) of this habitat. There are no known nesting locations, but it is possible that burrowing owls will attempt to nest in the project footprint over the 75-year permit term. We anticipate that all suitable burrowing owl foraging habitat and nesting sites within the areas permanently impacted by Covered Activities will be developed or otherwise made unsuitable for burrowing owl.

Table A for Burrowing Owl: Burrowing owl habitat (grassland, alkali meadow, agriculture) in the action area

Action Area Components	**Total Amount of Burrowing Owl Habitat (acres)**
Subarea 1	
Proposed RMV[1]	7,531
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	1,964
Prima Deshecha Landfill	815
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	1,694
Supplemental Open Space (Audubon Starr Ranch)	624
Subtotal for Subarea 1	***12,628***
Subarea 2	542
Subarea 3	463
Subarea 4[2]	5,126
TOTAL	**18,759**

[1] Includes project footprint for RMV infrastructure in Subarea 4 (15 ac).
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (15 ac).

The proposed RMV, including Ortega Rock, and SMWD Covered Activities will permanently impact 3,020 ac (1,222 ha) or 32 percent of the burrowing owl suitable habitat on RMV lands. The County Covered Activities at Prima Deshecha Landfill will permanently impact 484 ac (196 ha) or 59 percent of the burrowing owl suitable habitat at the Landfill. Avenida La Pata road extension will impact an additional 154 ac (62 ha) of suitable burrowing owl habitat within the Habitat Reserve and 96 ac (39 ha) in Subarea 4. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program" could allow the impact of up to 15 ac (6 ha) of suitable burrowing owl habitat in parcels 1-17 (Table B).

In addition to the permanent impacts associated with urban development, the construction and maintenance of bridges, trails, water storage tanks, drainage culverts, and water and sewer lines will temporarily impact 212 ac (86 ha) of habitat. All temporary impacts will be restored to equivalent or better conditions compared to the existing condition at the time of impact (Appendix U of the Plan).

Other Covered Activities may affect burrowing owl habitat and occasionally disturb burrowing owls, but they are not expected to result in a permanent loss of habitat. These Covered Activities include cattle grazing, prescribed burns, maintenance of existing infrastructure, such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities. Cattle grazing is anticipated to maintain the shorter grassland habitat that is generally preferred by burrowing owl, although over-grazing could lead to habitat degradation, and cattle could disturb over-wintering or nesting owls. Prescribed burns could result in the disturbance of burrowing owls in the burn area. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may occasionally disturb burrowing owls in the project area.

Table B for Burrowing Owl: The amount of burrowing owl habitat (grassland, alkali meadow and agriculture) permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed as suitable burrowing owl habitat in the action area.

Covered Activities and Conservation Areas	**Habitat Impact (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS[1] (acres)**	**Habitat with Status Unchanged (acres)**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	3,020	4,511		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		1,964		
Subtotal of impacts and conservation by RMV and SMWD	**3,020**	**6,475**		
Prima Deshecha Landfill	484		331	
Avenida La Pata on RMV Lands	154	-154		
Avenida La Pata in Subarea 4	96			
Subtotal of impacts and conservation by the County of Orange	**734**		**331**	
Subtotal of impacts and assured conservation with adaptive management	**3,754**	**6,321**	**331**	
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 15			
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	0	1,694		
No Covered Activities				6,644
TOTAL	**3,769**	**8,015**	**331**	**6,644[4]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 624 ac in Audubon Starr Ranch SOS.

Indirect Effects

Burrowing owls will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion. Potentially important indirect effects include an increase in predation pressure by cats and dogs and possible efforts to control burrowing mammal populations through the use of poison and other methods. In addition, the frequency and timing of wildfires may change as a result of increased human-caused ignitions associated with new urban areas (Stephenson and Calcarone 1999) and increased access to the open space areas. Potential effects associated with an altered fire regime include changes to the vegetation community (Stephenson and Calcarone 1999) and effects due to increased wildfire suppression activities.

Conservation Measures

Conservation and Restoration. The Habitat Reserve will contain 8,015 ac (3,244 ha) (43 percent) of suitable burrowing owl habitat in the action area, including 6,321 ac (2,558 ha) on RMV lands

and 1,694 ac (686 ha) in existing County Parks. To help offset impacts at Prima Deshecha Landfill and due to the extension of Avenida La Pata, 331 ac (134 ha) of habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the burrowing owl. However, approximately 170 of those disturbed grassland acres will be converted to CSS, leaving a total of approximately 161 ac (65 ha) of grassland on the Landfill in SOS.

Construction-Related Avoidance and Minimization Measures. Potential impacts to nesting burrowing owls will be avoided by surveying suitable habitat prior to any construction-related clearing between February 1 and August 31. If nesting burrowing owls are found in impact areas, the nest and a 300-ft (91-m) radius area around the nest will be avoided until the breeding season is complete. Following the breeding season, an artificial burrow in suitable habitat will be constructed in nearby suitable habitat before the burrow in the project footprint is destroyed. In addition, a Biological Resources Construction Plan (BRCP) will be developed in coordination with the CFWO to address potential impacts to Covered Species (including burrowing owl) associated with a particular project.

Grazing Management. Implementation of the Grazing Management Plan is anticipated to reduce the potential for over-grazing and associated degradation of burrowing owl habitat by monitoring ground cover and moving cattle from pasture to pasture accordingly.

Pest Management. Ground squirrel controls will be prohibited within the Habitat Reserve, and the use of chemical pesticides in areas adjacent to the Habitat Reserve (*e.g.*, golf courses) will be minimized to the extent feasible and will be used in accordance with an approved Integrated Pest Management Program designed to avoid and minimize effects on native species and habitats.

Predator Control. Non-native, urban-related predators of burrowing owls (*e.g.*, cats and dogs) will be controlled in the Reserve, primarily through homeowner education, but possibly through trapping if necessary and feasible.

Monitoring. Monitoring will be conducted both at a species-specific level and also at a habitat landscape level. The detailed monitoring program for the burrowing owl as a Covered Species will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies.

Analysis of Impacts and Conservation by Planning Area

A summary of suitable burrowing owl habitat that will be impacted and conserved by Planning Area is presented in Table C below. In addition to the conservation identified by Planning Area, there will be conservation and management of the Covered Species including 1,964 ac (795 ha) of habitat on the prior RMV lands from the date of permit issuance.

Table C for Burrowing Owl: Burrowing owl habitat (grassland, alkali meadow and agriculture) permanently impacted and conserved/managed as a result of Covered Activities by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Burrowing Owl Habitat Impacted (Cumulative Impacts)**	**Burrowing Owl Habitat Conserved and Managed (Cumulative Conservation)**
PA1	461 (461)	631 (631)
PA2	562 (1,023)	1,253 (1,884)
PA3	806 (1,829)	341 (2,225)
PA4	114 (1,943)	67 (2,292)
PA5	325 (2,268)	297 (2,589)
PA6 & PA7[1]	50 (2,318)	324 (2,913)
PA8[1]	500 (2,818)	1,785 (4,698)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	156[2] (2,974)	-141[2] (4,557)
Ortega Rock	0 (2,974)	
Santa Margarita Water District Impacts	46 (3,020)	-46 (4,511)
Subtotal for Proposed RMV and Associated Projects	3,020	4,511
Prior RMV[3] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		1,964 (6,475)
TOTAL	**3,020**	**6,475**

[1] Potential impacts were capped at the maximum impact allowed for these Planning Areas (i.e., 50 ac for PA6&7 and 500 ac for PA8).
[2] 141 ac of infrastructure impact are in the Habitat Reserve, and 15 ac are in SOS.
[3] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus are added to the mitigation for Planning Area impacts.

If the development is conducted in order (PA1 through PA8, with PA6 and PA7 occurring at any time), the cumulative conservation of suitable burrowing owl habitat will always be greater than the habitat impacted (greater than a 1:1 ratio of conserved/impacted habitat). There are no known nesting locations within the action area, and most of the areas used by over-wintering burrowing owls will be conserved, including Cristianitos Canyon, upper Chiquita Canyon, and the Radio Tower Road mesa.

If RMV chooses to phase development by Alternative Order PA1, 3, 2, 4, 5, and 8 or Alternative Order PA1, 4, 3, 2, 5, and 8, conservation lags impacts by less than 400 ac (162 ha) following build out of PA3. However, conservation again exceeds impacts by a greater than 1:1 ratio in all remaining phases of development following build out of PA 2. In addition, the management of 1,964 ac (795 ha) of suitable habitat on prior RMV lands will more than offset the higher ratio of impacts/conservation following build-out of PA3. On RMV lands alone, 68 percent of the suitable burrowing habitat will be conserved, which represents a greater than 2:1 habitat conservation to impact ratio.

Conclusion

After reviewing the current status of the burrowing owl, the environmental baseline for the action area, the effects of the action and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as

described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the burrowing owl. We base this conclusion on the following:

1. This species ranges from Canada into the western continental United States and Mexico. Thus, the impacts under the Plan will occur over a very small fraction of the burrowing owl's overall range.

2. Subarea 1 where the majority of Covered Activities will occur includes only about 67 percent of the burrowing owl habitat in the action area. The remaining 33 percent of burrowing owl habitat in the action area occurs in the other three subareas and will not be significantly impacted (~1 percent) by implementation of the Plan.

3. The burrowing owl is not known to nest in the action area so no existing occurrences of burrowing owl will be impacted; and conservation measures are included in the Plan to avoid impacting any newly occupied or documented nesting sites during the breeding season.

4. An estimated 3,769 ac (1,525 ha) of suitable habitat for the burrowing owl will be developed or otherwise made unsuitable for this species, which represents 20 percent of the suitable habitat in the action area, but only a small fraction of potential habitat for the species range-wide.

5. A total of 8,015 ac (3,244 ha) or 43 percent of the suitable burrowing owl habitat in the action area will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 6,321 ac (2,558 (ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 1,694 ac (686 ha) of habitat is within existing County Parks. While adaptive management of the County Park lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

6. An additional 161 ac (65 ha)[5] of burrowing owl habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 624 ac (253 ha) of burrowing owl habitat is conserved at NAS Starr Ranch.

7. Combined, 8,800 ac (3,561 ha) or 47 percent of the habitat for burrowing owl in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[6]

8. Most of the habitat in areas used by over-wintering burrowing owls will be conserved, including Cristianitos Canyon, upper Chiquita Canyon, and the Radio Tower Road mesa.

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[5] The County will avoid and manage approximately 331 ac (134 ha) within SOS on the Landfill; but approximately 170 of those disturbed grassland acres will be converted to CSS, leaving a total of approximately 161 ac (65 ha) of grassland on the Landfill in SOS.

[6] There is likely burrowing owl habitat in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

9. We anticipate that permanent protection of potential burrowing owl habitat combined with long-term management and monitoring actions within the Habitat Reserve will help maintain over-wintering sites and suitable breeding habitat for burrowing owl in the Southern Subregion.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for the burrowing owl remains valid for the following reasons:

1. Project impacts will be reduced by 749 ac (303 ha), such that an estimated 3,020 ac (1,222 ha) of suitable burrowing owl habitat will be impacted, which represents about 16 percent of the suitable habitat in the action area, and a small portion of the habitat for this species across its range.

2. The burrowing owl is not known to nest in the action area so no existing occurrences of burrowing owl will be impacted; and conservation measures are included in the Plan to avoid impacting any newly occupied or documented nesting sites during the breeding season.

3. Most of the habitat in areas used by over-wintering burrowing owls will be conserved, including Cristianitos Canyon, upper Chiquita Canyon, and the Radio Tower Road mesa.

4. The Habitat Reserve will include 4,511 ac (1,826 ha) of newly conserved habitat and an additional 1,964 ac (795 ha) of habitat on prior conserved RMV lands that will be adaptively managed for the species. At NAS Starr Ranch, 624 ac (253 ha) of suitable burrowing owl habitat are conserved, and 1,694 ac (686 ha) of suitable habitat occur within County Park lands[7]; combined, at least 8,793 ac (3,559 ha) or 47 percent of suitable burrowing owl habitat in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.

5. The mitigation to offset the impacts on RMV lands includes conservation and adaptive management of 68 percent of the suitable burrowing owl habitat on RMV lands. This represents a greater than 2:1 conservation to impact ratio and a significant conservation contribution within the Subregion.

6. We anticipate that permanent protection of potential burrowing owl habitat combined with long-term management and monitoring actions within the Habitat Reserve will help maintain over-wintering sites and suitable breeding habitat for burrowing owl in the Southern Subregion.

[7] Cooperative management on County lands will not occur; thus, these lands will not be included in the Habitat Reserve and are now considered SOS by this analysis.

Coastal cactus wren

Status of the Species

Listing Status

The coastal cactus wren (*Campylorhynchus brunneicapillus couesi*) is listed on the Federal Birds of Conservation Concern and is designated a California Species of Special Concern by the California Department of Fish and Game. It is not listed under the Federal Endangered Species Act.

Species Description

The coastal cactus wren is one of eight subspecies of cactus wren (*C. brunneicapillus*). Taxonomic affiliations of the populations in California have been under debate (Bancroft 1923; Rea and Weaver 1990). Both coastal and interior populations exist in the State and were historically connected by the San Gorgonio Pass in Riverside County (Rea and Weaver 1990). Due to urbanization along this corridor, the coastal population of *C. b. cousei* is now geographically isolated from interior desert populations (Rea and Weaver 1990).

Habitat Affinities

The cactus wren frequents deserts and other arid terrain that contain thickets of large, branching cacti, thorny shrubs, and small trees (Grinnell and Miller 1944). The coastal cactus wren is an obligate, nonmigratory resident of the coastal sage scrub plant community (as defined by Westman 1983 and O'Leary 1990). It occurs almost exclusively in thickets of *Opuntia prolifera*, *O. littoralis*, and *O. oricola* dominated stands of coastal sage scrub below 1,500 ft (457 m) in elevation (Proudfoot *et al*. 2000). Characteristic shrubs associated with cactus wren occupied coastal sage scrub include California buckwheat, coastal sagebrush, *Salvia* spp., laurel sumac, and lemonadeberry (Garrett and Dunn 1981; Unitt 1984; Rea and Weaver 1990).

Life History

The cactus wren is primarily insectivorous and forages on the ground and in low vegetation (Bent 1968; Anderson and Anderson 1973). The breeding season for the coastal cactus wren extends from late February to August (Unitt 1984; Ogden Environmental and Energy Services 1993). Nests are usually built in *Opuntia* spp. or other large thorny shrubs greater than 3 ft (0.9 m) in height. Clutch sizes range from 2 to 5 eggs (Anderson and Anderson 1973; Marr and Raitt 1983; Simons and Martin 1990) and during favorable years, cactus wrens can fledge two or three successful broods. Fledglings are dependent on their parents 4 to 6 weeks post-fledging and often remain within their natal territory for several months. During this time, they may participate in territorial disputes and help to raise subsequent siblings (Anderson and Anderson 1973).

Information on dispersal capacity of cactus wrens is limited. Adult cactus wrens are considered highly sedentary, remaining in the same territory for their entire adult life (Ogden Environmental

and Energy Services 1993). Territory size for coastal cactus wren ranges from 1 to 5 ac (0.4-2 ha) (Solek and Szijj 2004). Known predators of cactus wrens include domestic cats, roadrunners, snakes, Cooper's hawks, American kestrels, and woodrats (Ogden Environmental and Energy Services 1993).

Distribution

The cactus wren is a resident species from southern California south to southern Baja California, southern Nevada, southwestern Utah, western and south-central Arizona, southern New Mexico, and central Texas south to Mexico (Terres 1980). Zeiner *et al*. (1990) described the distribution, abundance, and seasonality of the cactus wren in California as a locally common resident in the Mojave and Colorado deserts, north from the Mexican boundary to Inyo and Kern counties. Coastal populations were found in arid parts of westward-draining slopes from San Diego County northwest to Ventura County. Historically, coastal cactus wrens were found on the coastal slopes and lowlands of southern California in arid and semiarid regions with abundant cacti (Grinnell 1898; Grinnell and Miller 1944; Unitt 1984).

Rangewide Trends and Current Threats

Until the late 1930's, the coastal cactus wren was considered a locally common resident of cactus-dominated habitat from San Diego northwest to Santa Paula in Ventura County (Harper and Salata 1991). By the mid-1940's, however, the effects of habitat loss were already being noted by local authorities (Grinnell and Miller 1944). Between 1976 and 1990, the species was extirpated from at least 57 sites, including 26 of the 78 sites in southern Orange and San Diego counties (Rea and Weaver 1990). In 1991, it was estimated that only 1,500 to 2,350 pairs of coastal cactus wrens remained in southern California (Harper and Salata 1991), with Orange County accounting for the majority of pairs (1,000-1,600; 68 percent). Ogden Environmental and Energy Services (1993) estimated the total population between 1,900 and 2,500 pairs, with the majority of birds (65 percent) in Orange County.

The primary threats to the coastal cactus wren are habitat loss, degradation, and fragmentation due to urbanization and agricultural development (Harper and Salata 1991). Habitat loss and degradation directly reduce cactus wren populations while fragmentation then isolates these decreasing populations. Small population size coupled with fragmentation may compromise long-term viability of the species by increasing genetic homozygosity and lowering species fitness (Ogden Environmental and Energy Services 1993).

Fragmented habitats also have more edge than larger, intact habitats. Habitats with a high ratio of edge to interior habitat have been shown to have higher rates of predation and invasion by exotic species (*e.g*., Crooks and Soulé 1999). Invasive plant competition may hinder or delay the reestablishment of cactus patches essential to this species.

Another consequence of urbanization that is contributing to coastal cactus wren declines is an increase in human caused wildfires (Harper and Salata 1991). Benson (1969) considered fire to be the chief limiting factor in the distribution of native cactus in southern California, a fact that would affect the distribution of coastal cactus wren populations in the region. Bontrager *et al*.

(1995) found that cactus wrens have difficulty recolonizing burned areas of coastal sage scrub, since the species requires cactus of at least 3 ft (0.9 m) in height and cactus recovery after a fire can be slow. Studies in Orange County found that a formerly large population of cactus wrens in the San Joaquin Hills was recovering very slowly from the effects of the 1993 Laguna Beach fire (Hamilton 2003).

Conservation Needs

Conservation of as much of the remaining occupied coastal sage scrub habitat appears to be the most efficient and viable strategy for the survival of this subspecies (Solek and Szijj 2004). On already conserved lands, measures should be implemented to ensure the maintenance and ultimate expansion of component cactus patches. This would include exotics removal, measures to minimize the threat of fire and other associated edge effects. Solek and Szijj (2004) suggested the following might aid the species' recovery:

1. Breeding season surveys by county, with particular emphasis on counties where population status is unclear (*e.g.* Ventura County).

2. If feasible, create habitat buffers around existing protected areas.

3. Promote scientific studies of reproductive success, survivorship, and dispersal capacity.

4. Explore the efficacy of habitat restoration and promote sound urban habitat conservation practices (*e.g.*, discourage cactus removal by homeowners at the urban/rural interface).

Conservation efforts are focusing on preserving relatively large, contiguous patches of coastal sage scrub suitable for this species. Several Habitat Conservation Plans have been established pursuant to Section 10(a)(1)(B) of the Act including:

- Central and Coastal Subregion Natural Community Conservation Plan and Habitat Conservation Plan for Orange County in 1996.
- City of San Diego Multiple Species Conservation Plan (MSCP) in 1997 for southwestern San Diego County including the County of San Diego and the cities of Chula Vista, Coronado, Del Mar, El Cajon, La Mesa Poway, San Diego, and Santee. Although the umbrella MSCP has been approved for these jurisdictions, only the County of San Diego and cities of Chula Vista, La Mesa, Poway, and San Diego have approved subarea plans.
- San Diego County Multiple Species Conservation Plan (MSCP) in 1998 for unincorporated lands in the southeastern portion of the county.
- San Diego Multiple Habitat Conservation Program (MHCP) in 2003 for the northern cities of Carlsbad, Encinitas, Escondido, Oceanside, San Marcos, Solana Beach, and Vista. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.
- Western Riverside County MSHCP in 2004.

The coastal cactus wren is a Covered Species in each of these five habitat conservation plans. These plans have created large reserve systems that include substantial habitat for the cactus wren and requirements for monitoring and management actions beneficial to the long-term conservation of the species (Appendix 2).

Environmental Baseline

Habitat (CSS) and Locations

The action area contains 20,716 ac (8,383 ha) of CSS, of which 16,814 ac (6,804 ha) or 81 percent are in Subarea 1 (Table A). The action area contains 1,390 cactus wren locations, of which 1,168 or 84 percent are in Subarea 1 (Table A).

The California Natural Diversity Database (data as summarized 2006) contains only four cactus wren territory sightings in the action area since 2001. In the early 1990s, however, 157 pairs were documented in the action area, including 96 pairs in Canada Gobernadora.

Within the action area the coastal cactus wren is widely distributed in the San Juan Creek and San Mateo Creek watersheds, and there is continuous habitat connectivity among occupied areas. All 1,390 coastal cactus wren locations in the action area comprise a "major" population. The "major" population is located in habitat that provides a linkage between the San Diego County populations on MCB Camp Pendleton and conserved populations in the Central and Coastal Subregion Habitat Reserve.

Table A for Coastal Cactus Wren: Coastal cactus wren habitat (CSS) and locations in the action area.

Action Area Components	**Total Amount of Coastal Cactus wren Habitat (acres)**	**Coastal Cactus Wren Locations in NCCP Dataset**
Subarea 1		
Proposed RMV[1]	7,702	531
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	1,286	158
Prima Deshecha Landfill	255	9
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	5,493	372
Supplemental Open Space (Audubon Starr Ranch)	2,061	96
Other	17	2
Subtotal for Subarea 1	***16,814***	***1,168***
Subarea 2	1,300	74
Subarea 3	753	101
Subarea 4[2]	1,849	47
TOTAL	**20,716**	**1,390**

[1] Includes project footprint for RMV infrastructure in Subarea 4 (5 ac and 0 locations).
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (5 ac and 0 locations).

Within the "major" population approximately 670 locations or 48 percent have already been afforded some conservation protection:

- Approximately 190 locations or 15 percent have been conserved as a result of previous development. These locations occur in Saddleback Meadows, Camino La Ronda, Talega, Forster Ranch, Ladera Conservancy, Avery O'Neill Trust, Upper Chiquita Conservation Area, and Donna O'Neill Land Conservancy.
- 372 locations or 27 percent are conserved on County parklands.
- 96 locations or 7 percent occur on Starr Ranch.

An additional 65 locations or 5 percent occur in Coto de Caza SOS.

Linkages

Several linkages between cactus wren populations on RMV and surrounding areas are currently defined by development and/or conserved areas (see Figure 159-M in the NCCP/HCP) including the following:

- Linkage F is a "horseshoe" shaped corridor north of the Coto de Caza golf course that provides habitat and connectivity between Upper Chiquita Canyon and Starr Ranch and Caspers Wilderness Park. Although this linkage is fragmented, narrow (substantially less than the 2,000-ft-wide (610 m) Plan goal), and a patchy mosaic of CSS, it still supports many cactus wren territories. The patchy CSS habitat also likely provides a route for cactus wren dispersal. South of Linkage F, some east-west movement of cactus wrens may also occur across the Coto de Caza golf course from surrounding SOS lands in the vicinity of Via Ortega/Via Coyote. In this area, native scrub habitat that will remain undeveloped is immediately adjacent to either side of a narrow strip of the golf course.
- Linkage A is defined by the north-south oriented O'Neill Regional Park along Arroyo Trabuco which contains several areas of CSS and continuous riparian habitat. This is the primary low elevation linkage that is expected to be used by cactus wrens for dispersal between Chiquita Canyon and the Foothill Trabuco Specific Plan area (Subarea 2) and the Central and Coastal Reserve.
- Linkage B occurs between Ladera and Las Flores developments. This short east-west linkage that contains patches of CSS connects Chiquita Canyon with O'Neill Regional Park and is likely used frequently by cactus wrens for dispersal.

Linkages between the action area and other important regional cactus wren populations include:

- Linkage R, which connects the Southern Subregion Planning Area, to the Central Subarea component of the Central/Coastal NCCP/HCP Subregion ("Central Subarea"). The Saddleback Meadows area provides a secondary low elevation habitat linkage for the cactus wren between O'Neill Regional Park and habitat areas across El Toro Road in the Central Subarea Reserve. The Live Oak Canyon parcel, which is being restored to CSS, is located northwest of and contiguous with the Saddleback Meadows open space and provides additional connectivity to the Central Subarea.

- Linkage S, which is the lowest elevation linkage for cactus wrens between the Southern Subregion and the Central Subarea. This linkage, located north of Oso Reservoir, includes O'Neill Regional Park and the County-owned Oso Nursery Property. Linkage S is not currently a contiguous corridor of natural habitat primarily because of the 44-ac (18-ha) Oso nursery site leased by the County.
- Linkage N currently consists of patches of CSS and riparian areas between Donna O'Neill Conservancy and the eastern boundary of RMV. This cactus wren-occupied area provides a linkage between the cactus wren population in upper Cristianitos Canyon and cactus wren populations in the San Juan Creek Watershed and the cactus wren population on MCB Camp Pendleton.

Effects of the Action

Direct Effects

The action area includes 20,716 ac (8,383 ha) of suitable nesting and foraging habitat (CSS) for the Coastal cactus wren and 1,390 cactus wren locations (Table A). For all Covered Activities over the 75-year term of the permit and within the action area, 2,479 ac (1,003 ha) or 12 percent of cactus wren nesting and foraging habitat (CSS) will be permanently impacted. The impact area includes 223 cactus wren locations or 16 percent of the locations documented in the action area (Table B).

Infrastructure improvements by RMV and SMWD will temporarily impact 71 ac (29 ha) of CSS in the Habitat Reserve and SOS in Subareas 1 and 4. At least eight cactus wren locations in the Habitat Reserve will be temporarily impacted as a result of infrastructure improvements. Future landslide remediation activities on Prima Deshecha Landfill may temporarily impact additional acres of CSS and cactus wren locations.

Covered Activities for RMV and SMWD, including Ortega Rock, will permanently impact 2,248 ac (910 ha) of CSS or 11 percent of the CSS within the action area and 25 percent of the CSS on RMV lands. The RMV impact area includes 208 or 15 percent of the cactus wren locations within the action area and 30 percent of the locations on RMV lands (Table B).

We do not anticipate mortality or injury of adult or juvenile cactus wrens or cactus wren nests or eggs during habitat grading or grubbing since a biological monitor will flush cactus wrens out of harms way and habitat removal will be conducted outside of the cactus wren breeding season (February 15 – September 15). Mortality and injury to displaced cactus wrens, however, is likely. Cactus wrens are resident birds and are site tenacious. For birds whose use areas are completely destroyed or significantly reduced, the search for suitable habitat exposes them to increased predation pressure. Further, birds that are able to disperse from the area of habitat destroyed by grubbing or grading will likely have to engage in increased competition for remaining suitable habitat resulting in increased stress and energy expenditure beyond normal behavior. Displaced birds that do not find suitable replacement habitat may starve or otherwise die from lack of shelter or predation. Lastly, cactus wrens that do find suitable habitat may lose their mates and be unable to find new mates, at least initially after disturbance, causing a decline in reproductive output.

Table B for Coastal Cactus Wren: The amount of coastal sage scrub (CSS) and the number of coastal cactus wren locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the wren in the action area.

Covered Activities and Conservation Areas	**CSS Impacts (acres)**	**CSS in Habitat Reserve (acres)**	**CSS in Prima SOS[1] (acres)**	**CSS with Status Unchanged**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations in Prima SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	2,248	5,454			208	323		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		1,286				158		
Subtotal of impacts and conservation by RMV and SMWD	**2,248**	**6,740**			**208**	**481**		
Prima Deshecha Landfill	122		133		7		2	
Avenida La Pata on RMV Lands	42	-42	52		1	-1	0	
Avenida La Pata in Subarea 4	10				0			
Subtotal of impacts and conservation by the County of Orange	**174**		**185**		**8**		**2**	
Subtotal of impacts and assured conservation with adaptive management	**2,422**	**6,698**	**185[5]**		**216**	**480**	**2**	
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 57				Up to 7			
[3,4]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		5,493			0	372		
No Covered Activities				5,861				313
TOTAL	**2,479**	**12,191**	**185**	**5,861[6]**	**223**	**852**	**2**	**313[6]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Impacts to CSS habitat in the Ortega Rock quarry are subtracted from the County total per Table 13-4.
[5] See Project Description for a full explanation of the County CSS mitigation program.
[6] Includes 2,061 ac of CSS and 96 locations in Audubon Starr Ranch SOS and additional conserved habitat and locations in SOS in Subareas 2-4.

The County Covered Activities at Prima Deshecha Landfill will permanently impact 122 ac (49 ha) or 48 percent of the CSS at the Landfill, including 7 of the 9 cactus wren locations (78 percent). Avenida La Pata road extension will impact an additional 52 ac (21 ha) of CSS including 42 ac (17 ha) within the Habitat Reserve and 10 ac (4 ha) within Subarea 4. This project will impact 1 cactus wren location. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program," could allow the impact of up to 57 ac (23 ha) of CSS and 7 cactus wren locations in parcels 1-17.

Other Covered Activities that may impact the cactus wren, but are not expected to result in a permanent loss of habitat, include prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities and habitat and wildlife management and monitoring activities. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance but should occur outside the cactus wren breeding season. Habitat management and monitoring activities could result in minor disturbance of individuals and temporary loss of habitat, but no direct loss of individuals is anticipated.

New Roads

As each Planning Area is developed, associated infrastructure will also be constructed. Roads will be built to connect each Planning Area with pre-existing development in the action area. We would expect both juvenile and adult cactus wrens to occasionally disperse/fly over these new roads and possibly establish territories adjacent to them if appropriate habitat is available. Dispersing birds as well as territorial birds will have a risk of being struck by a vehicle when crossing these roads. Cactus wrens may also be indirectly affected by these roads, as roads fragment habitat and create more edges; especially the proposed local arterial connector between Oso Parkway and PA2 and PA3 and Cow Camp Road where it crosses several of the north-south linkages.

Coto de Caza

As described in the "Environmental Baseline" section of this biological opinion, Linkage F provides habitat and connectivity for the cactus wren between Upper Chiquita Canyon and Starr Ranch and Caspers Wilderness Parks. However, if all participants choose to pay the fee and conserve no CSS on-site then Linkage F will likely be non-functional for cactus wren movement.

Grazing

RMV has grazed cattle on its property since 1882. Areas containing CSS and cactus wrens are not fenced to exclude cattle. Free-ranging cattle could therefore forage within CSS and possibly displace nesting and roosting cactus wrens or otherwise degrade the habitat. Grazing can also inhibit the recovery of burned CSS areas, whether the fire was a result of a prescribed burn or natural wildfire. The re-introduction of cattle into a burned area too early can negatively affect the natural recovery process and may result in type conversion of the CSS to annual grassland.

Indirect Effects

The cactus wren could be subject to indirect effects from Covered Activities as described in the "General Effects" section of this biological opinion and more specifically as follows.

In Southern California, effects of fragmentation have been shown to decrease the number of resident bird species, decrease the diversity of small rodents, and decrease the diversity and cover of native plant species (Soulé *et al*. 1988; Bolger *et al*. 1991; Alberts *et al*. 1993; Bolger *et al*. 1997a,b). These alterations to the species assemblage, especially the reduction in native plant species diversity and cover, may decrease the quality of habitat for cactus wrens over time. This would occur as the arthropod abundance and diversity declines in correlation with the decline in their native plant hosts, decreasing the food supply of this insectivorous species.

The fragmentation of natural habitats in the action area may also negatively affect the quality of remaining habitat by facilitating the invasion of exotic plant and animal species. Invasive weedy annual plants can alter the species composition and structure of the habitat, which may make it less suitable to the cactus wren and also more susceptible to fire. The cactus wren is especially vulnerable to wildland fires because of its narrow habitat requirements, sedentary behavior, and low dispersal characteristics. Intense fires may actually kill cactus plants and eliminate nesting habitat for the cactus wren. As a result of competition from invasive non-native plants, grazing, weather patterns and other natural and human-influenced disturbances, the re-establishment of severely burned cactus patches essential to this species may take several years. An increasing pattern of habitat fragmentation and isolated populations also diminishes the dispersal ability and inter-population connections of the cactus wren, potentially reducing the overall genetic viability of the species.

Throughout southern California, CSS is being converted to nonnative grassland and other ruderal (weedy) habitats (Allen *et al*. 1999; Allen *et al*. 1996; Minnich and Dezzani 1998; Allen 2004). Conversion of shrublands to grasslands has been attributed to a combination of factors including invasion of exotic non-native plant species (*e.g*., annual grasses), increased fire frequency, and nitrogen deposition due to air pollution. Even in reserve areas not threatened by habitat destruction, a continuous loss of suitable habitat available to the cactus wren is ongoing (Minnich and Dezzani 1998).

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species including cowbird trapping, grazing, and fire, the following conservation measures specific to and/or of particular importance to the cactus wren will be implemented.

<u>Conservation and Restoration</u>: To offset the impacts of the Covered Activities on the cactus wren, a total of 854 or 61 percent of the cactus wren locations and 12,376 ac (5,008 ha) or 60 percent of the cactus wren nesting and foraging habitat (CSS) within the action area will be included in the Habitat Reserve and SOS on Prima Deshecha Landfill (Table B).

Within RMV lands alone, at least 6,740 ac (2,728 ha) or 75 percent of the CSS will be permanently conserved and adaptively managed within the Habitat Reserve (Table B). The RMV portion of the Habitat Reserve will include 481 or 70 percent of the cactus wren locations within RMV lands (Table B).

To off set the loss of CSS (174 ac (70 ha)) associated with the Prima Deshecha Landfill and the extension of Avenida La Pata, the County will create the same amount of CSS (174 ac (70 ha)) within a 530.7-ac (215-ha) SOS (conservation) area on the landfill within 5 years of permit issuance and will manage this area for Covered Species, including the cactus wren, in perpetuity. The creation of 174 ac (70 ha) of CSS will occur to a standard identified in Appendix M (Attachment M-2 Prima Deshecha/Avenida La Pata Mitigation Program in the NCCP/MSAA/HCP) and will occur prior to future impacts of the Landfill and road projects. In addition to habitat creation, 2 cactus wren locations and associated CSS habitat will be conserved in undeveloped portions of the Landfill that will be included in the Landfill's SOS lands (see Figure 164-M in the NCCP/MSAA/HCP). Once the CSS restoration is successfully completed, cactus wrens may establish territories and occupy the site. The County is also restoring an extra 11 ac (4 ha) of CSS in the SOS (for a total of 185 ac (75 ha)) in case 11 ac or less (≤4 ha) does not meet the CSS restoration success criteria.

In Coto de Caza (Subarea 3) conservation of the 57 ac (23 ha) of CSS and up to 7 cactus wren locations will depend upon the individual land owners and whether they choose to participate in the County's Coto de Caza "Opt-In-Program" for coverage under this Plan. Under the "Opt-In-Program," the landowner must avoid CSS occupied by the cactus wren to the maximum extent practicable and/or pay a per-acre in-lieu-fee for management of the County Parkland within the Habitat Reserve. If enough of the landowners participate in the "Opt-In-Program" and conserve some portion of the remaining CSS, Linkage F is expected to remain a viable corridor for cactus wren movement. However, because we cannot predict whether owners of the 17 parcels will participate in the "Opt-In-Program" and conserve some CSS on their lots, we have assumed the worst-case scenario that all 57 ac (23 ha) of CSS and all 7 cactus wren locations will be permanently impacted. Alternatively, infrequent cactus wren dispersal across the golf course south of Linkage F in the vicinity of Via Ortega/Via Coyote may occur. More likely dispersal for cactus wrens east of Linkage F would be to the south into Starr Ranch or Caspers Regional Wilderness Park and into PA3.

In addition to mitigation for the Covered Activities, the County has agreed to enroll 5,493 ac (2,223 ha) of CSS including 372 cactus wren locations into the Habitat Reserve as soon as is practicable following signatory acceptance of the Plan, but no later than 1 year following this date. These lands are currently managed and conserved as County wilderness or regional parks.

In an attempt to offset the potential loss of CSS habitat as a result of conversion to non-native annual grassland habitat, the HRMP will establish the following goals and objectives to attain these goals: 1) protection and management of CSS to maintain approximate baseline acreage (12,191 ac (4,937 ha)), 2) restoration of CSS through implementation of the Habitat Restoration Plan, 3) management of CSS fire regimes such that a natural diversity of age-stands are maintained throughout the Habitat Reserve by implementing the Wildland Fire Management

Plan, and 4) management of exotic non-native plant species, especially along the Habitat Reserve/urban interface by implementing the Invasive Species Control Plan.

To off-set temporary impacts in the Habitat Reserve, RMV will restore all areas as described in the Project Description of this document and Appendix U of the NCCP/MSAA/HCP. In addition, RMV will conduct restoration of CSS in designated areas along Chiquita and Chiquadora Ridges and in Sulphur Canyon (Page 7-70 of the NCCP/MSAA/HCP). Similarly, SMWD and the County of Orange will restore all temporarily disturbed CSS to original or better conditions.

Reserve Design: Following implementation of the Plan, cactus wren locations will be conserved throughout the Habitat Reserve, which will include 854 or 61 percent of the cactus wren locations in the action area (Figure 195-M in the NCCP/MSAA/HCP). Although cactus wrens occur throughout the Habitat Reserve, they are concentrated in three general areas including 1) Chiquita Canyon; 2) Caspers Wilderness Park; and 3) the southwestern portion of the Habitat Reserve that includes Donna O'Neill Land Conservancy, Cristianitos, Middle Gabino, Blind and Talega canyons.

Habitat connectivity for cactus wren dispersal within the action area will be maintained through conservation and adaptive management of the following linkages, which are under 1,500 ft (457 ha) elevation and contain suitable cactus wren dispersal habitat:

- Linkages C and G are two north-south linkages that connect Chiquita and Chiquadora ridges. Linkage C runs between PA2 and the Ladera Ranch housing development and Linkage G is located between PA2 and PA3. Linkage C facilitates cactus wren movement between Middle and Lower Chiquita along Chiquita Ridge. Linkage G facilitates cactus wren movement from Middle Chiquita through Canada Gobernadora into San Juan Creek and south into occupied habitat in Cristianitos Meadows and Cristianitos Canyon.
- Linkages D and I are east-west linkages that connect Arroyo Trabuco and Caspers Wilderness Park. Linkage D (the "Narrows") separates middle and lower Chiquita Canyon and runs east through the Habitat Reserve until it becomes Linkage I. Linkage I is Canada Gobernadora between Coto de Caza and the mouth of Sulphur Canyon. Linkage D facilitates cactus wren movement between Chiquita Ridge and Canada Gobernadora. Linkage I connects occupied cactus wren habitat in Canada Gobernadora with occupied habitat in Bell Canyon and more eastern portions of Caspers Wilderness Park. Cactus wrens could also disperse northward from this linkage into the western portion of Caspers Wilderness Park that abuts the eastern side of the Coto de Caza development.
- Linkage J is the San Juan Creek floodplain which travels through Caspers Wilderness Park and runs southwest into Lower Chiquita Canyon. This linkage connects Chiquita Ridge and Chiquita Canyon with the Central San Juan Creek and Trampas Canyon sub-basin and aids dispersal of birds to the south via Cristianitos Canyon. Linkage J connects occupied cactus wren habitat with occupied habitat further south in Donna O'Neill, Cristianitos Meadows, and Upper Cristianitos.

- Linkage N is a north-south linkage that connects Cristianitos Canyon and the southern portion of the Chiquita sub-basin. Linkage N also links San Juan Creek with lower Gabino Creek and MCB Camp Pendleton along lower Cristianitos/San Mateo Creek. Occupied cactus wren habitat occurs throughout all of these areas with a high density of locations in Cristianitos Canyon.

These linkages in the Proposed RMV area meet the Plan goal width of 2,000 ft (610 m) except the corridor that runs north-south between PA5 and Prima Deshecha Landfill, which has a minimum width of 600 ft (183 m) at its narrowest point. Although this linkage is less than the 2,000-foot-wide (610 m) Plan goal, it is expected to provide suitable habitat for cactus wren dispersal once restoration and management activities proposed by the County are implemented.

As stated above, indirect effects associated with roads such as habitat fragmentation and edge effects will occur mostly along the proposed local arterial connector between Oso Parkway and PA2 and PA3 as well as along Cow Camp Road where it is proposed to cross several of the north-south linkages described above. However, we expect both juvenile and adult cactus wrens to occasionally disperse/fly over these new roads and/or where possible travel underneath bridge crossings, if suitable habitat is present. Because the Habitat Reserve design is based on maintaining large areas of CSS habitat, indirect effects such as habitat fragmentation and habitats with increased edge should be minimized.

Grazing: The Grazing Management Plan (see Appendix G of the NCCP/MSAA/HCP and "Project Description" in this biological opinion) includes the management of grazing activities and restoration of upland habitat with native grasses and CSS to help ensure that the habitat remains suitable for a wide variety of species, including the cactus wren. The Grazing Management Plan also describes the pastures that have been planted with barley in the San Juan watershed, including Chiquita Canyon. Chiquita Canyon has been planted with 1,000 ac (405 ha) of barley, which provides high quality forage for the free-ranging cattle. According to the NCCP/MSAA/HCP, cattle have concentrated in the barley fields and annual grasslands and have not foraged extensively in the less desirable CSS. These barley pastures and the annual grasslands will continue to be maintained.

As stated above, the re-introduction of cattle into a burned area too early can negatively affect the natural recovery process and may result in type changing the CSS vegetation to annual grassland. To avoid this potential loss of CSS, RMV will test hypotheses in coordination with the Science Advisors about when to release cattle back into burned areas in three of the major vegetation communities on RMV (CSS, grassland and oak woodland). Results of the testing of these hypotheses will help identify the optimal time that cattle can be re-introduced into a burned area to avoid habitat type conversion.

Monitoring: Monitoring will be conducted at a species-specific level and also at a habitat landscape level. The detailed monitoring program for cactus wren will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. The Plan (page 7-212 and E-23) provides a conceptual monitoring program for the cactus wren that proposes annual field surveys within pre-designated sample plots to monitor changes in the CSS community and cactus wren population size. Within 2 years of the Effective Date, RMV will

also establish a CSS baseline in the Habitat Reserve for the purposes of long-term tracking, with the goal of maintaining the approximate existing CSS acreage in the Habitat Reserve.

In addition, RMV will monitor the proposed 32 Covered Species including the cactus wren, on County Park lands within the Habitat Reserve. County Parks may receive additional funding for adaptive management of Covered Species on their lands through the Coto de Caza "Opt-In-Program" and from grants; however, this funding is not assured.

Analysis of Impacts and Conservation by RMV Planning Area

A summary of cactus wren locations and habitat that will be impacted and conserved from RMV and SMWD Covered Activities is presented in Table C below. In addition to the impacts and conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Table C for Coastal Cactus Wren: Coastal cactus wren habitat (CSS) and locations permanently impacted and conserved/managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Locations and Habitat Impacted (Cumulative Impacts)**		**Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	0 (0)	9 (9)	4 (4)	235 (235)
PA2	63 (63)	264 (273)	171 (175)	1,064 (1,299)
PA3	63 (126)	649 (922)	39 (214)	1,261 (2,560)
PA4	0 (126)	399 (1,321)	4 (218)	238 (2,798)
PA5	6 (132)	299 (1,620)	5 (223)	109 (2,907)
PA6 & PA7	10 (142)	47 (1,667)	0 (223)	0 (2,907)
PA8	39 (181)	395 (2,062)	118 (341)	2,665 (5,572)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	17 (198)	100[1] (2,162)	-17 (324)	-95[1] (5,477)
Ortega Rock	9 (207)	63 (2,225)		
Santa Margarita Water District Impacts (Reservoir in Upper Chiquita Conservation Area)	1 (208)	23 (2,248)	-1 (323)	-23 (5,454)
Subtotal for Proposed RMV and Associated Projects	208	2,248	323	5,454
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			158[3] (481)	1,286 (6,740)
TOTAL	**208**	**2,248**	**481**	**6,740**

[1] 95 ac of infrastructure impact are in the Habitat Reserve, and 5 ac are in SOS.
[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus are added to the mitigation for Planning Area impacts.
[3] 158 locations represent the gross number of cactus wren locations in prior RMV, including the 1 location that would be impacted by the SMWD reservoir in the Upper Chiquita Conservation Area. The gross number is used here because the 1 location that is impacted is accounted for in the Proposed RMV and Associated Projects.

Build-out of PA1 will impact 9 ac (4 ha) of CSS but no cactus wren locations. It will result in the management and conservation of 235 ac (95 ha) of CSS and 4 cactus wren locations in the Habitat Reserve.

Upon build-out of PA2, an additional 264 ac (107 ha) of CSS and 63 cactus wren locations will be developed or otherwise made unsuitable for cactus wren. RMV will conserve an additional 1,064 ac (431 ha) of CSS and 171 cactus wren locations in the Habitat Reserve to minimize this impact (Table C). PA2 is located at the southeastern end of Chiquita Canyon, which currently supports approximately 298 cactus wren locations. Development of PA2 will impact 21 percent of these locations. The CSS habitat conserved as a result of PA2 development, however, is almost entirely occupied by the cactus wren and maintains connectivity between the remaining locations throughout Chiquita Canyon and conserves Linkage I that was discussed above. Cumulatively, build-out of PA1 and PA2 will result in substantially more CSS and cactus wren locations conserved (1,299 ac (526 ha) and 175 locations) than would be impacted (273 ac (110 ha) and 63 locations), a conservation to impact ratio greater than 4:1 for CSS and greater than 2:1 for cactus wren locations.

Build-out of PA3 will impact the most CSS habitat (649 ac (263 ha)) of all the planning areas and an additional 63 cactus wren locations. To offset this loss, RMV will conserve an additional 1,261 ac (510 ha) of CSS habitat and 39 locations in the Habitat Reserve. Cumulatively, build out of PA1-PA3 will still result in more CSS and cactus wren locations conserved (2,560 ac (1,036 ha) and 214 locations) than will be impacted (922 ac (373 ha) and 126 locations), a conservation to impact ratio greater than 2:1 for CSS and greater than 1:1 for cactus wren locations.

The exact location and configuration of PA4 has not been determined, 725 ac (293 ha) will ultimately be developed based on the projected impacts from the NCCP/MSAA/HCP. Because the location of the development bubble has not been identified, the exact impacts to CSS could not be provided. Instead, the Plan identifies an overstated impact scenario of 399 ac (161 ha) of CSS and no cactus wren locations. To off-set this loss, 238 ac (96 ha) of CSS and 4 cactus wren locations will be added to the Habitat Reserve. Cumulatively, build out of PA4 will result in more conservation of CSS (2,798 ac (1,132 ha)) than will be impacted (1,321 ac (535 ha)) and still maintains a conservation to impact ratio greater than 2:1 for CSS and greater than 1:1 for cactus wren locations.

Build-out of PA5 will impact 299 ac (121 ha) of CSS and 6 cactus wren locations. To off-set this loss, RMV will conserve an additional 109 ac (44 ha) of CSS and 5 cactus wren locations in the Habitat Reserve. Cumulatively, build out of PA5 will result in more conservation of CSS (2,907 ac (1,176 ha)) than will be impacted (1,620 ac (656 ha)), although the habitat conservation to impact ratio is reduced to greater than 1:1. The conservation to impact ratio for cactus wren locations is maintained at greater than a 1:1 ratio.

Development in PA6 and PA7 can occur anytime and will impact (47 ac (19 ha) of CSS and 10 cactus wren locations. Cumulatively, build out of PA1-PA7 will result in more conservation of CSS (2,907 ac (1,176 ha)) than will be impacted (1,667 ac (675 ha)) and maintains a

conservation to impact ratio of greater than 1:1 for CSS and greater than 1:1 for cactus wren locations.

Upon build out of PA8, an additional 395 ac (160 ha) of CSS and 39 cactus wren locations will be impacted. To offset this loss, an additional 2,665 ac (1,079 ha) of CSS and 118 cactus wren locations will be conserved in the Habitat Reserve. The cumulative conservation (5,572 ac (2,256 ha) and 341 locations) is still greater than the impacts (2,062 ac (834 ha) and 181 locations), a conservation to impact ratio greater than 2:1 for CSS and greater than 1:1 for cactus wren locations.

Lastly, the analysis by planning area provided above does not include impacts associated with RMV's infrastructure, SMWD, and Ortega Rock in the Habitat Reserve. Impacts with these activities include: infrastructure (100 ac (40 ha) CSS and 17 locations), Ortega Rock (63 ac (25 ha) CSS and 9 locations), and Santa Margarita Water District impacts at the Upper Chiquita Conservation Area Reservoir (23 ac (9 ha) of CSS and 1 location). These impacts represent a small fraction of the total impacts that will occur over the life of this project, and they will also occur in a phased manner. In addition to the impacts and conservation identified by planning area, there will be conservation and management of the Covered Species including 158 occurrences of cactus wren and 1,286 ac (520 ha) of CSS on the Prior RMV lands within 6 months of permit issuance. The Prior RMV lands add substantial value to the conservation goal of maintaining connectivity for cactus wren as well as additional habitat and cactus wren locations. Overall, the impacts from RMV/SMWD Covered Activities (2,248 ac (910 ha) and 208 locations) are mitigated by the substantial conservation and adaptive management of 6,740 ac (2,728 ha) of CSS and 481 cactus wren locations, a conservation to impact ratio of about 3:1 for CSS and greater than 2:1 for cactus wren locations.

If RMV chooses to phase development by Alternative Order PA1, 3, 2, 4, 5, and 8, new conservation of CSS still exceeds impacts by a 2:1 ratio through development of PA1 and PA3; however, the number of newly conserved cactus wren locations lags behind the development because 63 cactus wren locations will be impacted but only 43 locations will be newly conserved. However, 158 cactus wren locations and 1,286 ac (520 ha) of CSS will be conserved and adaptively managed in the Prior RMV portions of the Habitat Reserve prior to impacts from PA3. Therefore, after build out of PA1 and PA3, there would be a total of 2,782 ac (1,126 ha) of CSS and 201 cactus wren locations conserved and adaptively managed in the Habitat Reserve with only 658 ac (254 ha) of CSS and 63 cactus wren locations impacted, which maintains the positive conservation to impact ratio for CSS and cactus wren locations. Upon build-out of PA2 and in all remaining phases of development, newly conserved CSS and cactus wren locations again exceeds the development impact by a ratio of greater than 2:1 for habitat and greater than 1:1 for cactus wren locations. When combined with the conservation on Prior RMV lands the overall conservation to impact ratio is still 3:1 for cactus wren habitat and greater than 2:1 for cactus wren locations.

If RMV chooses to phase development by Alternative Order PA1, 4, 3, 2, 5, and 8, the same analysis as above applies since PA4 does not impact or conserve any cactus wren locations, the amount of habitat impacted and conserved in PA4 is not significantly out of balance, and development of PA3 precedes development of PA2.

Conclusion

After reviewing the current status of the coastal cactus wren, the environmental baseline for the action area, and the effects of the proposed Covered Activities, it is the Service's biological opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP are not likely to jeopardize the continued existence of the coastal cactus wren. We base this conclusion on the following:

1. A total of 223 coastal cactus wren locations (16 percent) and a total of 2,479 ac (1,003 ha) or 12 percent of coastal cactus wren nesting and foraging habitat in the action area will be permanently impacted by Covered Activities.

2. A total of 12,191 ac (4,934 ha) or 59 percent of the suitable nesting and foraging habitat for the coastal cactus wren in the action area, including 852 locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 6,698 ac (2,711 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 5,493 ac (2,223 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

3. An additional 185 ac (75 ha) of cactus wren nesting and foraging habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 2,061 ac (834 ha) (10 percent) of cactus wren nesting and foraging habitat, including 96 cactus wren locations, is conserved at NAS Starr Ranch.

4. Combined, 14,437 ac (5,843 ha) or 70 percent of the nesting and foraging habitat for coastal cactus wren, including 950 locations (68 percent), in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.

5. Cactus wren connectivity between MCB Camp Pendleton and the Central/Coastal NCCP Reserve via RMV and County parkland will be maintained.

6 With implementation of the conservation measures, we anticipate that no adult or juvenile, or nestling cactus wrens or eggs will be killed or injured during habitat grading or grubbing.

7 We anticipate that permanent protection of the cactus wren locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the cactus wren in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA has not been invoked, and the Habitat Reserve is comprised of lands

dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid for the following reasons:

1. Impacts of the Covered Activities will be reduced to the loss of 208 coastal cactus wren locations and 2,248 ac (910 ha) of coastal cactus wren nesting and foraging habitat, which represents 15 percent of the locations and less than 11 percent of the cactus wren habitat in the action area.

2. The County of Orange will not implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS and County Park lands, and these lands will not be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP. However, a total of 372 cactus wren locations and 5,493 ac (2,223 ha) of cactus wren nesting and foraging habitat will remain within existing County Park lands.

3. The conservation proposed by RMV will still be implemented such that 75 percent of the cactus wren nesting and foraging habitat and 70 percent of the cactus locations on RMV lands will be conserved and adaptively managed within the Habitat Reserve. This represents a 3:1 conservation to impact ratio for cactus wren habitat on RMV lands.

4. Cactus wren connectivity between MCB Camp Pendleton and the Central and Coastal Reserve via RMV and County parkland will be maintained.

5. With implementation of the conservation measures, we anticipate that no adult or juvenile, or nestling cactus wrens or eggs will be killed or injured during habitat grading or grubbing.

6. We anticipate that permanent protection of the cactus wren locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the cactus wren in the Southern Subregion and contribute to the range-wide conservation of this species.

Cooper's Hawk

Status of the Species

Listing Status

The Cooper's hawk (*Accipiter cooperii*) was designated a Species of Special Concern by the California Department of Fish and Game. It is not listed under the Federal Endangered Species Act.

Species Description

The Cooper's hawk is a medium-sized hawk with short, rounded wings and a long, rounded tail. The species exhibits sexual dimorphism with the female about one-third larger than the male (Rosenfield and Bielefeldt 1993). The Cooper's hawk is one of three species of the genus *Accipiter*.

Habitat Affinities

The Cooper's hawk is found in deciduous, mixed, and evergreen forests and deciduous stands of riparian habitat (Rosenfield and Bielefeldt 1993). This species will nest in partially concealed and shaded areas in the main crotch or horizontal branch of a variety of tree species (Rosenfield and Bielefeldt 1993). It often uses patchy woodlands and edges with snags for perching (Beebe 1974). Migrant and wintering birds are generally less selective in their choice of habitats and may be found with regularity in developed (*e.g.*, suburban) areas; however, Zeiner *et al.* (1990) noted that this species is seldom found in areas without dense tree cover or patchy woodland habitat. Within California, Cooper's hawks use dense stands of live oak, riparian, or other forest habitats near water (Zeiner *et al.* 1990). In southern California, Cooper's hawks primarily breed in riparian areas and oak woodlands and are most common in montane canyons. They hunt in broken woodland and habitat edges.

Life History

The Cooper's hawk is diurnally active throughout the year (Zeiner *et al.* 1990). It primarily feeds on birds, sometimes taking fish, small mammals, reptiles and amphibians (Terres 1980). After catching its prey, the Cooper's hawk may fly to a water source to drown the prey (Terres 1980).

Both sexes are usually present on the nest area by mid to late March (Meng 1951; Rosenfield and Bielefeldt 1993). In California, the first eggs are generally laid in April (Asay 1987) with clutch sizes ranging from 1 to 7 eggs (Rosenfield and Bielefeldt 1993). Pairs will often renest if the initial clutch is lost early. Young fledge at 27-30 days but return to the nest for prey deliveries and roosting for at least 10 more days (Reynolds and Wright 1978).

Seasonal home ranges of Cooper's hawks have been estimated at 1,930 ac (782 ha) with the daily home range averaging 570 ac (231 ha) (Rosenfield and Bielefeldt 1993). Cooper's hawk may require a minimum of 15 ac (6 ha) of relatively undisturbed woodland or riparian habitat for nesting (Call 1978). Cooper's hawks defend nesting territories of about 300 ft (91m) around the nest.

Mortality rates have been estimated at 72-78 percent in the first year and 34-37 percent thereafter (Rosenfield and Bielefeldt 1993). Eggs may be depredated by raccoons and great-horned owls, but this has not been quantified (Rosenfield and Bielefeldt 1993). Predators of adult Cooper's hawks include great horned owls, red-tailed hawks, and northern goshawks (Rosenfield and Bielefeldt 1993).

Distribution

The Cooper's hawk breeds from southern Canada south throughout most of the continental United States and in portions of northern Mexico (AOU 1983). Its breeding range is from sea level to above 8,600 ft (2,623 m). Cooper's hawks are present year-round throughout California, except along the Colorado River and in desert areas, where the species is reportedly extirpated as a nester but is generally a transient and winter visitor (Garrett and Dunn 1981). Although the Cooper's hawk breeds in southern California and has a year-round resident population, it also occurs in the region as a spring and fall migrant and as a winter resident (Garrett and Dunn 1981).

Rangewide Trends and Current Threats

Historically, the Cooper's hawk was considered a common nester throughout California and was described as "…varyingly common, to even abundant, for a raptor, in autumn in favorable territory…" (Grinnell and Miller 1944). Southern California's breeding population reportedly has been "…much reduced in recent decades, especially in lowland areas where much riparian woodland has been destroyed…" (Garrett and Dunn 1981). In the early 1980s, however, it was considered common in the west where populations were believed to be relatively stable (Rosenfield and Bielefeldt 1993). Current information on the status of the species in southern California is lacking, but Unitt (2001) stated that during the 1990s the hawk's adaptation to nesting in San Diego County parklands accelerated and the "birds' numbers increased conspicuously." Other researchers have found, however, that reproductive success for this species is substantially higher in natural versus urban settings (Boal and Mannan 1998). Nestlings in urban settings primarily died from trichomoniasis (a parasitic protozoan found in humans), and adult hawks died from collisions, most often with windows.

Habitat destruction, mainly in lowland riparian areas, may be the main threat to Cooper's hawk, although direct or indirect human disturbance at nest sites can be equally detrimental (Remsen 1978; Boal and Mannan 1998). In California, the main threat to Cooper's hawks is habitat destruction and degradation in low-lying riparian areas due to urbanization. Impacts that adversely affect oak riparian and woodland habitat quality also may affect the Cooper's hawk, including frequent and/or high intensity fire, altered hydrology and geomorphology, invasive species such as giant reed, oak disease, and oak acorn, seedling and sapling predation. In addition, contaminants (*e.g.*, dieldrin, PCB's, mercury, and other heavy metals) have been found in eggs but with unknown effects (Snyder *et al.* 1973; Pattee *et al.* 1985). A few recent cases of organophosphate poisoning have been reported (Rosenfield *et al.* 1991), but the effect on the population is unclear, as are the consequences of pesticide use in Mexico (Reynolds 1989). Collisions with cars have been documented, but the magnitude of this threat is unknown (Keran 1981).

Several large-scale habitat conservation plans have been implemented in southern California in the past decade where Cooper's hawk is a Covered Species. In 1998, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. In 2004, the Service issued a permit for the Western Riverside County MSHCP. These plans have

created large reserve systems that include substantial habitat for Cooper's hawk and requirements for monitoring and management actions beneficial to the long-term conservation of the species (Appendix 2).

Conservation Needs

The Cooper's hawk would benefit from the conservation of relatively undisturbed riparian and woodland habitats with dense tree stands for cover and in proximity to water. In addition, hydrological and other ecological processes necessary to maintain suitable habitat should be preserved.

Environmental Baseline

Within the Plan Area, the Cooper's hawk is a relatively common breeding resident in riparian and woodland habitats. Cooper's hawk nesting and foraging habitat was defined in the Plan as riparian and woodland and forest. A total of 7,687 ac (3,111 ha) of these habitats exists in the action area with 6,234 ac (2,523 ha) or 81 percent in Subarea 1, where most of the impacts of Plan implementation will occur. The NCCP database includes 42 historic nest sites, most of which are in Subarea 1 (Table A). These sites are distributed throughout the action area and include San Mateo Creek, the confluence of Talega and Cristianitos canyons, Gabino Canyon, La Paz Canyon, San Juan Creek, Bell Canyon, Wagon Wheel Canyon, lower Canada Gobernadora, and Arroyo Trabuco. There is no apparent clustering of nest sites, and no "major" or "important" populations were identified.

Table A for Cooper's Hawk: Cooper's hawk habitat (riparian and woodland and forest) and historic nest sites in the action area.

Action Area Components	**Total Amount of Cooper's Hawk Habitat (acres)**	**Cooper's Hawk Historic Nest Sites in NCCP Dataset**
Subarea 1		
Proposed RMV[1]	2,605	23
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	449	5
Prima Deshecha Landfill	32	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	2,218	8
Supplemental Open Space (Audubon Starr Ranch)	915	5
Other	15	**0**
Subtotal for Subarea 1	***6,234***	**41**
Subarea 2	595	0
Subarea 3	282	0
Subarea 4[2]	576	1
TOTAL	**7,687**	**42**

[1] Includes project footprint for RMV infrastructure in Subarea 4 (8 ac and 0 locations).
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (8 ac and 0 locations).

Effects of the Action

Direct Effects

The action area includes 7,687 ac (3,111 ha) of suitable habitat (riparian and woodland and forest) for the Cooper's hawk (Table A). Over the 75-year term of the permit, 756 ac (306 ha) or 10 percent would be destroyed by urban development, including infrastructure construction (Table B). In addition to the permanent impacts associated with urban development, the construction and maintenance of bridges, water storage tanks, drainage culverts, and water and sewer lines will temporarily impact 85 ac (34 ha) of habitat; no nest sites will be affected by these temporary impacts. All temporary impacts will be restored to equivalent or better conditions compared to the existing condition at the time of impact (Appendix U of the Plan).

A total of six Cooper's hawk historic nest sites or 14 percent will be impacted (Table B). However, we do not anticipate impacts to eggs or young since habitat will be cleared or grubbed only between September 15 and February 15, outside of the typical breeding season. The Permittee also will implement minimization measures for each construction project including a BRCP that provides for resource protection and establishes monitoring requirements. The BRCP will contain specific measures for the protection of Cooper's hawk nests during construction including erosion and siltation control measures, dust control measures, grading techniques, construction area limits, identification and quantification of habitats to be removed, and protective fencing around conserved and construction staging areas (Appendix U of the Plan).

Other Covered Activities that may impact Cooper's hawks, but are not expected to result in a permanent loss of habitat, include prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities. Prescribed burns could result in the disturbance of Cooper's hawks in the burn area. Habitat monitoring and management activities may occasionally disturb Cooper's hawks; however, we anticipate that these effects will be minor and will not result in injury or death of individual Cooper's hawks.

Indirect Effects

The Cooper's hawk will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section. Indirect effects include the potential for disturbance due to noise from roads and urban areas. Also, the frequency and timing of wildfires may change as a result of increased human-caused ignitions associated with new urban areas (Stephenson and Calcarone 1999) and increased access to the open space areas. Potential effects associated with an altered fire regime include changes to the vegetation community (Stephenson and Calcarone 1999) and effects due to increased wildfire suppression activities.

Table B for Cooper's Hawk: The amount of habitat (riparian and woodland and forest) and the number of Cooper's hawk historic nest sites permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the Cooper's hawk in the action area.

Covered Activities and Conservation Areas	**Habitat Impacts (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS [1] (acres)**	**Habitat with Status Unchanged (acres)**	**Nest Sites Impacted**	**Nest Sites in Habitat Reserve**	**Nest Sites in Prima SOS[1]**	**Nest Sites with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	727	1,878			6	17		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		449				5		
Subtotal of impacts and conservation by RMV and SMWD	**727**	**2,327**			**6**	**22**		
Prima Deshecha Landfill	17		15		0		0	
Avenida La Pata on RMV Lands	9	-9			0			
Avenida La Pata in Subarea 4	0				0			
Subtotal of impacts and conservation by the County of Orange	**26**		**15**		**0**			
Subtotal of impacts and assured conservation with adaptive management	**753**	**2,318**	**15**		**6**	**22**		
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 3							
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		2,218				8		
No Project				2,380				6
TOTAL	**756**	**4,536**	**15**	**2,380[4]**	**6**	**30**	**0**	**6[4]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 915 ac and 5 nest sites in Audubon Starr Ranch SOS.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section to address management of recreation/access and to minimize the effects of construction activities, the following conservation measures specific to and/or of particular importance for Cooper's hawks will be implemented.

Conservation and Restoration. The Habitat Reserve will contain 30 historic Cooper's hawk nest sites or 71 percent of the historic locations in the action area, including 22 locations on RMV lands and 8 locations within existing County Parks. The Habitat Reserve will also include 4,536 ac (1,836 ha) (59 percent) of the Cooper's hawk habitat in the action area, including 2,318 ac (938 ha) on RMV lands and 2,218 ac (898 ha) within existing County Parks. To help offset impacts at Prima Deshecha Landfill specifically, 15 ac (6 ha) of Cooper's hawk habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the Cooper's hawk.

Monitoring. Monitoring will be conducted at a species-specific level and a landscape level. The detailed monitoring program for the Cooper's hawk will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. The monitoring will focus will on the interface of urban and wildland areas to address risk from human activities; nesting status will be monitored as part of standard wildlife surveys.

Analysis of Impacts and Conservation by Planning Area

RMV has proposed to carry out development in eight Planning Areas and is anticipating development of these Planning Areas in sequential order: PA1 through PA8. Although it is not expected or anticipated, the Implementation Agreement states that RMV can terminate the 75-year permit at any time during their proposed phased development. Therefore, the conservation on a cumulative basis as each Planning Area is developed should be sufficient to avoid/minimize impacts. In addition to the conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance. A summary of Cooper's hawk occurrences and habitat by Planning Area that will be impacted and conserved is presented in Table C.

Build-out of PA6 and PA7 can occur at any time during the 75-year timeframe of Plan implementation. Since the build-out of PA6 and PA7 involve impacts to Cooper's hawk habitat and no conservation, we assume for the purposes of this analysis that these impacts could happen prior to PA1 as a worst-case scenario. Build-out of PA6 and PA7 would impact 5 ac (2 ha) of habitat and no known locations for the Cooper's hawk. The loss of 5 ac (2 ha) of habitat upon build-out of PA6 and PA7 will leave about 7,682 ac (3,109 ha) of habitat in the action area, although not necessarily in Habitat Reserve lands. The loss of the 5 ac (2 ha) associated with PA6 and PA7 will be more than offset by the monitoring and management of the 5 locations of Cooper's hawk historic nest sites and 449 ac (182 ha) of suitable habitat associated with Prior RMV lands within 6 months of permit issuance.

Table C for Cooper's Hawk: Cooper's hawk habitat (riparian, woodland, and forest) and historic nest sites permanently impacted and conserved/managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Nest Sites and Habitat Impacted (Cumulative Impacts)**		**Nest Sites and Habitat Conserved and Managed (Cumulative Conservation)**	
	Historic Nest Sites	**Habitat (acres)**	**Historic Nest Sites**	**Habitat (acres)**
PA1	1 (1)	9 (9)	1 (1)	79 (79)
PA2	1 (2)	49 (58)	8 (9)	249 (328)
PA3	0	148 (206)	3 (12)	576 (904)
PA4	2 (4)	118 (324)	0 (12)	13 (917)
PA5	0 (4)	220 (544)	0 (12)	128 (1,045)
PA6 & PA7	0 (4)	5 (549)	0 (12)	0 (1,045)
PA8	1 (5)	124 (673)	6 (18)	878 (1,923)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	1 (6)	50[1] (723)	-1 (17)	-42[1] (1,881)
Ortega Rock	0	1 (724)		
Santa Margarita Water District Impacts (Reservoir in Upper Chiquita Conservation Area)	0	3 (727)		-3 (1,878)
Subtotal for Proposed RMV and Associated Projects	6	727	17	1,878
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			5 (22)	449 (2,327)
TOTAL	**6**	**727**	**22**	**2,327**

[1] 42 ac of infrastructure impact are in the Habitat Reserve, and 8 ac are in SOS.
[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build out of PA1– PA8 as described below maintains nearly a 2:1 conservation to impact ratio for Cooper's hawk suitable nesting habitat and a 3:1 conservation/impact ratio for historic nest site locations throughout each phase and cumulatively results in a greater than 2:1 conservation/impact ratio for Cooper's hawk habitat and a greater than 3:1 conservation/impact ratio for historic nest site locations.

Build-out of PA1 will impact 9 ac (4 ha) of suitable habitat for Cooper's hawk and conserve 79 ac (32 ha) of habitat; one historic nest site location will be impacted and one conserved. Build-out of PA2 will impact 49 ac (20 ha) of suitable habitat and conserve 249 ac (101 ha) of habitat; one location will be impacted and 8 locations will be conserved. In total, the build-out of PA1 and PA2 will impact 58 ac (23 ha) and conserve 328 ac (133 ha) of suitable habitat for Cooper's hawk and conserve 9 historic nest site locations.

Build-out of PA3 will impact 148 ac (60 ha) of suitable habitat for Cooper's hawk and conserve 576 ac (233 ha) of habitat; no locations will be impacted and 3 locations will be conserved. In total, the build-out of PA1-PA3 will impact 206 ac (83 ha) and conserve 904 ac (366 ha) of suitable habitat for Cooper's hawk and conserve 12 historic nest site locations.

Build-out of PA4 will impact 118 ac (48 ha) and conserve 13 ac (5 ha) of suitable Cooper's hawk habitat. Build-out of PA5 will impact 220 ac (89 ha) of suitable habitat and conserve 128 ac (52 ha) of habitat. No occurrences will be impacted or conserved in PA4 or PA5. Cumulatively, 544

ac (220 ha) of suitable habitat for Cooper's hawk will be impacted and 1,045 ac (423 ha) of habitat and 12 historic nest site locations conserved with the build-out of PA1- PA5.

PA8 will impact 124 ac (50 ha) and conserve 878 ac (355 ha) of suitable habitat for Cooper's hawk; one historic nest site will be impacted, but six sites will be conserved. Cumulatively, 673 ac (272 ha) of suitable habitat for Cooper's hawk will be impacted and 1,923 ac (779 ha) of habitat and 18 nest site locations will be conserved with the build-out of PA1- PA8.

Lastly, the analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure in the Habitat Reserve and SOS or Covered Activities at Ortega Rock Quarry or by SMWD. Impacts to suitable habitat for Cooper's hawk associated with these activities will reduce conservation in the Habitat Reserve by 45 ac (18 ha). However, as noted above, within 6 months of permit issuance, 449 ac (182 ha) of suitable habitat in Prior RMV lands will be included in the Habitat Reserve and adaptively managed. In total, 22 of the 28 historic Cooper's hawk nesting sites or 79 percent of the sites on RMV lands and 2,327 ac (942 ha) or 76 percent of the suitable Cooper's hawk habitat on RMV lands will be conserved and adaptively managed within the Habitat Reserve, a greater than 3:1 conservation to impact ratio for Cooper's hawk suitable habitat and historic nest sites on RMV lands.

If RMV chooses to phase development by Alternative Order PA1, 3, 2, 4, 5, and 8, a significant amount of the habitat conservation will occur earlier with build-out of PA3. Since development of PA3 does not impact any historic nest site locations and conserves three locations, the conservation of nest site locations still exceeds the impact under this alternative phasing. Thus, this alternative phasing could be considered a slight improvement from the order analyzed above for Cooper's hawk habitat, although some of the significant conservation of historic nest sites will occur later in time with development of PA2.

If RMV chooses to phase development by Alternative Order PA1, 4, 3, 2, 5, and 8, conservation of suitable Cooper's hawk habitat lags behind impacts by 35 ac (14 ha) and three historic nest sites are impacted while only one is conserved. However, these impacts will be more than offset by the monitoring and management, within 6 months of permit issuance, of the 449 ac (182 ha) of suitable habitat within Prior RMV lands and five historic nest site locations. In addition, with build-out of PA3 conservation of suitable habitat again exceeds impacts by about a 2:1 ratio in all remaining phases of development. Likewise, this order of development causes the significant conservation of historic nest sites with development of PA2 to occur later in time, but overall the conservation of nest sites still exceeds the impact early on with development of PA3.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the Cooper's hawk. We base this conclusion on the following:

1. The species breeds in southern Canada, throughout most of the continental United States, and portions of northern Mexico. Therefore, the action area for this Plan represents a small fraction of the species' entire distribution.

2. Six historic nest sites and 756 ac (306 ha) of Cooper's hawk habitat will be developed or otherwise made unsuitable for these hawks, which represents 14 percent of the nest sites but only 10 percent of the Cooper's hawk habitat in the action area and a much smaller percentage of the habitat for this species across its range.

3. A total of 4,536 ac (1,836 ha) or 59 percent of suitable habitat for the Cooper's hawk in the action area, including 30 historic nest site locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 2,318 ac (938 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 2,218 ac (898 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 15 ac (6 ha) of Cooper's hawk habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 915 ac (370 ha) (12 percent) of Cooper's hawk nesting habitat, including five historic nest site locations, is conserved at NAS Starr Ranch.

5. Combined, 5,466 ac (2,212 ha) or 71 percent of the suitable nesting habitat for Cooper's hawk, including 35 historic nest site locations (83 percent), in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[8]

6. Implementation of the Plan will conserve, monitor, and manage large habitat blocks and associated linkages within the Habitat Reserve for the benefit of this species.

7. We anticipate that permanent protection of 30 historic nest site locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain Cooper's hawks in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the Implementation Agreement is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid for the following reasons:

[8] There is likely Cooper's hawk nesting habitat in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

1. Project impacts will be reduced by 29 ac (12 ha), and the mitigation within Prima Deshecha Landfill (15 ac; 6 ha) will not be implemented, such that an estimated 727 ac (294 ha) of suitable habitat for Cooper's hawk will be impacted, which represents about 9 percent of the Cooper's hawk habitat in the action area, and a small portion of the habitat for this species across its range.

2. Without the impacts from Avenida La Pata, the Habitat Reserve on RMV lands will increase slightly to include 1,878 ac (760 ha) of newly conserved Cooper's hawk habitat and 17 historic nest site locations and an additional 449 ac (182 ha) of habitat and 5 historic nest site locations on prior conserved RMV lands that will be adaptively managed for the species. At NAS Starr Ranch, 915 ac (370 ha) of suitable Cooper's hawk habitat and 5 historic nest site locations are conserved, and 2,218 ac (898 ha) of suitable nesting habitat and 8 nest site locations occur within County Park lands[9]; combined, at least 5,460 ac (2,210 ha) or 71 percent of the suitable habitat and 35 or 83 percent of the historic nest sites for Cooper's hawk in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.

3. The mitigation to offset the impacts on RMV lands includes conservation and adaptive management of 76 percent of the suitable habitat for Cooper's hawk that includes 79 percent of the historic nest site locations on RMV lands. This represents a greater than 3:1 conservation to impact ratio for Cooper's hawk habitat and historic nest site locations and a significant conservation contribution within the Subregion.

4. Implementation of the Plan will conserve, monitor, and manage large habitat blocks and associated linkages within the Habitat Reserve for the benefit of this species.

5. We anticipate that permanent protection of 22 locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain Cooper's hawk in the Southern Subregion and contribute to the range-wide conservation of this species.

Grasshopper Sparrow

Status of the Species

Listing Status

The grasshopper sparrow, *Ammodramus savannarum,* is a U. S. Fish and Wildlife Service Migratory Non-game Bird of Management Concern. It is not listed under the Federal Endangered Species Act.

[9] Cooperative management on County lands will not occur; thus, these lands will not be included in the Habitat Reserve and are now considered SOS by this analysis.

Species Description

The grasshopper sparrow is a small, flat-headed sparrow with a deep bill, cream-colored breast, dark crown, short, sharp tail and yellow wing edge (Vickery 1996). Four of the 12 subspecies of *Ammodramus savannarum* breed in North America including the eastern subspecies (*A. s. pratensis*), western subspecies (*A. s. perpallidus*), Arizona subspecies (*A. s. ammolegus*) and Florida subspecies (*A. s. floridanus*) (Bent 1968). The western subspecies breeds and winters in southern California.

Habitat Affinities

The grasshopper sparrow generally prefers moderately open grasslands and prairies with patches of bare ground for foraging, but it selects different components of vegetation, depending on the grassland ecosystem (Vickery 1996). In the arid grasslands of the southwestern U. S., the grasshopper sparrow occupies areas with more grass and shrub cover than in areas of higher precipitation.

Grasshopper sparrows in California breed and winter on slopes and mesas containing grasslands of varying compositions (Grinnell and Miller 1944; Garrett and Dunn 1981). The species frequents dense, dry or well-drained grassland, especially native grassland with a mix of grasses and forbs, for foraging and nesting. A thick cover of grasses and forbs is essential for concealment, but patches of bare ground are needed for foraging. They require fairly continuous native grassland areas with occasional taller stems for breeding areas (Garrett and Dunn 1981). Nests are built from grasses and forbs in a slight depression in the ground or hidden at the base of an overhanging clump of grasses or forbs (Bent 1968; Zeiner *et al.* 1990). Grasshopper sparrows use a variety of forb species for singing perches and choose them predominantly on the basis of their height rather than the specific plant species (Payne *et al.* 1998).

Life History

The grasshopper sparrow is a visual predator, foraging exclusively on the ground. Its diet varies by season, with insects (Orthoptera) being the primary food source in the summer and grass and forb seeds the primary food source during the winter. Depending on location, breeding takes place from early March to mid-July, with a peak in May and June. Grasshopper sparrow territories range in size from 0.8-4.3 ac (0.3-1.7 ha) and are vigorously defended by males through song, flight displays, and antagonistic interactions (Vickery 1996). Grasshopper sparrows average four eggs per clutch, and two to three broods per year are common. Incubation lasts approximately 11-12 days, and the young leave the nest at about 9 days of age, although they are unable to fly at this stage (Harrison 1978). Nests are well concealed, but they still fall prey to skunks, cats, raccoons and snakes. Adult grasshopper sparrows are also killed by loggerhead shrikes (*Lanius ludovicianus*) and hawks. Most grasshopper sparrows will migrate south from the breeding area in August or September, although fall migrants have been recorded in late September and early October on the Farallon Islands (DeSante and Ainley 1980).

Distribution

The grasshopper sparrow breeds from eastern Washington to southern Maine and southward to southern California and northernmost Mexico. The species has a disjunctive distribution through the more western portion of the United States and is not present within the mountain and desert regions. It is a year-round resident in the western states and in the southern portions of the southeastern states. Grasshopper sparrows winter from California to North Carolina and south through Middle America to Costa Rica. In southern California, the species occurs locally in appropriate habitats west of the deserts and has nested up to 4,920 ft (1,500 m) in the San Jacinto Mountains.

Rangewide Trends and Current Threats

Populations of the grasshopper sparrow, especially the easternmost and westernmost subspecies, have declined by 69 percent across the United States since the late 1960s. Survey data show an annual decline of 6.9 percent throughout North America from 1980 to 2004 (Sauer *et al*. 2005), with an annual decline of 4.5 percent in the western United States between 1966 and 1994 (Vickery 1996). Declines have been attributed to loss of habitat, conversion of pasture to intensive row crops, and inhibition of fire.

In southern California, the grasshopper sparrow was once widespread through the Riverside area to Beaumont (Garrett and Dunn 1981). In a survey of the Puente-Chino Hills, grasshopper sparrows were found breeding in only one area of Los Angeles County, south of Rowland Heights (Cooper 2000). In San Diego County, suitable habitat for the grasshopper sparrow has diminished due to urban development of the coastal lowland (Garrett and Dunn 1981; Unitt 1984). Currently, only five locations in San Diego County support breeding grasshopper sparrows (Unitt 2004). Unitt (2004) cited 85 breeding pairs in San Diego County, however, numbers for MCB Camp Pendleton are much higher than were reported. It is estimated that MCB Camp Pendleton supports a minimum of 500 territories (P. Beck, CFWO, pers. comm. to C. Beck, CFWO, 2006). Actual numbers for Riverside County are not known, but the Prado Basin, Santa Rosa Plateau, Lake Skinner/Diamond Valley Lake area, Lake Mathews-Estelle Mountain, Wasson Canyon, and Murrieta Hot Springs areas are all core areas for this species (USFWS 2004).

Continuing threats to grasshopper sparrows include habitat loss, degradation, and fragmentation. In more arid grasslands, such as those found in southern California, removal of grass cover by grazing can be considered detrimental to the species (Vickery 1996). Garrett and Dunn (1981) concluded that grasshopper sparrow breeding has declined in recent decades because of development of open hilly areas that include its preferred habitat.

Permits for three large-scale habitat conservation plans have been issued in southern California that included the grasshopper sparrow as a Covered Species (Appendix 2). The Service issued permits to San Diego Gas and Electric in 1995, for the Multiple Habitat Conservation Plan for northwestern San Diego County in 1998, and for the Western Riverside County MSHCP in 2004. These plans have created large reserve systems that include habitat for grasshopper sparrow and

requirements for monitoring and management actions beneficial to the long-term conservation of the species (Appendix 2).

Conservation Needs

Depending on the type of grassland ecosystem, prescribed burning, grazing, and mowing are all management techniques that have been used to enhance grasshopper sparrow habitat (Vickery 1996). However, in California and other more arid grassland systems, grazing is not known to be specifically beneficial to the species (Vickery 1996). Conservation and restoration of the remaining large tracts of grassland would be the most effective means of recovery for this species. Focused breeding surveys would also be warranted to determine accurate numbers of breeding individuals still present in the action area.

Environmental Baseline

Suitable habitats for this species include grassland/alkali meadow and barley fields. Within the action area there are a total of 18,759 ac (7,591 ha) of grassland and agriculture habitats (grassland), of which 12,628 ac (5,110 ha) or 67 percent are found in Subarea 1, where most of the impacts from Covered Activities will occur. In addition, a total of 708 grasshopper sparrow locations were documented in the action area, of which 656 or 93 percent are in Subarea 1 (Table A). These observations were not documented nest sites and do not distinguish breeding pairs from individuals. Although this dataset does not provide a population estimate, it does show historic and recent grasshopper sparrow habitat use in the action area.

Grasshopper sparrows were found breeding at the following locations within the action area: Chiquita Canyon, Chiquadora Ridge, Gobernadora Canyon, Radio Tower Road area, Cristianitos Canyon, lower Gabino Canyon and Blind Canyon. The conservation analysis for the grasshopper sparrow is based on site-specific information (*i.e.*, documented locations and identified "major" and "important" populations) and landscape-level habitat factors including amount of habitat conserved and habitat patch size and within-patch contiguity.

The action area appears to support one "major" population and two "important" populations of grasshopper sparrows that account for about 96 percent of the documented locations in the Southern Subregion. The "major" population is found in middle and lower Chiquita Canyon (*i.e.*, south of Oso Parkway), Chiquadora Ridge, and Gobernadora Canyon and includes 380 grasshopper sparrow locations. The two "important" populations include: 1) grasslands in the Radio Tower Road area extending south through the grasslands of Prima Deshecha to Avenida Pico, which has 152 grasshopper sparrow locations and 2) the grasslands within Cristianitos Canyon and lower Gabino and Blind canyons, which has 148 locations.

Table A for Grasshopper Sparrow: Grasshopper sparrow habitat (grassland, alkali meadow, and agriculture) and locations in the action area

Action Area Components	**Total Amount of Grasshopper Sparrow Habitat (acres)**	**Grasshopper Sparrow Locations in NCCP Dataset**
Subarea 1		
Proposed RMV[1]	7,531	583
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	1,964	45
Prima Deshecha Landfill	815	25
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	1,694	2
Supplemental Open Space (Audubon Starr Ranch)	624	1
Subtotal for Subarea 1	***12,628***	**656**
Subarea 2	542	0
Subarea 3	463	4
Subarea 4[2]	5,126	48
TOTAL	**18,759**	**708**

[1] Includes project footprint for RMV infrastructure in Subarea 4 (15 ac and 1 location).
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (15 ac and 1 location).

Effects of the Action

Direct Effects

The action area includes 18,759 ac (7,591 ha) of suitable nesting and foraging habitat for the grasshopper sparrow and 708 sparrow locations (Table A). For all Covered Activities over the 75-year term of the permit and within the action area, 3,769 ac (1,525 ha) or 20 percent of grasshopper nesting and foraging habitat will be permanently impacted. The impact area includes 267 grasshopper sparrow locations or 38 percent of the locations documented in the action area (Table B).

Infrastructure improvements by RMV and SMWD will temporarily impact 212 ac (86 ha) of grassland in the Habitat Reserve and SOS in Subareas 1 and 4. Fifteen grasshopper sparrow locations in the Habitat Reserve will be temporarily impacted as a result of infrastructure improvements. Future landslide remediation activities on Prima Deshecha Landfill may temporarily impact additional grassland and grasshopper sparrow locations.

Covered Activities for RMV and SMWD, including Ortega Rock, will permanently impact 3,020 ac (1,222 ha) of grassland or 16 percent of the grassland within the action area and 32 percent of the grassland on RMV lands. The RMV impact area includes 220 or 31 percent of the grasshopper sparrow locations within the action area and 35 percent of the locations on RMV lands (Table B).

Table B for Grasshopper Sparrow: The amount of habitat (grassland, alkali meadow, and agriculture) and the number of grasshopper sparrow locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the grasshopper sparrow in the action area.

Covered Activities and Conservation Areas	**Habitat Impacts (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS[1] (acres)**	**Habitat with Status Unchanged (acres)**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations conserved in SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infra-structure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	3,020	4,511			220	363		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		1,964				45		
Subtotal of impacts and conservation by RMV and SMWD	**3,020**	**6,475**			**220**	**408**		
Prima Deshecha Landfill	484		331		17		8	
Avenida La Pata on RMV Lands	154	-154			28	-28		
Avenida La Pata in Subarea 4	96				2			
Subtotal of impacts and conservation by the County of Orange	**734**		**331**		**47**	**380**		
Subtotal of impacts and assured conservation with adaptive management	**3,754**	**6,321**	**331**		**267**			
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 15				0			
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	0	1,694				2		
No Project				6,644				51
TOTAL	**3,769**	**8,015**	**331**	**6,644[4]**	**267**	**382**	**8[4]**	**51[4]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 624 ac and 1 location in Audubon Starr Ranch SOS.

The County Covered Activities at Prima Deshecha Landfill will permanently impact 484 ac (196 ha) or 59 percent of the mostly disturbed grassland at the Landfill, including 17 of the 25

grasshopper sparrow locations (68 percent). Avenida La Pata road extension will impact an additional 250 ac (101 ha) of grassland including 154 ac (62 ha) within the Habitat Reserve and 96 ac (39 ha) within Subarea 4. This project will impact 28 grasshopper sparrow locations. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program," could allow the impact of up to 15 ac (6 ha) of grassland but no known grasshopper sparrow locations in parcels 1-17.

We do not anticipate mortality or injury of adult or juvenile grasshopper sparrows or grasshopper sparrow nests or eggs during habitat grading or grubbing since a biological monitor will flush grasshopper sparrows out of harms way and habitat removal will be conducted outside of the grasshopper sparrow breeding season (February 15 - September 15). We anticipate that all of the grasshopper sparrow habitat in the areas permanently impacted by Covered Activities will be developed or otherwise made unsuitable for grasshopper sparrow. Less available habitat may lead to increased competition for remaining habitat resulting in increased stress and energy expenditure beyond normal behavior. Birds that do not find suitable replacement habitat may starve or otherwise die from lack of shelter or predation.

In addition to the effects of urbanization, cattle grazing may impact the grasshopper sparrow. Existing cattle grazing is expected to continue to overlap most grasshopper sparrow locations within the action area. In addition to current grazing, grazing will be reintroduced to two pastures: the eastern portion of River Pasture and TRW Pasture. Cattle grazing may result in the trampling of nests and increase cowbird densities.

Other Covered Activities that may impact grasshopper sparrow, but are not expected to result in a permanent loss of habitat, include prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities. Prescribed burns could result in the disturbance of grasshopper sparrows in the burn area. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may occasionally disturb grasshopper sparrows in the project area. Habitat management and monitoring activities may occasionally disturb grasshopper sparrows that are within active restoration areas but are not anticipated to result in death or injury to individual birds.

A total of 137 of 380 locations (36 percent) in the Chiquita Ridge/Chiquadora Ridge/ Gobernadora "major" population and 63 of 148 locations (43 percent) in the Cristianitos/Lower Gabino/Blind Canyons "important" population will be impacted. Fifty-two of 152 locations (34 percent) in the Radio Tower Road-Prima Deshecha "important" population will be impacted, of which 30 are in the conceptual Avenida La Pata Improvement Project footprint. The impact level could be reduced with more refined impact areas for PA6 and 7 and possibly for the Avenida La Pata Improvement Project.

Indirect Effects

The grasshopper sparrow could be subject to indirect effects from Covered Activities as described in the "General Effects" section of this biological opinion and more specifically as follows.

Indirect effects include the potential for disturbance due to noise from roads and urban areas. In addition, indirect effects can occur due to increased cowbird densities associated with grazing via cowbird parasitism. Edge effects associated with urban areas may include the potential for increased predation rates from domestic cats.

Habitat patch size appears to be an important factor affecting grasshopper sparrow populations. According to the NCCP/MSAA/HCP (Appendix E), predation rates are a major cause of nest failure and are highest in patch sizes less than approximately 37 ac (15 ha), and grasshopper sparrows appear to avoid nesting within approximately 165 ft (50 m) of habitat edges.

Also, the frequency and timing of wildfires may change as a result of increased human-caused ignitions associated with new urban areas (Stephenson and Calcarone 1999) and increased access to the open space areas. Potential effects associated with an altered fire regime include changes to the vegetation community (Stephenson and Calcarone 1999) and effects due to increased wildfire suppression activities.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological/conference opinion to address management of recreation/access and non-native species and to minimize the effects of construction activities, the following conservation measures specific to and/or of particular importance for grasshopper sparrows will be implemented.

Conservation and Restoration: The Habitat Reserve will contain 382 grasshopper sparrow locations or 54 percent of the locations in the action area, including 380 locations on RMV lands and 2 locations within existing County Parks. The Habitat Reserve will also include 8,015 ac (3,244 ha) (43 percent) of the grasshopper foraging and nesting habitat in the action area, including 6,321 (2,558 ha) on RMV lands and 1,694 ac (686 ha) within existing County Parks. To help offset impacts at Prima Deshecha Landfill and due to the extension of Avenida La Pata, 331 ac (134 ha) of habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the grasshopper sparrow. However, approximately 170 of those disturbed grassland acres will be converted to CSS, leaving a total of approximately 161 ac (65 ha) of grassland on the Landfill in SOS. The Habitat Reserve will include 222 or 61 percent of the grasshopper sparrow locations in the Chiquita sub-basin/Chiquadora Ridge/Gobernadora "major" population and at least 146 or 56 percent of the grasshopper sparrow locations in the two "important" populations.

In addition to conservation and management of Habitat Reserve areas for grasshopper sparrow and restoration of temporarily impacted areas, the permittee will implement minimization measures described in Appendix U of the Plan. For each construction project, the applicant will develop and implement a BRCP that provides for resource protection and establishes monitoring requirements. The BRCP will contain specific measures for the protection of grasshopper sparrow during construction, including erosion and siltation control measures, dust control measures, grading techniques, construction area limits, identification and quantification of habitats to be removed, and protective fencing around conserved and construction staging areas.

Grazing Management: Several factors should minimize the potential effects of grazing on the grasshopper sparrow. Cattle have been rotated between pastures based on water and forage availability and a desire to maintain an average of 25 percent residual dry matter for natural pastures. The maintenance of a limit on grazing intensity should minimize the potential for trampling of nests and effects to native grasslands. Also, appropriately timed grazing can increase the vigor of native grasslands and its value as grasshopper sparrow habitat, by removal of thatch and litter, recycling of nutrients, stimulation of tillering (sprouting of new stalks), and removal and control of alien species. In addition, cowbird parasitism is not thought to be a major problem for grasshopper sparrows (Vickery 1996). Regardless, cowbird trapping will be conducted in the Habitat Reserve to benefit native passerines, as necessary. Finally, grazing is an existing use that has occurred for over 100 years; existing practices have been compatible with maintaining grasshopper sparrow locations.

Monitoring: Monitoring will be conducted at a species-specific level and a habitat landscape level. This species will be monitored primarily through vegetation based sample plots (see page 7-212-213 in the NCCP/HCP). Annual botanical and wildlife field studies will be conducted within predestinated sample plots to monitor fine-grained changes (in contrast to the more coarse vegetation mapping) in habitat used by the grasshopper sparrow. The detailed monitoring program for the grasshopper sparrow will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. For a more detailed description of the monitoring that will occur for this species, see Chapter 7 and Appendix E of the NCCP/HCP.

Analysis of Impacts and Conservation by Planning Area

A summary of grasshopper sparrow locations and habitat that will be impacted and conserved from RMV and SMWD Covered Activities is presented in Table C below. In addition to the impacts and conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Build out of PA1– PA8 as described below cumulatively maintains a greater than 1:1 conservation to impact ratio for grasshopper sparrow nesting and foraging habitat as each phase develops.

Build-out of PA1 will impact 3 locations and conserve 85 locations of grasshopper sparrow. Build-out of PA1 will result in protection of a large area of the Radio Tower Road-Prima Deshecha “major” population. Build-out of PA2 will impact 82 locations and conserve 210 locations of grasshopper sparrow. Upon build-out of PA1 and PA2, the Chiquita Canyon/Chiquadora Ridge/Gobernadora “important” population will be affected; however, large and contiguous portions of grasshopper sparrow habitat will remain. The conservation area will connect the Chiquita Canyon/Chiquadora Ridge/Gobernadora “important” and Radio Tower Road-Prima Deshecha “major” populations.

Build-out of PA3 will impact 53 locations and conserve 12 locations of grasshopper sparrow. Build-out of PA3 will affect the Chiquita Canyon/Chiquadora Ridge/Gobernadora “important”

population, but it will still leave a large and contiguous area of habitat for the grasshopper sparrow.

Table C for Grasshopper Sparrow: Grasshopper sparrow (GRSP) habitat (grassland, alkali meadow, and agriculture) and locations permanently impacted and conserved/managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**GRSP Locations and Habitat Impacted (Cumulative Impacts)**		**GRSP Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	3 (3)	461 (461)	85 (85)	631 (631)
PA2	82 (85)	562 (1,023)	210 (295)	1,253 (1,884)
PA3	53 (138)	806 (1,829)	12 (307)	341 (2,225)
PA4	0 (138)	114 (1,943)	5 (312)	67 (2,292)
PA5	3 (141)	325 (2,268)	5 (317)	297 (2,589)
PA6 & PA7	34 (175)	50 (2,318)	0 (317)	324 (2,913)
PA8	25 (200)	500 (2,818)	64 (381)	1,785 (4,698)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	19 (219)	156[1] (2,974)	-17[1] (364)	-141[1] (4,557)
Ortega Rock	0 (219)	0 (2,974)		
Santa Margarita Water District Impacts (Reservoir in Upper Chiquita Conservation Area)	1 (220)	46 (3,020)	-1 (363)	-46 (4,511)
Subtotal for Proposed RMV and Associated Projects	220	3,020	363	4,511
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			45 (408)	1,964 (6,475)
TOTAL	**220**	**3,020**	**408**	**6,475**

[1] Infrastructure will impact 141 ac and 17 locations in the Habitat Reserve and 15 ac and 2 locations outside the Habitat Reserve (in SOS and an existing orchard in PA2).
[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA4 will not impact grasshopper sparrow locations but will result in the conservation of 5 locations. Build-out of PA5 will impact 3 locations and conserve 5 locations of grasshopper sparrow. Build-out of PA4 and PA5 will have a relatively minor impact on grasshopper sparrow in the action area.

Build-out of PA6 and PA7 can occur at any time during the 75-year timeframe of Plan implementation. Build-out of PA6 and PA7 will impact up to 34 locations of grasshopper sparrow. Build-out of PA6 and PA7 will impact the Cristianitos/Lower Gabino/Blind Canyon "important" population of grasshopper sparrows. The loss of up to 34 locations upon build-out of PA6 and PA7 will leave about 114 locations of grasshopper sparrows in this population.

Build-out of PA8 will impact 25 locations and conserve 64 locations of grasshopper sparrow. Build-out of PA8 will impact and conserve the portions of the Cristianitos/Lower Gabino/Blind Canyon "important" population.

The analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure in the Habitat Reserve. The construction of infrastructure in the Habitat Reserve will impact 19 locations and 156 ac (63 ha) of suitable grasshopper sparrow habitat. The impacts associated with infrastructure represent a portion of the total impacts and will be spread throughout the life of the project. In addition, there will be conservation and management of the Covered Species including 45 locations of grasshopper sparrow and 1,964 ac (795 ha) of grassland on the Prior RMV lands within 6 months of permit issuance. The Prior RMV lands add substantial value to the conservation goal of maintaining habitat and grasshopper sparrow locations. Overall, the impacts from RMV/SMWD Covered Activities (3,020 ac (1,222 ha) and 220 locations) are mitigated by the substantial conservation and adaptive management of 6,475 ac (2,620 ha) of grasshopper sparrow habitat and 408 grasshopper sparrow locations, a conservation to impact ratio slightly greater than 2:1 for grasshopper sparrow habitat and nearly 2:1 for grasshopper sparrow locations.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 or Alternative Order 1, 4, 3, 2, 5, and 8, conservation of grasshopper sparrow suitable habitat lags the development impacts by several hundred acres with development of PA3. However, the early conservation and adaptive management of Prior RMV lands more than offsets the higher ratio of impacts/conservation associated with the build-out of PA3 prior to the significant conservation of PA2. In either of the above alternative phasing scenarios, the cumulative conservation to impact ratio of grasshopper sparrow locations is maintained at greater than 1:1 ratio following each development phase.

Conclusion

After reviewing the current status of the grasshopper sparrow, the environmental baseline for the action area, the effects of the action and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the grasshopper sparrow. We base this conclusion on the following:

1. This species ranges across the continental United States and into Mexico; thus, the impacts under the Plan will occur over a very small fraction of its overall range. Populations of grasshopper sparrows also occur near the action area within the region, including large occurrences on MCB Camp Pendleton.

2. Two-hundred sixty seven (267) grasshopper sparrow locations (38 percent) and a total of 3,769 ac (1,525 ha) or 20 percent of suitable grasshopper sparrow habitat in the action area will be permanently impacted by Covered Activities.

3. With Plan implementation the action area will maintain a large population of grasshopper sparrows. A total of 8,015 ac (3,244 ha) or 43 percent of the grasshopper sparrow habitat in the action area, including 382 grasshopper sparrow locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 6,321 ac (2,558 ha) of habitat on RMV lands that will be adaptively managed for the species, which

includes 380 grasshopper sparrow locations. In addition 1,694 ac (686 ha) of habitat, with an additional 2 grasshopper sparrow locations, are within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. In addition, 8 locations of grasshopper sparrow and 161 ac (65 ha)[10]of grasshopper sparrow habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 624 ac (253 ha) of grasshopper sparrow habitat and l location are conserved in SOS at NAS Starr Ranch.

5. Combined, 8,800 ac (3,561 ha) or 47 percent of the grasshopper sparrow habitat and 391 or 55 percent of the grasshopper sparrow locations in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[11]

6. The Habitat Reserve will include 222 or 61 percent of the grasshopper sparrow locations in the Chiquita sub-basin/Chiquadora Ridge/Gobernadora "major" population and at least 146 or 56 percent of the grasshopper sparrow locations in the two "important" populations.

7. We anticipate that permanent protection of grasshopper sparrow locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain grasshopper sparrow in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid for the following reasons:

1. Impacts of the Covered Activities will be reduced to the loss of 220 grasshopper sparrow locations and 3,020 ac (1,222 ha) of suitable grasshopper sparrow, which represents 31 percent of the locations and 16 percent of the suitable grasshopper sparrow habitat in the action area.

2. The conservation proposed by RMV will still be implemented such that 68 percent of the suitable grasshopper sparrow habitat (6,475 ac (2,622 ha)) and 65 percent (408) of the grasshopper sparrow locations on RMV lands will be conserved and adaptively managed within the Habitat Reserve, including 61 percent of the grasshopper sparrow locations in

[10] The County will avoid and manage approximately 331 ac (134 ha) within SOS on the Landfill; but approximately 170 of those disturbed grassland acres will be converted to CSS, leaving a total of approximately 161 ac (65 ha) of grassland on the Landfill in SOS.

[11] There is likely grasshopper sparrow habitat in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

the Chiquita sub-basin/Chiquadora Ridge/Gobernadora "major" population and at least 56 percent of the grasshopper sparrow locations in the two "important" populations.

3. At NAS Starr Ranch, one location and 624 ac (253 ha) of habitat are conserved, and two locations and 1,694 ac (686 ha) of grasshopper sparrow habitat occur within County Park lands[12]. In total, 8,793 ac (3,559 ha) of suitable grasshopper sparrow habitat or 47 percent and 411 grasshopper sparrow locations or 58 percent will be conserved or remain in open-space lands.

4. Most of the grasshopper sparrow locations in the Habitat Reserve will still be in large habitat areas, which should help minimize edge effects.

5. Even in absence of cooperative management with the County, we anticipate that the permanent protection of known locations of the grasshopper sparrow and its habitat combined with long-term management and monitoring actions within the Habitat Reserve will still help sustain grasshopper sparrow in the Southern Subregion and contribute to the range-wide conservation of this species.

Long-eared Owl (*Asio otus*)

Status of the Species

Listing Status

The long-eared owl was designated a Species of Special Concern by the California Department of Fish and Game. It is not listed under the Federal Endangered Species Act.

Species Description

The long-eared owl is a medium-sized owl (13-16 in) (33-41 cm) with a large head and round conspicuous "ear" tufts. Its wings are long and rounded and its body feathers are a mix of black, brown, gray, buff and white. The species exhibits sexual dimorphism with the female slightly larger than the male (Marks *et al*. 1994). There are six subspecies currently recognized, two of which occur in North America: *A. o. wilsonianus* is found in eastern North America and *A. o. tuftsi* is found is western North America.

Habitat Affinities

The long-eared owl breeds in a variety of habitats depending on its geographic location. In general it favors dense vegetation adjacent to grasslands, shrublands or open forests (Marks *et al*. 1994). In Idaho, large numbers nest in willows, cottonwoods, and junipers adjacent to shrubsteppe desert, while in Michigan and western Oregon it inhabits coniferous or deciduous forest near open meadows. In southern California, the species nests in willow thickets in the

[12] Cooperative management on County lands will not occur; thus, these lands will not be included in the Habitat Reserve and are now considered SOS by this analysis.

coastal and lowland valleys and in oak woodland at higher elevations (Garrett and Dunn 1981; Hamilton and Willick 1996; Unitt 2004).

Migrant and wintering long-eared owls likely forage in open habitats such as grasslands, deserts, and forest openings. Winter habitat is largely similar to breeding habitat and in some cases, the same tree groves have been used for both breeding and wintering (Marks *et al*. 1994). In the west, communal roosts are formed in dense willow thickets and groves of salt cedar, palo verde, and conifers. An important attribute of winter roosting sites seems to be dense vegetation for concealment and thermal cover. Roost groves are adjacent to open habitats used for foraging.

Life History

The long-eared owl feeds on a wide variety of small mammals including voles, deer mice, pocket mice, kangaroo rats, pocket gophers, shrews, young rabbits, grasshopper mice, and harvest mice, and some species of passerine birds (Marks *et al*. 1994). Unusual prey items for this species include lizards, snakes, and bats.

The long-eared owl is a monogamous species, but it is unknown whether the pair bond is formed at the winter roost or at the nest site (Marks *et al*. 1994). The long-eared owl does not build its own nest but instead uses nests built by other bird species including black-billed magpies, American crows, common ravens, Cooper's hawks and various species of buteos (Bent 1938; Bloom 1994; Marks *et al*. 1994). Nests are generally 4 to 25 ft (1-8 m) above the ground, and long-eared owls prefer to nest in tree groves that are greater than 30-feet wide (Marks 1986). Nests may be reused by long-eared owls in subsequent years, but often by different individuals (Marks *et al*. 1994). The long-eared owl does not appear territorial and does not defend any space outside the immediate vicinity of the nest. Breeding home range size for this species has not been well documented, but one study in Idaho found a breeding male covered approximately 500 ac (203 ha) in any given night over a five-night period (Hilliard *et al*. 1982).

The long-eared owl arrives to the breeding site by early March and eggs are laid mid-March to mid-May (Marks 1986). Average clutch size for this species is four to five eggs, and only one brood per year is attempted. The eggs are incubated for 26-28 days, and the chicks are brooded for at least two weeks. Although not capable of flight, the young leave the nest at 21 days of age. Young can fly by 35 days of age but are still fed by the parents until 12 weeks of age.

Predators of adult long-eared owls include great horned owls, barred owls, golden eagles, and red-tailed and red-shouldered hawks (Marks *et al*. 1994). Probable predators of eggs, chicks, and nestlings include raccoon, porcupine, northern goshawk, bull snake, American crow, black-billed magpie, and Cooper's, red-tailed, and red-shoulder hawks.

Distribution

In North America, the long-eared owl breeds from southern and eastern British Columbia, northern Yukon, and northern Alberta across central Canada to the Maritime Provinces and south to northwestern Baja California, southern Arizona, and southern New Mexico east to Pennsylvania, New York and northern New England (AOU 1983). It also breeds down the

Appalachian Mountains into Virginia. In California, the long-eared owl is an uncommon resident or winter visitor throughout most of the northern part of the State, excluding the humid North Coast Range, Cascade Range, and the higher elevations of the Sierra Nevada (Zeiner *et al*. 1990). This species is also an uncommon resident in southern California and occurs primarily in riparian groves and plantings of larger trees in the Owens Valley, Fish Lake Valley, and numerous wooded washes and oases throughout the desert (Garrett and Dunn 1981) and coastal lowlands (Unitt 2004).

The long-eared owl winters largely from southern Canada south to northern Baja California, interior Mexico, southern Texas, the Gulf coast and Georgia (AOU 1983). In California, it is a winter visitor of tamarisk and other tree stands in the Mojave Desert and along the southern coastline (Zeiner *et al*. 1990). Winter roosts involving up to 20 birds have been found regularly at Yaqui Wells, Afton Canyon, and Antelope Valley (Garrett and Dunn 1981).

Rangewide Trends and Current Threats

Although the long-eared owl is widely distributed throughout the United States, no population estimates have been reported in the literature. Marks *et al*. (1994) stated the species was relatively common in the western United States but also stated population numbers fluctuate from year-to-year. Trends for this species based on Breeding Bird Survey data are not available, but status reviews based on qualitative information are available from the western and mid-western United States. Declining trends were postulated for California, Maryland, Pennsylvania, Indiana and South Dakota, with stable numbers elsewhere. Each report emphasized that little is known about long-term population trends for this species. Quantitative evidence of population declines have been collected for California, New Jersey, and Minnesota (Marks *et al*. 1994).

Zeiner *et al*. (1990) stated that the resident long-eared owl population in California has been declining since the 1940s, especially in southern California where it was once considered common throughout the lowland cismontane areas of the State (Hamilton and Willick 1996). Currently, there are few recent confirmed breeding locations for this species in southern California. In western Riverside County, there is one documented breeding record from 1991 for Potrero Creek that included a nest site, one fledgling bird and an adult pair (Dudek and Associates 2001c). It also occurs in mature willow woodland of the Prado Basin (Cooper 2000). No records exist in the California Natural Diversity Database (2006) for Los Angeles County, although it may still persist in Antelope Valley. The Breeding Bird Atlas data suggests 50-200 pairs of long-eared owl are still nesting in San Diego County (Unitt 2004). Sites in the county still supporting breeding long-eared owls include Sycamore Canyon, Guajome Lake, Tijuana River Valley, and MCB Camp Pendleton. In Orange County, this species was found nesting in Wagon Wheel and Bell Canyon/Starr Ranch in 1984 (CNDDB 2006). In each location, two pairs of birds were found nesting, and the pair at Starr Ranch was seen with young. In 1992, according to Hamilton and Willick (1996), 12 active nests were found in Orange County (locations not given), and 11 produced young. These 12 nest sites were not active during the 1994 and 1995 breeding seasons. All nests were found at least 0.5 mi (0.80 km) from residential development.

Early and recent declines of the species are attributed to habitat loss and fragmentation, especially in southern California where over 90 percent of riparian woodlands and a majority of the grassland habitats have been lost to urban development. Disturbance at nest and roost sites is another possible factor contributing to long-eared owl declines. In one study, females flushed from a nest during the daytime generally returned within 10 minutes; however, predation of eggs or hatchlings occurred during this time period (Marks 1986). In southern California, Bloom (1994) suggested this species rarely tolerates disturbance within 0.5 mi (0.80 km) of a breeding territory.

Conservation Needs

The long-eared owl would benefit from the conservation of undisturbed riparian and woodland habitats throughout the Plan Area. Within these habitats, this species prefers wide stands of trees for nesting that are adjacent to open areas for foraging. The conservation of known and future breeding locations of long-eared owl within the above habitats is needed for this species to persist in the Plan Area. In addition, hydrological and other ecological processes necessary to maintain suitable habitat should be preserved.

Environmental Baseline

The conservation analysis for the long-eared owl focuses on documented historic nest sites within the action area and not on impacts or conservation to breeding or wintering habitat because of the relative rarity of the species in the action area compared to other raptors. Therefore, no impact or conservation acreages for breeding or wintering habitat were given in the NCCP/MSAA/HCP document.

A total of eight historic nest sites occur in the action area, and all of them are located in Subarea 1. These eight sites include lower Talega Canyon near the confluence with Cristianitos Creek, lower La Paz Canyon, middle Gabino Canyon, Bell Canyon (two locations at Starr Ranch), Fox Canyon (east of upper Bell Canyon at Starr Ranch), Sulphur Canyon, and Arroyo Trabuco north of Santa Margarita Parkway (O'Neil Regional Park). In addition, a 9th site is located in upper Talega Canyon immediately adjacent to RMV on MCB Camp Pendleton (Fig. 197-M), but outside the action area. In 1992, four additional breeding territories were documented in the action area: one located north of Ortega Highway in Canada Gobernadora and three located in Cristianitos Canyon. These breeding territories were not included in the NCCP raptor database because they did not have documented nest site locations and were therefore not included in the NCCP/MSAA/HCP analysis.

The above information regarding long-eared owl nest sites is a cumulative data set that was compiled over a period of 10 years or more; thus, we have no information regarding the number of long-eared owls that may be using these nest sites at any one time.

Table A for Long-eared Owl: Long-eared owl historic nest sites in the action area.[1]

Action Area Components	**Long-eared Owl Historic Nest Sites**
Subarea 1	
Proposed RMV	4
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	0
Avenida La Pata	0
Prima Deshecha Landfill	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park, including Ortega Rock)	1
Supplemental Open Space (Audubon Starr Ranch)	3
Subtotal for Subarea 1	***8***
Subarea 2	0
Subarea 3	0
Subarea 4	0
TOTAL	**8**

[1] The conservation analysis is based on historic nest sites rather than habitat because of the relative rarity of the species in the Planning Area compared to other raptors.

Effects of the Action

Direct Effects

The proposed Covered Activities will result in permanent impacts to 2 out of 8 long-eared owl historic nest sites (25 percent) in PA2 and PA8 (Table B). Three sites and a portion of a foraging area from the site immediately adjacent to RMV in Upper Talega Canyon on MCB Camp Pendleton will be included in the Habitat Reserve.

The historic nest sites in PA2 and PA8 that will be permanently impacted are located in woodland habitat that is less than 100 ft (31 m) from proposed development. The historic nest site location in lower Cristianitos Canyon in PA 8 is also currently within 100 ft (31 m) of the Talega development and may already be extirpated. Although we do not expect direct mortality of any long-eared owls from grading or grubbing of nearby habitat, the permanent loss of this habitat and the permanent effects from the proximity of the development will likely render these nest sites unusable. Loss of these nest sites and much of each associated breeding territory would force birds into other areas that may already be occupied and thus increase the competition for any remaining available habitat. Displaced birds may be able to disperse to adjacent habitats; however, displaced birds that do not find suitable replacement habitat may starve or otherwise die from lack of shelter or predation. Lastly, owls that do find suitable habitat may lose their mates and be unable to find new mates, at least initially after disturbance, causing a decline in reproductive output.

Table B for Long-eared Owl: Long-eared owl historic nest sites permanently impacted by Covered Activities and the corresponding sites that will be conserved and adaptively managed as long-eared owl nest sites.

Covered Activities and Conservation Areas	**Long-eared Owl Historic Nest Site Impacts**	**Long-eared Owl Historic Nest Sites in Habitat Reserve**	**Long-eared Owl Historic Nest Sites in SOS**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	2	2	
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		0	
Subtotal of impacts and conservation by RMV and SMWD	**2**	**2**	
Prima Deshecha Landfill	0		0
Avenida La Pata	0		
Subtotal of impacts and conservation by the County of Orange	**0**		
Subtotal of impacts and assured conservation with adaptive management	**2**	**2**	
Subarea 3 Coto de Caza Parcels 1-17	0		
[1]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		**1**	
TOTAL	**2**	**3**	**0**

[1] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.

Other Covered Activities that may impact long-eared owl but are not expected to result in a permanent or determined loss of habitat include prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities. Prescribed burns could result in the disturbance of long-eared owls in the burn area. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may occasionally disturb long-eared owls in the project area.

Indirect Effects

The long-eared owl could be subject to indirect effects from Covered Activities both inside and outside of the Plan Area. These include the indirect effects described in the "General Effects" section of this biological opinion

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, and fire, the following conservation measures specific to and/or of particular importance to long-eared owl will be implemented.

Conservation and Restoration: To offset impacts to long-eared owl in the action area, a total of three locations (38 percent) will be included in the Habitat Reserve. Of these three locations, two will be permanently conserved and adaptively managed on RMV lands and an additional location is known from within existing County Parks. Management actions for long-eared owl within the Habitat Reserve will focus on habitat management including the control of invasive species through implementation of the Invasive Species Control Plan described in the "Project Description" section. Artichoke thistle control occurs on RMV and is expected to continue into the future. These invasive species control efforts will help maintain and likely enhance the quality of riparian and woodland habitats that the owl depends on for nesting as well as maintain and enhance other open space areas for foraging. If construction is pursued during the bird breeding season, surveys will be conducted for any nests including the long-eared owl. If nesting is detected, the long-eared owl will be protected by establishing a 300-ft (92-m) buffer around the nest and marked with fencing consisting of T-bar posts and yellow rope. Signs noting the area as an "Environmentally Sensitive Area" will be attached to the rope at regular intervals. In addition, a construction monitoring program will be implemented to mitigate for short-term noise impacts to nesting raptors including the long-eared owl.

Monitoring: Monitoring will be conducted at a species-specific level and a habitat landscape level. Annual botanical and wildlife field studies will be conducted within predesignated sample plots to monitor fine-grained changes in riparian and woodland habitats for the long-eared owl and other focal riparian and wetland species. The locations and dates of all nest sites and long-eared owl observations collected from the general wildlife surveys in riparian and woodland habitats will be logged and presented in the annual report to the Wildlife Agencies. Any active nests will be monitored to determine breeding activity.

Analysis of Impacts and Conservation by RMV Planning Area

A summary of long-eared owl locations that will be impacted and conserved on RMV land is presented in Table C below. In addition to the conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands initiated 6 months from the date of permit issuance.

The impact to the historic nest site in PA2 will occur prior to conservation and management of the historic nest sites in the San Mateo Watershed under each of the three possible development sequences, since PA8 and PA5 will always be developed last. However, substantial amounts of appropriate woodland and other habitat will be conserved and managed in some remote areas of the PA3 open space in the Lucas Canyon watershed. In addition, the three historic nest sites within the action area at Starr Ranch will remain within these existing conserved SOS lands.

Table C for Long-eared Owl: Long-eared Owl Historic Nest Sites Permanently Impacted and Conserved/Managed as a Result of Covered Activities by Planning Area

Proposed RMV (Phased Dedication) and Associated Projects	**Long-eared Owl Historic Nest Sites Impacted (Cumulative Impacts)**	**Long-eared Owl Historic Nest Sites Conserved and Managed (Cumulative Conservation)**
PA1	0 (0)	0 (0)
PA2	1 (1)	0 (0)
PA3	0 (1)	0 (0)
PA4	0 (1)	0 (0)
PA5	0 (1)	0 (0)
PA6 & PA7	0 (1)	0 (0)
PA8	1 (2)	2 (2)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	0 (2)	
Ortega Rock	0 (2)	
Santa Margarita Water District Impacts	0 (2)	
Subtotal for Proposed RMV and Associated Projects	2	2
Prior RMV[1] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		0 (2)
TOTAL	**2**	**2**

[1]The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of the long-eared owl. We base this conclusion on the following:

6. This species ranges from British Columbia to northern Mexico and east to New England and southern Canada; thus, the impacts associated with Plan implementation will occur over a small portion of this species' range;

7. Only two historic nest site locations (25 percent) of long-eared owl will be rendered unusable in the action area due to their proximity to future development in PA2 and PA 8.

8. Three historic nest site locations of long-eared owl in the action area will be permanently conserved and monitored within the Habitat Reserve. The two locations on RMV will be adaptively managed for the benefit of the long-eared owl and a third location within existing County Parks will be cooperatively managed in accordance with the overall conservation goals of the NCCP/MSSA/HCP. Three historic nest site locations are also conserved within SOS lands at NAS Starr Ranch. In total, 6 of the 8 (75 percent) historic

nest site locations will be conserved or remain in existing dedicated open space following implementation of the Plan.

9. The foraging area of a historic nest site immediately adjacent to RMV on MCB Camp Pendleton in Upper Talega Canyon will be permanently conserved and adaptively managed within the Habitat Reserve.

10. Monitoring and management associated with the Plan will address the maintenance and enhancement of the woodland habitat necessary for nesting and the maintenance and enhancement of grassland and other open space areas for foraging.

11. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling long-eared owls or eggs will be killed or injured during habitat grading or grubbing;

12. We anticipate that permanent protection of long-eared owl historic nest site locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain long-eared owl in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid for the long-eared owl for the following reasons:

1. The impacts to only two historic nest site locations (25 percent) of long-eared owl are unchanged since no locations are known from the County's impact areas.

2. Two historic nest site locations of long-eared owl in the action area on RMV lands will be permanently conserved and adaptively managed within the Habitat Reserve for the benefit of the long-eared owl. Three historic nest site locations will remain within existing conserved SOS lands at NAS Starr Ranch and one historic nest site will remain within existing County Parks.[13] In total, 75 percent of the historic nest site locations will be conserved or remain in existing dedicated open space following implementation of the Plan.

3. The foraging area of a historic nest site immediately adjacent to RMV on MCB Camp Pendleton in Upper Talega Canyon will be permanently conserved and adaptively managed.

[13] Cooperative management on County lands will not occur; thus, these lands will not be included in the Habitat Reserve and are now considered SOS by this analysis.

4. Monitoring and management associated with the Plan will address the maintenance and enhancement of the woodland habitat necessary for nesting and the maintenance and enhancement of grassland and other open space areas for foraging.

5. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling long-eared owls or eggs will be killed or injured during habitat grading or grubbing.

6. We anticipate that permanent protection of long-eared owl historic nest site locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain long-eared owl in the Southern Subregion and contribute to the range-wide conservation of this species.

Tricolored blackbird

Status of the species

Listing Status

The tricolored blackbird (*Agelaius tricolor*) is a Fish and Wildlife Service Migratory Non-game Bird of Management Concern and is listed on the Federal Birds of Conservation Concern. It is designated a California Species of Special Concern by the California Department of Fish and Game. This species is not listed under the Federal Endangered Species Act.

Species Description

The tricolored blackbird is a medium sized (7-9.5 in (18 cm -24 cm) in length), sexually dimorphic blackbird. The male is black with a bright red and white patch on the shoulder. The female is mostly black with grayish streaks, a whitish chin and throat, and a small reddish shoulder patch. The juveniles are similar to the adult female but lighter gray and buff in color (Beedy and Hamilton 1999). No subspecies is currently recognized.

Habitat Affinities

The tricolored blackbird breeds near fresh water, preferably in emergent wetlands with tall, dense cattails or tules (Zeiner *et al.* 1990). In the Sacramento Valley, almost 93 percent of the nesting locations were in freshwater marshes dominated by cattails or bulrushes (Neff 1937). In addition to the freshwater marsh habitat, nests may be located in a variety of wetland and upland vegetation including blackberry, grainfields, giant cane, safflower, stinging nettle, willow scrub, riparian forest, barley, and orchard (Beedy *et al.* 1991; Hamilton 2004). A few, small breeding colonies have also been documented at private and public lakes, reservoirs, and parks located near shopping centers, subdivisions and other urban development (Beedy and Hamilton 1999). In general, nest sites include: accessible water; protected nesting sites (either flooded or surrounded by thorny or spiny vegetation); and suitable foraging areas with adequate insect prey within a few miles of the nesting colony (Beedy and Hamilton 1999).

In winter, tricolored blackbirds can form single-species, multi-species, and sometimes single-sex flocks. Foraging occurs on the ground in crop lands, grassy fields, flooded land, irrigated pastures, lightly grazed rangelands, dry seasonal pools, mowed alfalfa fields, feedlots, dairies, garbage dumps, parking lots and along edges of ponds (Zeiner *et al.* 1990; Beedy and Hamilton 1999; Unitt 2004).

Life History

During the breeding season, adult tricolored blackbirds are opportunistic foragers of any abundant insect resource (Beedy and Hamilton 1997) including grasshoppers, beetles [61 percent of all nesting foods in a large study by Crase and DeHaven (1977)], weevils, caddis fly larvae, moth and butterfly larvae, dragonfly larvae, and lakeshore midges (Skorupa *et al*. 1980). In California, animal matter accounted for 91 percent of the food volume being consumed by nestlings and fledglings (Skorupa *et al.* 1980). Seeds and cultivated grains, such as rice, cracked corn and oats, are eaten mostly during the fall and winter (Martin *et al.* 1961)

The tricolored blackbird is a colonial nester, forming the largest breeding colonies of any North American passerine bird (Sibley 2003). The stages of colony development include 1) synchronous en masse flights to prospective foraging areas by colonizing individuals; 2) synchronous male song, female nest building and egg-laying; and 3) cessation of most male song following completion of egg laying. During the day, when females are incubating the eggs, males leave the colony. At this time, colony size is easily underestimated and large colonies can be overlooked. Presence of large, all-male foraging flocks during the breeding season identifies the presence of nesting colonies in the vicinity (Hamilton 2004). This species is considered a nomadic or "itinerant" breeder, changing its nesting locations from year-to-year.

The typical breeding season for tricolored blackbirds is mid-April into late July (Payne 1969). Orians (1960) also reported active breeding in October and November in the Sacramento Valley, although reproductive success was low. In dense vegetation, the breeding territory, which includes only the vicinity of the nest, is typically 35 square ft (3 square m) but may be larger in habitats of less suitable cover (Orians 1961). Tricolored blackbirds usually forage less than four mi (6 km) from the breeding grounds (Orians 1961).

The species is polygynous; each male having one to four females in his territory (Hamilton 2004). Nests are usually located a few feet over, or near, fresh water or hidden on the ground among low vegetation, and are built of mud and plant materials (Zeiner *et al.* 1990). Average clutch size for this species is three to four eggs (Emlen 1941), and two broods per year are common (Terres 1980). Eggs are incubated for about 11 days, and the young leave the nest around 13 days of age (Zeiner *et al.* 1990). After fledging, offspring will either be moved up to several miles from the colony to crèche sites where parental provisioning continues or they stay near the natal colony if it is not disrupted and foraging in the immediate area remains productive (Hamilton 2004).

Black crowned night herons, coyotes, ravens, and raccoons are all documented predators of the tricolored blackbird. Harriers are also known to harass colonies incessantly, imposing a reproductive cost. Cook (1996) reported high nestling mortality after severe or prolonged

storms. Females will occasionally shelter nests during rain; at one colony, 17 of 2,040 nests examined post-nesting, contained a dead female covering her chicks or eggs (Beedy and Hamilton 1999). Rainfall can destroy from a few to all nests in a colony, depending on developmental stage of nestlings and severity of storms. Other effects of severe storms include blowdown of cattails, silage, and other plants supporting nests. Responses to drought include failure to breed (Collier 1968), abandonment of active colonies, and low reproductive success (Orians and Collier 1963).

Distribution

The tricolored blackbird breeds from southern Oregon and the Modoc Plateau of northeastern California, south through the lowlands of California west of the Sierra Nevada to northwestern Baja California (Grinnell and Miller 1944). In California, the tricolored blackbird is a year-round resident (Zeiner *et al.* 1990). It is common locally throughout the Central Valley and in coastal districts from Sonoma County south to Baja, Mexico (Zeiner *et al.* 1990). Since 1980, active breeding colonies have been observed in 46 of the 58 California counties, with the largest colonies occurring in the Central Valley (Beedy and Hamilton 1999). It breeds locally west of the Cascade Range, Sierra Nevada, and southeastern deserts from Humboldt and Shasta counties south to extreme southwest San Bernardino County, western Riverside County and western and southern San Diego County. In Central California, its breeding range extends east into the foothills of the Sierra Nevada (Beedy and Hamilton 1999). In the southern deserts, it is found regularly only at Antelope Valley, Los Angeles County. In winter, it becomes more widespread along the central coast and San Francisco Bay area (Grinnell and Miller 1944; McCaskie *et al.* 1979; Garrett and Dunn 1981).

Rangewide Trends and Current Threats

The overall range of the tricolored blackbird has changed little since the mid-1930s; however, expansions into Washington and British Columbia have recently occurred (Hamilton 2004). California supports more than 99 percent of the population, and during a 1994 statewide survey, 94 percent of all breeding adults were found in the Central Valley (Beedy and Hamilton 1999). Combined results from population surveys conducted throughout California by Hamilton *et al*. (1995) estimated the 1994 population at 370,000 (±15 percent) breeding adults. A survey of similar coverage and intensity estimated the 1997 population at 233,000 (±15 percent) adults, a decline of 37 percent (Beedy and Hamilton 1997). Breeding Bird Survey data show an annual decline of 4.5 percent throughout its range from 1980 to 2004, with a similar trend documented for California (Sauer *et al*. 2005).

In southern California, declines in numbers of tricolored blackbirds were noted as early as the 1930s (Willet 1933). More recent surveys indicate that tricolored blackbird populations have continued to decline (Beedy and Hamilton 1997; Hamilton *et al.* 1999; Hamilton 2000). In San Diego County, Unitt (2004) estimated the population at 5,000-8,000 individuals, concentrated in 20-30 colonies. This is a dramatic decline from its earlier status as “the most abundant species near San Diego” (Neff 1937). In 2001, a volunteer coordinated breeding survey was conducted throughout California (Humple and Churchwell 2002). No breeding colonies were detected in Orange and Los Angeles counties. One small colony of 30 individuals was observed in

Riverside County, a significant reduction from 1997, when 35,000 individuals had been observed at this site (San Jacinto ponds). In 2003, another volunteer coordinated breeding survey was completed; however, data have not yet been published.

The loss of suitable nesting and foraging habitats from water diversion and land conversion is the primary threat to the tricolored blackbird. Other current threats to this species include burning and discing of marshes, predation by native and non-native species, changes in the types and timing of agricultural practices, severe storms, and poisoning (Beedy and Hamilton 1997). Brood parasitism by cowbirds appears to be rare (Beedy and Hamilton 1999).

Several large-scale habitat conservation plans have been implemented in southern California in recent years. In 1995, an NCCP/HCP was issued for San Diego Gas and Electric Facilities in San Diego County. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 1998, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. In 2004, the Service issued a permit for the Western Riverside County MSHCP.

The tricolored blackbird is a Covered Species in each of the above plans except for the Central and Coastal Orange County NCCP/HCP. These plans have created large reserve systems that include habitat for tricolored blackbird and requirements for monitoring and management actions beneficial to the long-term conservation of the species (Appendix 2).

Conservation needs

Due to the significant loss of wetlands in southern California, a primary conservation need of this species is the maintenance of wetland nesting habitat in proximity to preferred foraging sites. Focused surveys of potential breeding locales are also essential. Due to the colonial nature of this species, wetlands must be large enough to support hundreds to thousands of breeding pairs. Hydrological considerations may also be essential to the successful maintenance, management, restoration, and regeneration of tricolored blackbird breeding habitats.

Beedy and Hamilton (1997) also made the following management recommendations for this species: 1) improve breeding habitat on public lands and encourage private landowners to do the same, 2) enhance public awareness of this species, and 3) minimize habitat losses. Hamilton (In press) emphasized 1) monitoring to include measurements of reproductive success, 2) designating adequate and sufficient habitat in Habitat Conservation Plans, 3) protecting ephemeral habitats, 4) developing habitat to take advantage of rice as a nesting habitat when associated with native marsh vegetation, 5) avoiding dairies as a focus for management and restoration, 6) developing water point sources where their absence limits settlement, 7) encouraging development of colonies in conspicuous urban environments where their educational value will be useful, 8) creating habitat when reservoirs are designed and constructed, 9) creating restoration colonies, 10) emphasizing native plants in restoration efforts and 11) managing problem species such as ravens, night herons and coyotes whenever possible.

Within the Plan Area, the following management actions would benefit the tricolored blackbird: 1) maintaining hydrology and water quality and minimizing additional loadings of nutrients or pollutants at potential breeding sites; 2) enhancing habitat at historic, current and potential breeding sites (this species responds well to habitat manipulation); 3) protecting grassland foraging habitats in proximity to breeding areas; 4) controlling urban-related predators such as cats; and 4) minimizing human disturbance at breeding sites.

Environmental Baseline

Six general breeding locations have been documented in the action area: 1) middle Chiquita Canyon/the Narrows (middle Chiquita Canyon site), 2) Gobernadora sub-basin ponds in south Coto de Caza (Coto de Caza site), 3) a stock pond near Radio Tower Road (Radio Tower Road site), 4) CalMat Lake and the mouth of Verdugo Canyon in San Juan Creek (San Juan Creek sites), 5) Riverside Cement Leaseholds in lower Gabino Canyon (lower Gabino Canyon site), and 6) the Trampas Canyon settling ponds (Trampas Canyon site) (Table A). All of the documented breeding sites contain the standing water and emergent vegetation typical of tricolored blackbird nesting locations.

Breeding at all of these sites has been sporadic, and breeding throughout the action area appears to have declined in recent years. The Radio Tower Road site has supported breeding in recent years, but 1996 was the last documented breeding for the Coto de Caza site; 1994 was the last documented breeding activity for the middle Chiquita Canyon site; 1992 was the last documented breeding in San Juan Creek; and 1989 was the last documented breeding in lower Gabino Canyon and Trampas Canyon sites.

Because of the nomadic behavior of this species and the fact that surveys were not conducted every year throughout the action area, it is possible that a few smaller breeding sites were not documented, but tricolored blackbird breeding colonies are generally loud and conspicuous, so the above locations likely represent the majority of breeding sites in the action area.

Only the Coto de Caza site was identified in the Plan as an “important” population in a “key” location. Breeding colonies of several thousand birds were consistently observed at this site from 1993 to 1996. The Coto de Caza site is in Subarea 3 just north of the boundary of Subarea 1 and is the only known breeding site in the action area outside of Subarea 1.

The grassland created by a long history of grazing and the barley fields in the action area provide substantial areas for foraging around all of the nesting locations. The amount of suitable foraging habitat in the action area, defined as grassland/alkali meadow and barley fields, is shown in Table A.

Table A for Tricolored Blackbird: Tricolored blackbird foraging habitat (grassland, alkali meadow, and barley fields) and locations in the action area

Action Area Components	**Foraging Habitat (acres)**	**Locations in NCCP Dataset[1]**
Subarea 1		
Proposed RMV[2]	7,531	5
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	1,964	0
Prima Deshecha Landfill	815	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	1,694	0
Supplemental Open Space (Audubon Starr Ranch)	624	0
Subtotal for Subarea 1	***12,628***	***5***
Subarea 2	542	0
Subarea 3	463	1
Subarea 4[3]	5,126	0
TOTAL	**18,759**	**6**

[1] The conservation analysis for tricolored blackbird reported in these tables focuses on documented breeding sites.
[2] Includes project footprint for RMV infrastructure in Subarea 4 (15 ac and 0 locations).
[3] Does not include project footprint for RMV infrastructure in Subarea 4 (15 ac and 0 locations).

Effects of the Action

Direct Effects

Over the 75-year term of the permit, a total of 3,769 ac (1,525 ha) or 20 percent of the foraging habitat in the action area and one of six known breeding locations (the Trampas Canyon site) will be permanently impacted by urban development, including infrastructure construction (see Table B). Breeding has not been documented at the Trampas Canyon since 1989, almost 18 years.

In addition to the permanent impacts associated with urban development, the construction and maintenance of bridges, trails, water storage tanks, drainage culverts, and water and sewer lines will temporarily impact 212 ac (86 ha) of foraging habitat. All temporary impacts will be restored to equivalent or better conditions compared to the existing condition at the time of impact (Appendix U of the Plan).

Table B: The amount of habitat (grassland, alkali meadow, and agriculture) and the number of tricolored blackbird locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the tricolored blackbird in the action area.

Covered Activities and Conservation Areas	**Habitat Impacts (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS[1] (acres)**	**Habitat with Status Unchanged (acres)**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations conserved in SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	3,020	4,511			1	4		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		1,964				0		
Subtotal of impacts and conservation by RMV and SMWD	**3,020**	**6,475**			**1**	**4**		
Prima Deshecha Landfill	484		331		0			
Avenida La Pata on RMV Lands	154	-154			0	0		
Avenida La Pata in Subarea 4	96				0			
Subtotal of impacts and conservation by the County of Orange	**734**		**331**		**0**	**0**		
Subtotal of impacts and assured conservation with adaptive management	**3,754**	**6,321**	**331**		**1**	**4**		
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 15				0			1
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	0	1,694						
No Project				6,644				1
TOTAL	**3,769**	**8,015**	**331**	**6,644[4]**	**1**	**4**	**0**	**1**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 624 ac in Audubon Starr Ranch SOS.

Other Covered Activities that may impact tricolored blackbird, but are not expected to result in a permanent loss of habitat, include cattle grazing, prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities. Cattle grazing is anticipated to maintain the grassland habitat preferred by foraging tricolored blackbirds, although over-grazing could lead to habitat degradation, and cattle may occasionally disturb foraging or nesting tricolored blackbirds. Prescribed burns could result in the disturbance of tricolored blackbirds in the burn area. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small, but undetermined, amount of habitat disturbance and may occasionally disturb tricolored blackbirds in the project area. Habitat management activities may occasionally disturb tricolored blackbirds that are within active restoration areas.

Indirect Effects

The tricolored blackbird will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion. Indirect effects of particular importance include a potential increase in predation rates by domestic cats and potential changes in hydrology and water quality associated with the development of the surrounding landscape. For example, if runoff from future development has higher nutrients levels, it could decrease the water quality and consequently the suitability of ponds used by tricolored blackbird for breeding.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this opinion to address management of recreation/access and non-native species and to minimize the effects of construction activities, the following conservation measures specific to and/or of particular importance for tricolored blackbirds will be implemented.

<u>Conservation and Restoration</u>: The Habitat Reserve will include 8,015 ac (3,246 ha) (43 percent) of the tricolored blackbird foraging habitat in the action area, including 6,321 (2,560 ha) on RMV lands and 1,694 ac (686 ha) within existing County Parks. To help offset impacts at Prima Deshecha Landfill and due to the extension of Avenida La Pata, 331 ac (134 ha) of habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the grasshopper sparrow. However, approximately 170 of those disturbed grassland acres will be converted to CSS, leaving a total of approximately 161 ac (65 ha) of grassland on the Landfill in SOS.

The Habitat Reserve will contain four of the six documented breeding locations for tricolored blackbird. The Coto de Caza breeding site (the only site identified as an "important" population in a "key" location) is just north of the Habitat Reserve in Subarea 3 and is neither conserved under the Plan nor authorized to be impacted, although substantial amounts of foraging habitat will be conserved in the Habitat Reserve just south of the pond.

Following implementation of the Plan, each of the conserved breeding sites will be surrounded by at least several thousand acres of foraging habitat within a 4-mi (6-km) radius. Orians (1961) noted that tricolored blackbirds usually forage within 4 mi (6 km) of their nesting colonies. Based on rough estimates from Central California colonies, this amount of foraging habitat should be sufficient habitat to support breeding colonies of at least several thousand tricolored blackbirds.

Predator Control: Domestic cats will be controlled in the Reserve, primarily through homeowner education, but possibly through trapping if necessary and feasible.

Grazing Management: Implementation of the Grazing Management Plan is anticipated to reduce the potential for over-grazing and associated degradation of tricolored blackbird foraging habitat by monitoring ground cover and moving cattle from pasture to pasture accordingly.

Monitoring: Monitoring will be conducted both at a species-specific level and also at a habitat landscape level. The detailed monitoring program for the tricolored blackbird as a Covered Species will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies.

Analysis of Impacts and Conservation by Planning Area

A summary of tricolored blackbird habitat that will be impacted and conserved by Planning Area is presented in Table C below. In addition to the conservation identified by Planning Area, there will be conservation and management of the Covered Species including 1,964 acres of habitat on the prior RMV lands from the date of permit issuance.

If the development is conducted in order (PA1 through PA8), the conserved habitat will always be greater than the habitat impacted, and three known breeding sites (one associated with each of the following conservation areas: PA2, PA3, and PA5) will be conserved before the one breeding site in the impact area (the Trampas Canyon site in PA5) is impacted. A fourth breeding site will be conserved in association with PA8.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 or Alternative Order 1, 4, 3, 2, 5, and 8, three known breeding sites will still be conserved before the one breeding site in the PA5 impact area will be lost. The early conservation associated with PA1 combined with the management of 1,964 ac (795 ha) of foraging habitat on prior RMV lands will offset the higher ratio of impacts/conservation associated with the build-out of PA3.

Conclusion

After reviewing the current status of the tricolored blackbird, the environmental baseline for the action area, the effects of the action and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the tricolored blackbird. We base this conclusion on the following:

Table C for Tricolored Blackbird: Tricolored blackbird habitat (grassland, alkali meadow, and agriculture) and locations permanently impacted and conserved/managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Locations and Habitat Impacted (Cumulative Impacts)**		**Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	0 (0)	461 (461)	0 (0)	631 (631)
PA2	0 (0)	562 (1,023)	1 (1)	1,253 (1,884)
PA3	0 (0)	806 (1,829)	1 (2)	341 (2,225)
PA4	0 (0)	114 (1,943)	0 (2)	67 (2,292)
PA5	1 (1)	325 (2,268)	1 (3)	297 (2,589)
PA6 & PA7	0 (1)	50 (2,318)	0 (3)	0 (2,589)
PA8	0 (1)	500 (2,818)	1 (4)	1,664 (4,698)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	0 (1)	156[1] (2,974)	0 (4)	-141[1] (4,557)
Ortega Rock	0 (1)	0 (2,974)		
Santa Margarita Water District Impacts (Reservoir in Upper Chiquita Conservation Area)	0 (1)	46 (3,020)	0 (4)	-46 (4,511)
Subtotal for Proposed RMV and Associated Projects	1	3,020	4	4,511
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			0 (4)	1,964 (6,475)
TOTAL	**1**	**3,020**	**4**	**6,475**

[1] 141 ac of infrastructure impact are in the Habitat Reserve, and 15 ac are in SOS.
[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

1. The tricolored blackbird breeds from southern Oregon and the Modoc Plateau of northeastern California, south through the lowlands of California west of the Sierra Nevada Mountains to northwestern Baja California. Thus, the impacts under the Plan will occur over a fraction of the species range.

2. Subarea 1 where the majority of Covered Activities will occur includes only 67 percent of the blackbird foraging habitat in the action area. The remaining 33 percent of tricolored blackbird habitat in the action area occurs in the other three subareas and will not be significantly impacted (~ 1 percent) by implementation of the Plan.

3. An estimated 3,769 ac (1,525 ha) of foraging habitat and one known former nesting site, where breeding has not been documented in over 18 years, will be developed or otherwise made unsuitable for tricolored blackbird. This represents about 20 percent of the foraging habitat in the action area, one of six known nesting sites in the action area, and a small portion of the habitat for this species across its range.

4. A total of 8,015 ac (3,246 ha) or 43 percent of the foraging habitat for the tricolored blackbird in the action area, including 4 historic nest site locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 6,321 ac (2,560 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 1,694 ac (686 ha) of habitat is within existing County Parks. While adaptive

management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

5. An additional 161 ac (65 ha)[14]of tricolored blackbird foraging habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 624 ac (253 ha) of tricolored blackbird foraging habitat is conserved at NAS Starr Ranch.

6. Combined, 8,800 ac (3,564 ha) or 47 percent of the foraging habitat for tricolored blackbird, including 4 of the 6 historic nest site locations in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[15]

7. Sufficient foraging habitat is anticipated to remain to support breeding colonies at each of the four conserved nesting sites and the "important" population in Coto de Caza, which is neither conserved nor authorized to be impacted.

8. We anticipate that permanent protection of tricolored blackbird habitat combined with long-term management and monitoring actions within the Habitat Reserve will help maintain over wintering sites and potential breeding sites for tricolored blackbird in the Southern Subregion.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for the tricolored blackbird remains valid for the following reasons:

9. Project impacts will be reduced to an estimated 3,020 ac (1,223 ha) of tricolored blackbird foraging habitat and the 161 ac (65 ha) of additional mitigation at Prima Deshecha Landfill SOS will not occur. The impact to nesting sites will remain unchanged with one known former nesting site still developed or otherwise made unsuitable for tricolored blackbird. This represents about 16 percent of the habitat in the action area, one of six known nesting sites in the action area, and a small portion of the habitat for this species across its range.

10. Because Avenida La Pata Road extension will not be a Covered Activity, the Habitat Reserve will increase by 154 ac (62 ha) and include 6,475 ac (2,622 ha) of foraging habitat and the same four newly conserved nesting sites for the tricolored blackbird. This habitat and the nesting sites will be adaptively managed for the species. There

[14] The County will avoid and manage approximately 331 ac (134 ha) within SOS on the Landfill; but approximately 170 of those disturbed grassland acres will be converted to CSS, leaving a total of approximately 161 ac (65 ha) of grassland on the Landfill in SOS.

[15] There is likely tricolored blackbird foragng habitat in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

are 1,694 ac (686 ha) of habitat within County Park lands[16], and at NAS Starr Ranch, 624 ac (253 ha) of tricolored blackbird habitat are conserved; combined, at least 47 percent of tricolored blackbird habitat in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan. Sufficient foraging habitat is anticipated to remain to support breeding colonies at each of the four conserved nesting sites and the "important" population in Coto de Caza, which is neither conserved nor authorized to be impacted.

11. The mitigation to offset the impacts on RMV lands includes conservation and adaptive management of 68 percent of the tricolored blackbird foraging habitat and 80 percent of the known nesting sites on RMV lands, which will help maintain tricolored blackbird in the Southern Subregion and supports the overall conservation of the species.

White-Tailed Kite (*Elanus leucurus*)

Status of the Species

Listing Status

The white-tailed kite (*Elanus leucurus*) is a California Department of Fish and Game Fully Protected Species. It is a Fish and Wildlife Service Migratory Non-game Bird of Management Concern. It is not listed under the Federal Endangered Species Act.

Species Description

The white-tailed kite is a medium to small hawk with a long white tail. The adults are white underneath, gray on the back from the crown to the upper tail coverts, and have conspicuous large, black scapulars. Two subspecies of *E. leucurus* are recognized: *E. l. majusculus* in North America and *E. l. leucurus* in South America (Dunk 1995).

Habitat Affinities

The white-tailed kite breeds in low elevation grassland, agricultural, wetland, oak woodland or savannah habitats (Dunk 1995). Riparian areas adjacent to open areas are also used (Dunk 1995). Specific plant associations within its habitat are not as important as vegetation structure and prey abundance (Dunk 1995). Nest trees range from single isolated trees to trees within stands greater than 250 ac (101 ha) (Dunk 1995).

The winter habitat requirements of the white-tailed kite are similar to the breeding habitat requirements, but the proximity to trees is not important. This species has been documented using ungrazed lands more than grazed lands for winter foraging. In fall and winter, the kite is a communal rooster, preferring small stands of trees, open fields, and orchards (Dunk 1995).

[16] Cooperative management on County lands will not occur; thus, these lands will not be included in the Habitat Reserve and are now considered SOS by this analysis.

Life History

The white-tailed kite's diet consists mainly of small mammals such as voles (*Microtus* sp.*)*, although birds, insects, reptiles, and amphibians will occasionally be eaten. It forages in undisturbed, open grasslands, meadows, farmlands, emergent wetlands, ungrazed grasslands, fence rows and irrigation ditches adjacent to grazed lands, scrub, and open woodland (Dunk 1995). It hunts almost exclusively by hovering from 15-85 ft (4.5 -26 m) above the ground and typically forages from a central perch over areas as large as 740 ac (300 ha) (Warner and Rudd 1975). It seldom hunts more than 0.5 mi (0.8 km) from the nest when breeding (Hawbecker 1942).

Stendell (1972) believed the white-tailed kite was a resident species, becoming nomadic during periods of low prey abundance. It is also a monogamous species and although some pairs can be found together year-round, more individuals are only paired December through August (Dunk 1995). Nest-building begins in January and continues through August (Dunk 1995). The nest consists of loosely piled sticks and twigs, lined with grass, straw, or rootlets. The nest is placed near the top of a dense oak, willow, or other tree stand and is usually 18-60 ft (5–18 m) above the ground. Nesting trees vary in height from 9-150 ft (3-46 m) (Dixon *et al.* 1957) and are located near open foraging areas. Average clutch size for this species is four eggs, with egg laying beginning in February and peaking in March and April (Moore 2004). Only the female incubates the eggs and chicks, but the male feeds the female and supplies her with food to feed the young. The young fledge and are taught to hunt within 35-40 days of hatching. White-tailed kites usually have a single brood, but occasionally two broods are raised during years of high prey abundance (Dunk 1995). Probable predators of adults and immatures include red-tailed hawks, peregrine falcons, prairie falcons, and great horned owls. Probable egg and nestling predators include American crows, common ravens, and small to medium sized carnivores (Moore 2004).

Although it is the subject of some debate, the white-tailed kite is considered territorial (Dunk 1995). Nest sites are defended against crows, other hawk species, and eagles but rarely against conspecifics (Pickwell 1930; Dixon *et al.* 1957). Territory size appears to be a function of both prey and competitor abundances and varies by geographic location, with larger territories reported for southern versus northern California (Dunk 1995). Communal roosts are used during the non-breeding season (Waian and Stendell 1970) and may contain up to a 100 individuals (Garrett and Dunn 1981). In some locations, rainfall and presumably prey abundance, which are closely linked, also seem to limit kite populations. For example, nest data collected in San Diego County from 1997 through 2001 (Unitt 2004) shows a significant variation between years: 15 nests in 1997, 41 in 1998, 72 in 1999, 7 in 2000 and 11 in 2001. The highest number of nests, documented in 1999, follows the El Niño winter rain event of 1997/98.

Distribution

As of 1995, the white-tailed kite's distribution was the largest in the species' known history. California is considered its breeding stronghold, with nearly all areas occupied up to the western Sierra Nevada foothills and southeastern deserts. It is common in California's Central Valley and along the entire length of its coast. Outside of California, breeding has been consistently

documented in the far west counties of Oregon and more recently in southwest Washington. It is also a common breeder in southern Texas. In southern Florida, a small breeding population has existed since at least 1986. Its breeding range continues south along the coast to Mexico, into Central America, and in South America from Colombia south to Buenos Aires, Argentina. The species is a winter resident throughout most of its breeding range, although dispersal occurs during the non-breeding season, resulting in some range expansion.

Rangewide Trends and Current Threats

Before the early 1900s, the white-tailed kite may have been widespread throughout the lowlands of California, but by the turn of the century the population had severely declined, and its range was reduced to western California, from the Sacramento Valley to San Diego County (May 1935). By the 1930s, local bird experts were predicting the species would go extinct in California. From the 1940s to the early 1980s, however, the California population increased dramatically. This increase has been attributed to an increase in agriculture and a reduction in shooting and egg collecting (Dunk 1995; Unitt 2004). Unfortunately, this trend reversed and declines in the population have been detected since the mid-1980s. Breeding Bird Survey data indicates that 11 of 14 regions in California showed significant declines between 1980 and 2004. The most significant declines occurred in the southern California grassland region, with an annual decline of 12.3 percent (Dunk 1995).

Within southern California, the white-tailed kite was considered an uncommon to locally, fairly common resident throughout the coastal lowlands and a very rare breeder in the remaining areas (Garrett and Dunn 1981). The centers of abundance in the region were the coastal valley and plains of Orange and San Diego counties. By 1981, however, Garrett and Dunn felt population numbers were fluctuating (declining) such that its current status could not be determined. In Los Angeles County, white-tailed kites can still be found nesting in a few scattered locations including Whittier Narrows (Cooper 2001), Santa Monica Mountains (Santa Monica Mountains Conservancy 2004), San Clemente Island (Sullivan and Kershner 2005), Powder Canyon Natural Area, Hacienda Heights (Cooper 2000), and Coyote Hills (Angeles Chapter of Sierra Club 2006). This is also true for San Diego County, where in 2001 the species was found nesting at 11 locations (Unitt 2004). In Orange County, the species still nests at Starr Ranch, Bolsa Chica Lagoon, Gobernadora Canyon, and along portions of San Juan Creek.

Early declines of the species were attributed to habitat loss, shooting, and egg collecting (Dunk 1995). More recent declines in the population have been attributed to habitat loss, prolonged drought conditions (*i.e.*, 1982-1991), increased competition for nest sites and prey with other raptors and corvids, and increased disturbances at the nest. A significant threat to the species is the loss or degradation of habitat, especially the loss of nest trees and foraging habitat through the urbanization of natural lands or agricultural lands (Dunk 1995). Other threats to the species' habitat include altered hydrology and geomorphology, exotic plant invasions, recreation activities, cattle grazing, and diseases affecting oak woodlands. Within the Plan Area, urban development and habitat degradation due to exotic plant species and altered hydrology pose the greatest threat to this species.

Several large-scale habitat conservation plans have been implemented in southern California in the past decade. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 1998, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. In 2004, the Service issued a permit for the Western Riverside County MSHCP; this is the only plan with white-tailed kite as a Covered Species (Appendix 2).

Conservation Needs

Conservation of the white-tailed kite depends on the protection and restoration of favored breeding habitats, winter roosting sites, and foraging habitats. Conserved lands containing appropriate landscapes should be managed to reduce disturbance at nest sites and to provide breeding, foraging, and roosting areas for the species. Within the Plan Area and throughout its range, management actions that would benefit the white-tailed kite include (1) managing surface and subsurface flows from development upstream of nesting sites; (2) minimizing human disturbance within proximity of nesting sites; (3) implementing fire management techniques to help protect nesting and foraging habitat, including promoting perennial grasses to provide high quality vole habitat; and (4) minimizing rodent control programs where the species forages.

Environmental Baseline

White-tailed kite nesting and foraging habitat was defined in the Plan as agriculture, coastal sage scrub, grassland, alkali meadow, riparian, woodland and forest, and marsh and stream courses. To better understand potential impacts, riparian and woodland and forest habitats were used to estimate impacts to nesting habitat. A total of 7,687 ac (3,112 ha) of these habitats exist in the Plan Area with 6,234 ac (2,524 ha) or 81 percent in Subarea 1 (Table A). The database includes 37 historic nest sites, one of which is in the Camp Talega area of MCB Camp Pendleton just immediately outside of the Plan Area, and another is at Tesoro High School and considered Not A Part of the action area. Thus, there are 35 historic nest sites (Table A) distributed throughout the action area within the San Mateo watershed area and within or near San Juan Creek, Bell Canyon, Wagon Wheel Canyon, lower Canada Gobernadora, and Arroyo Trabuco. There is no apparent clustering of nest sites, and no “major” or “important” populations were identified in the Plan Area.

While many historic nest sites are known, only a few are typically active in any one breeding season (HCP, p.13-101). The 35 nest sites are scattered throughout the action area with no single area supporting the majority of the population. Several drainages in the action area, however, are important for this species including (1) Gobernadora Ecological Reserve Area in lower Gobernadora Creek and central San Juan Creek, which has supported nine historic nest sites; (2) Arroyo Trabuco between Live Oak Canyon Road in the north and Avery Parkway in the south, which has supported seven historic nest sites; (3) Bell Canyon, which has supported seven historic nest sites; (4) Middle Gabino and lower La Paz canyons, which have supported three historic nest sites; and (5) Talega and lower Cristianitos canyons, which have supported five historic nest site.

Table A for White-tailed Kite: White-tailed kite nesting habitat (riparian, woodland and forest) and historic nest sites in the action area.

Action Area Components	**Total Amount of White-tailed Kite Habitat (acres)**	**White-tailed Kite Historic Nest Sites in NCCP Dataset**
Subarea 1		
Proposed RMV[1]	2,605	14
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	449	4
Prima Deshecha Landfill	32	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	2,218	10
Supplemental Open Space (Audubon Starr Ranch)	915	3
Other	15	**0**
Subtotal for Subarea 1	***6,234***	**31**
Subarea 2	595	0
Subarea 3	282	0
Subarea 4[2]	576	4
TOTAL	**7,687**	**35**

[1] Includes RMV infrastructure in Subarea 4 (8 ac and 0 locations).
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (8 ac and 0 locations).

Effects of the Action

Direct Effects

The action area includes 7,687 ac (3,112 ha) of suitable nesting habitat (riparian and woodland and forest) for the white-tailed kite and 35 historic nest sites. Over the 75-year term of the permit, 756 ac (306 ha) or 10 percent will be developed or otherwise made unsuitable for white-tailed kite (Table B).

The proposed RMV, including Ortega Rock, and SMWD Covered Activities will permanently impact 727 ac (294 ha) or 24 percent of the white-tailed suitable nesting habitat and 2 of 18 historic nest sites (11 percent) on RMV lands (Table B).

The County Covered Activities at Prima Deshecha Landfill will permanently impact 17 ac (7 ha) or 53 percent of the suitable white-tailed kite nesting habitat at the Landfill, but no historic nest sites. Avenida La Pata road extension will impact an additional 9 ac (4 ha) of suitable white-tailed nesting habitat within the Habitat Reserve, but no historic nest sites. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program" could allow the impact of up to 3 ac (1 ha) of suitable white-tailed kite nesting habitat in parcels 1-17 (Table B).

Table B for White-tailed Kite: The amount of nesting habitat (riparian, woodland and forest) and the number of white-tailed kite historic nest sites permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed in the action area.

Covered Activities and Conservation Areas	**Habitat Impacts (acres)**	**Habitat in Habitat Reserve (acres)**	**Habitat in Prima SOS [1] (acres)**	**Habitat with Status Unchanged (acres)**	**Nest Sites Impacted**	**Nest Sites in Habitat Reserve**	**Nest Sites in Prima SOS[1]**	**Nest Sites with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	727	1,878			2	12		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		449				4		
Subtotal of impacts and conservation by RMV and SMWD	**727**	**2,327**			**2**	**16**		
Prima Deshecha Landfill	17		15		0		0	
Avenida La Pata on RMV Lands	9	-9			0			
Avenida La Pata in Subarea 4	0				0			
Subtotal of impacts and conservation by the County of Orange	**26**		**15**		**0**			
Subtotal of impacts and assured conservation with adaptive management	**753**	**2,318**	**15**		**2**	**16**		
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 3							
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		2,218				10		
No Covered Activities				2,380				7
TOTAL	**756**	**4,536**	**15**	**2,380[4]**	**2**	**26**	**0**	**7[4]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 915 ac and 3 locations in Audubon Starr Ranch SOS.

While two white-tailed kite historic nest sites would be impacted, we do not anticipate impacts to eggs or young since the kite is a State of California fully-protected species and habitat will be cleared or grubbed only between September 15 and February 15. The Permittee will also implement minimization measures for each construction project including a BRCP that provides for resource protection and establishes monitoring requirements. The BRCP will contain specific measures for the protection of white-tailed kite nests during construction including erosion and siltation control measures, dust control measures, grading techniques, construction area limits, identification and quantification of habitats to be removed, and protective fencing around conserved and construction staging areas (Appendix U of the Plan).

In addition to the permanent impacts associated with urban development, the construction and maintenance of bridges, water storage tanks, drainage culverts, and water and sewer lines will temporarily impact 85 ac (34 ha) of habitat. All temporary impacts will be restored to equivalent or better conditions compared to the existing condition at the time of impact (Appendix U of the Plan).

While not used in the nesting habitat loss analysis, foraging habitat for the white-tailed kite will be developed in Subarea 1; these losses include 2,666 ac (1,079 ha) of grasslands and 1,529 ac (619 ha) of agriculture. However, substantial grasslands will be conserved and managed in the Habitat Reserve (5,690 ac (2,304 ha)) and remain in SOS (954 ac (386 ha)) and about 1,844 ac (747 ha) of agriculture will remain to sustain the kite population in Subarea 1 (HCP Table 13-16).

Other Covered Activities that may impact white-tailed kite, but are not expected to result in a permanent loss of habitat, include prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities. Prescribed burns could result in the disturbance of white-tailed kites in the burn area. Habitat management and monitoring activities may occasionally disturb white-tailed kites that are within active restoration areas.

Indirect Effects

The white-tailed kite will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section. Indirect effects include the potential for disturbance due to noise from roads and urban areas. Also, the frequency and timing of wildfires may change as a result of increased human-caused ignitions associated with new urban areas (Stephenson and Calcarone 1999) and increased access to the open space areas. Potential effects associated with an altered fire regime include changes to the vegetation community (Stephenson and Calcarone 1999) and effects due to increased wildfire suppression activities.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section to address management of recreation/access and to minimize the effects of construction activities, the following conservation measures specific to and/or of particular importance for white-tailed kites will be implemented.

Conservation and Restoration. The Habitat Reserve will contain 26 historic white-tailed kite nest sites or 74 percent of the historic locations in the action area, including 16 locations on RMV lands and 10 locations within existing County Parks. The Habitat Reserve will also include 4,536 ac (1,836 ha) (59 percent) of the suitable white-tailed kite nesting habitat in the action area, including 2,318 ac (939 ha) on RMV lands and 2,218 ac (898 ha) within existing County Parks. To help offset impacts at Prima Deshecha Landfill, 15 ac (6 ha) of kite nesting habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the white-tailed kite.

Monitoring. Monitoring will be conducted at a species-specific level and a landscape level. The detailed monitoring program for the white-tailed kite will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. Status of nesting and the habitat communities that support nesting in the Habitat Reserve will be monitored.

Analysis of Impacts and Conservation by Planning Area

RMV has proposed to carry out development in eight Planning Areas and is anticipating development of these Planning Areas in sequential order: PA1 through PA8. Although it is not expected or anticipated, the IA states that RMV can terminate the 75-year permit at any time during their proposed phased development. Therefore, the conservation on a cumulative basis as each Planning Area is developed should be sufficient to avoid/minimize impacts. A summary of white-tailed kite historic nest sites and habitat by Planning Area that will be impacted and conserved is presented in Table C. In addition to the conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Build-out of PA6 and PA7 can occur at any time during the 75-year timeframe of Plan implementation. Since the build-out of PA6 and PA7 involve impacts to white-tailed kite habitat and no conservation, we assume for the purposes of this analysis that these impacts could happen prior to PA1 as a worst-case scenario. Build-out of PA6 and PA7 will impact 5 ac (2 ha) of suitable nesting habitat but no known locations for the white-tailed kite. The loss of 5 ac (2 ha) of habitat upon build-out of PA6 and PA7 will leave about 7,682 ac (3,110 ha) of suitable nesting habitat in the action area, although not necessarily in Habitat Reserve lands. The loss of the 5 ac (2 ha) associated with PA6 and PA7 will be more than offset by the monitoring and management, within 6 months of permit issuance, of four historic nest site locations and 449 ac (182 ha) of suitable nesting habitat within Prior RMV lands.

Build-out of PA1–PA8 as described below maintains nearly a 2:1 habitat conservation to impact ratio for white-tailed kite suitable nesting habitat throughout each phase and cumulatively results in a greater than 2:1 habitat conservation/impact ratio as well as significant conservation of historic nest site locations.

Table C for White-tailed Kite: White-tailed kite nesting habitat (riparian, woodland and forest) and historic nest sites permanently impacted and conserved/managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Kite Nest Sites and Habitat Impacted (Cumulative Impacts)**		**Kite Nest Sites and Habitat Conserved and Managed[1] (Cumulative Conservation)**	
	Historic Nest Sites	**Habitat (acres)**	**Historic Nest Sites**	**Habitat (acres)[1]**
PA1	0 (0)	9 (9)	0 (0)	79 (79)
PA2	0 (0)	49 (58)	4 (4)	249 (328)
PA3	1 (1)	148 (206)	5 (9)	576 (904)
PA4	0 (1)	118 (324)	0 (9)	13 (917)
PA5	0 (1)	220 (544)	0 (9)	128 (1,045)
PA6 & PA7	0 (1)	5 (549)	0 (9)	0 (1,045)
PA8	1 (2)	124 (673)	3 (12)	878 (1,923)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	0 (2)	50[1] (723)		-42[1] (1,881)
Ortega Rock	0 (2)	1 (724)		
Santa Margarita Water District Impacts (Reservoir in Upper Chiquita Conservation Area)	0 (2)	3 (727)		-3 (1,878)
Subtotal for Proposed RMV and Associated Projects	2	727	12	1,878
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			4 (16)	449 (2,327)
TOTAL	**2**	**727**	**16**	**2,327**

[1] 42 ac of infrastructure impact are in the Habitat Reserve and 8 ac are in SOS.
[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA1 will impact 9 ac (4 ha) of suitable nesting habitat for white-tailed kite and conserve 79 ac (32 ha) of habitat. Build-out of PA2 will impact 49 ac (20 ha) of habitat and conserve 249 ac (101 ha) of habitat; no known historic nest sites will be impacted and four will be conserved. In total, the build-out of PA1 and PA2 will impact 58 ac (24 ha) and conserve 328 ac (133 ha) of suitable nesting habitat for white-tailed kite and also conserve four historic nest site locations.

Build-out of PA3 will impact 148 ac (60 ha) of suitable nesting habitat for white-tailed kite and conserve 576 ac (233 ha) of habitat; one historic nest site location will be impacted but five historic nesting sites will be conserved. In total, the build-out of PA1-PA3 will impact 206 ac (83 ha) and conserve 904 ac (366 ha) of suitable nesting habitat for white-tailed kite and also conserve nine historic nest site locations.

Build-out of PA4 will impact 118 ac (48 ha) and conserve 13 ac (5 ha) of suitable white-tailed kite nesting habitat. Build-out of PA5 will impact 220 ac (89 ha) of suitable nesting habitat and conserve 128 ac (52 ha) of habitat. No occurrences will be impacted or conserved in PA4 or PA5. Cumulatively, 544 ac (220 ha) of suitable nesting habitat for white-tailed kite will be impacted and 1,045 ac (423 ha) of habitat and nine historic nest site locations conserved with the build-out of PA1- PA5.

PA8 will impact 124 ac (50 ha) and conserve 878 ac (356 ha) of suitable nesting habitat for the white-tailed kite; one historic nest site will be impacted, but three sites will be conserved. Cumulatively, 673 ac (273 ha) of suitable nesting habitat for white-tailed kite will be impacted and 1,923 ac (779 ha) of habitat and 12 nest site locations will be conserved with the build-out of PA1- PA8.

Lastly, the analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure in the Habitat Reserve and SOS or Covered Activities at Ortega Rock Quarry or by SMWD. Impacts to suitable nesting habitat for white-tailed kite associated with these activities will reduce conservation in the Habitat Reserve by 45 ac (18 ha). However, as noted above, within 6 months of permit issuance, 449 ac (182 ha) of suitable nesting habitat in Prior RMV lands will be included in the Habitat Reserve and adaptively managed. In total, 16 of the 18 historic white-tailed kite nesting sites or 89 percent of the sites on RMV lands and 2,327 ac (942 ha) or 76 percent of the suitable nesting habitat on RMV lands will be conserved and adaptively managed within the Habitat Reserve, a greater than 3:1 habitat conservation to impact ratio for white-tailed kite suitable nesting habitat on RMV lands. In addition, substantially more historic nest sites on RMV lands are conserved than impacted.

If RMV chooses to phase development by Alternative Order PA1, 3, 2, 4, 5, and 8, a significant amount of the conservation will occur earlier with build out of PA3. Thus, this order will be an improvement from the order analyzed above for white-tailed kite. If RMV chooses to phase development by Alternative Order PA1, 4, 3, 2, 5, and 8, conservation of suitable white-tailed nesting habitat lags behind impacts by 35 ac (14 ha); however, this loss will be more than offset by the monitoring and management, within 6 months of permit issuance, of the 449 ac (182 ha) of suitable nesting habitat within Prior RMV lands. In addition, with build-out of PA3 conservation of suitable nesting habitat again exceeds impacts by about a 2:1 ratio in all remaining phases of development. Likewise, this order of development does not affect the overall conservation of historic nest site locations since most of the conservation occurs with build out of PA3 and PA8 and the impacts are limited to just two sites, one in each of these Planning Areas.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the white-tailed kite. We base this conclusion on the following:

1. The species is found throughout the western United States and in portions of the southern United States, western Mexico, Central America, and South America. Therefore, the action area for this Plan represents a small fraction of the species' entire distribution.

2. Only two historic nest sites and 756 ac (306 ha) of white-tailed kite habitat will be developed or otherwise made unsuitable for kites, which represents only about 6

percent of the nest sites and 10 percent of the white-tailed kite habitat in the action area and a much smaller percentage of the habitat for this species across its range.

3. A total of 4,536 ac (1,836 ha) or 59 percent of the suitable nesting habitat for the white-tailed kite in the action area, including 26 historic nest site locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 2,318 ac (939 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 2,218 ac (898 ha) of habitat are within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 15 ac (6 ha) of kite nesting habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 915 ac (370 ha) (12 percent) of kite nesting habitat, including three historic nest site locations, is conserved at NAS Starr Ranch.

5. Combined, 5,466 ac (2,213 ha) or 71 percent of the suitable nesting habitat for white-tailed kite, including 29 historic nest site locations (83 percent), in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[17]

6. In addition to suitable habitat, the Habitat Reserve will include substantial areas of habitat for foraging. Implementation of the Plan will conserve, monitor, and manage large habitat blocks and associated linkages within the Habitat Reserve for the benefit of this species in general.

7. We anticipate that permanent protection of white-tailed kite nesting and foraging habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain white-tailed kite in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid for the following reasons:

1. Project impacts will be reduced by 29 ac (12 ha), such that an estimated 727 ac (294 ha) of suitable nesting habitat for white-tailed kite will be impacted, which represents about 10 percent of the suitable nesting habitat in the action area, and a small portion of the habitat for this species across its range.

[17] There is likely white-tailed kite nesting habitat in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

2. The Habitat Reserve will include 1,878 ac (760 ha) of newly conserved white-tailed kite suitable nesting habitat and 12 historic nest site locations and an additional 449 ac (182 ha) of habitat and four historic nest site locations on prior conserved RMV lands that will be adaptively managed for the species. At NAS Starr Ranch, 915 ac (370 ha) of suitable white-tailed kite nesting habitat and three historic nest site locations are conserved, and 2,218 ac (898 ha) of suitable nesting habitat and 10 nest site locations occur within County Park lands[18]; combined, at least 5,460 ac (2,211 ha) or 71 percent of the suitable nesting habitat for white-tailed kite in the action area and 29 nest site locations or 83 percent will be conserved or remain in existing dedicated open space following implementation of the Plan.

3. The mitigation to offset the impacts on RMV lands includes conservation and adaptive management of 76 percent of the suitable nesting habitat for white-tailed kite that includes 89 percent of the historic nest site locations on RMV lands. This represents a greater than 3:1 habitat conservation to impact ratio and a significant conservation contribution within the Subregion.

4. In addition to habitat for nesting sites, the Habitat Reserve will include substantial areas of habitat for foraging and nesting. Implementation of the Plan will conserve, monitor, and manage large habitat blocks and associated linkages within the Habitat Reserve for the benefit of this species in general.

5. We anticipate that permanent protection of 16 nest site locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain white-tailed kite in the Southern Subregion and contribute to the range-wide conservation of this species.

Yellow-breasted chat

Status of the Species

Listing Status

The yellow-breasted chat (*Icteria virens*) is designated a California Species of Special Concern by the California Department of Fish and Game. This species is not listed under the Federal Endangered Species Act.

Species Description

The yellow-breasted chat's large size, aberrant structure, and distinctive plumage distinguish it from all other wood-warblers and similarly colored songbirds (Eckerle and Thompson 2001). Its upperparts are olive green to grayish olive, with a lemon-yellow chin, throat, and breast and white belly and under tail coverts. Two subspecies of *I. virens* are recognized, including the

[18] Cooperative management on County lands will not occur; thus, these lands will not be included in the Habitat Reserve and are now considered SOS by this analysis.

eastern subspecies (*I. v. virens*) and the long-tailed chat or western subspecies (*I. v. auricollis*) (AOU 1957).

Habitat Affinities

In California, chats require dense riparian thickets of willows, vine tangles, and dense brush associated with streams, swampy ground and the borders of small ponds (Small 1994). Some taller trees (*i.e.*, cottonwoods and alders) are required for song perches (Dunn and Garrett 1997). Eastern birds can also be found in upland habitats such as old fields. They are most often found in areas in early stages of succession, as opposed to young and mature forests (Melhop and Lynch 1986). Annand and Thompson (1997) found chat abundance to be greatest in areas of forests that had been clearcut. Similarly, Kroodsma (1982) reported that chats preferred brushy areas within powerline corridors to forest edge and interior. He also found that chats preferred patches with a high density of blackberry vines (*Rubus* spp.) and tree saplings, while they avoided areas with a high percentage of grass cover. Other studies in Missouri (Burhans and Thompson 1999) and Kentucky (Ricketts 1999) confirmed chats' affinity for dense blackberry patches. Grinnell and Miller (1944) suggested that plant cover in breeding habitat must be dense to provide shade and concealment.

During the spring and fall migrations, the yellow-breasted chat uses the same low, dense vegetation used on the breeding and wintering grounds, although spring migrants are occasionally found in suburban habitats. Rappole *et al*. (1995) classified winter habitat as shrub-steppe, with dense, low cover of woody vegetation.

Life History

During the breeding season, the yellow-breasted chat feeds on small invertebrates, mainly insects and spiders, and fruits and berries (Eckerle and Thompson 2001). It forages by gleaning from shrub and low tree foliage (Zeiner *et al*. 1990). Nestlings are fed adult grasshoppers and crickets and larval moths and butterflies. During the winter, chats eat insects, spiders and fruit.

The yellow-breasted chat breeds from early May into early August with a peak of nesting activity in June. It is a monogamous species, and although it is territorial, pairs may congregate within a given area. In a low density population, territory size ranged from 2.7-4 ac (1-2 ha) and agnostic displays between neighboring males were rare (Thompson and Nolan 1973). In a high density population, territory size ranged from 1.2-2.5 ac (0.5-1 ha) and male-male interactions were common (Dennis 1958).

The nest is usually 2-8 ft (0.6-2 m) above the ground in dense shrubs near a stream or river. Average clutch size for this species is 3 to 4 eggs. Typically only one clutch is laid each year unless it is lost to predation early in the cycle, then a second set of eggs may be laid. The eggs are incubated 11 to 15 days, and the young fledge 8 to 11 days after hatching. Predation rates can be high with 94 percent (44 of 46 nests) of nests lost in a southern Indiana study (Thompson and Nolan 1973). Documented nest predators include snakes, blue jays, eastern chipmunks, black rat snakes, long-tailed weasels and American crows (Ricketts and Kus 2000). Potential nest predators in California include western scrub-jays, dusky-footed woodrats, raccoons, and

several species of snakes. The yellow-breasted chat is also susceptible to brood-parasitism by the brown-headed cowbird and is among the 17 hosts most parasitized by this species (Ricketts and Kus 2000).

Distribution

Yellow-breasted chats breed from British Columbia eastward to New Hampshire and southward to Baja California and northern mainland Mexico. The species presumably migrates throughout much of North America and winters primarily from northern Mexico to Panama (AOU 1998).

Zeiner *et al*. (1990) described the yellow-breasted chat as an uncommon summer resident and migrant in coastal California and in the foothills of the Sierra Nevada. The chat is found up to elevations of 4,800 ft (1,464 m) in valley foothill riparian habitats and up to 6,500 ft (1,982 m) east of the Sierra Nevada in desert riparian habitats (Gaines 1974; DeSante and Ainley 1980; Garrett and Dunn 1981). The yellow-breasted chat is uncommon along the coast of northern California and occurs only locally south of Mendocino County (McCaskie *et al*. 1979). In southern California, the species breeds locally on the coast and very locally inland at lower elevations throughout the region (Garrett and Dunn 1981).

In California, the yellow-breasted chat may be found during migration at lower montane elevations in riparian habitat (McCaskie *et* al. 1979). It usually arrives in April and departs by late September for the wintering grounds. The majority of the population winters from Mexico to western Panama, but some individuals winter in the southern United States (Eckerle and Thompson 2001). The yellow-breasted chat is occasionally recorded during winter in western California from Humboldt County south to Los Angeles County south to the Mexican border (Garrett and Dunn 1981; Small 1994).

Rangewide Trends

The western subspecies of yellow-breasted chat has declined throughout much of its range (Dunn and Garrett 1997), including southern California (Garrett and Dunn 1981), the northern California coast (*e.g.*, Shuford 1993), and in western Washington (*e.g.*, Hunn 1982). Breeding Bird Survey (Sauer *et al*. 2005) data for California from 1980 to 2004 and from 1990 to 2004 show annual declines of 1.7 percent and 2.4 percent, respectively.

Within southern California, a healthy population of yellow-breasted chats can still be found at the Prado Basin, western Riverside County. During the 2003 breeding season, it was estimated that 400 yellow-breasted chats were breeding within this area. Current population estimates for the rest of Riverside County are not known, but the species is thought to be present in the Santa Ana River, Temescal Wash, Alberhill Creek, Temecula Creek, San Timoteo Creek, and Murrietta Creek (USFWS 2004).

In Los Angeles County, occurrence information for the yellow-breasted chat is scarce. A 2001 summer bird census of Los Angeles Flood Control Basins documented 14 singing males at the Sante Fe Dam, 12 at Hansen Dam, 7 at Whittier Narrows and 4 along the San Gabriel River near the City of Duarte (Cooper 2001).

In San Diego County, the yellow-breasted chat was considered a common breeder until the 1970s (Unitt 2004). Although populations have declined throughout the County, the species is still present in many of the major drainages including the Santa Margarita, San Luis Rey, San Diego and Sweetwater rivers, and smaller creeks including San Mateo, San Onofre, Las Pulgas, Aliso and De Luz. A large population can also be found in the San Bernardo and San Pasqual valleys east of Lake Hodges.

In Orange County the species is still present in many locations including Carbon Canyon Regional Park, Anaheim Wetlands, Villa Park Dam flood basin, Peters Canyon Reservoir, below Rattlesnake Reservoir, Talbert Regional Park, Big Canyon east of Upper Newport Bay, Sand Canyon Wash above and in Mason Regional Park, San Diego Creek, Arroyo Trabuco in O'Neill Regional Park, Bell Canyon in Starr Ranch Audubon Sanctuary, and San Juan Creek (Gallagher 1997).

Threats and Conservation Needs

Potential threats to the yellow-breasted chat include destruction of habitat, habitat fragmentation and degradation, river channelization, water diversions, lowered water tables, gravel mining, agricultural development, and cowbird parasitism. As much as 90 percent of the original extent of riparian woodland in California has been eliminated, and it has been reported that most of the remaining 10 percent is in a degraded condition (Smith 1977; Dahl 1990). However, more recently, destruction and modification of riparian habitat has been curtailed significantly due to regulatory protections, and other efforts not driven by regulatory processes have also promoted increased conservation and restoration if riparian habitat (USFWS 2006). Habitat fragmentation negatively affects abundance and distribution of neotropical migratory songbirds, in part by increasing the incidence of nest predation and parasitism (Whitcomb *et al*. 1981; Small and Hunter 1988; Yahner and DeLong 1992; Sharp 2002; Peterson 2002). Exotic plant invasion has also reduced the quantity and quality of habitat available to the chat.

Yellow-breasted chat conservation depends on the protection and restoration of its breeding and wintering habitats, especially riparian habitats in southern California. Within the action area, the following management actions would benefit the yellow-breasted chat: 1) protection of southern willow scrub habitat and maintenance and management of riparian and aquatic habitats along creeks; 2) initiation of cowbird trapping where needed; 3) exotic plant control programs where needed; 4) protection of riparian breeding locations; and 5) protection of habitats downstream of major development projects by maintaining hydrology and water quality.

Outside the action area, two large, regional Habitat Conservation Plans in southern California have addressed the effects of urban development on this species. These plans are expected to provide long-term protection of core occurrences of chats in western Riverside and San Diego counties (Appendix 2). Compliance-driven and voluntary riparian restoration activities throughout the range of the chat may also be contributing to an increase in riparian habitat since the early 1990s, although this cannot be established without a thorough evaluation of riparian habitat within California. The Riparian Habitat Joint Venture, a cooperative association of Federal, State, and private organizations, plans to systematically map existing riparian habitat in

California starting in 2007 (RHJV 2006). This mapping effort should provide a more objective measure of ongoing changes to riparian habitat in California.

Within the past decade, control of giant reed and other exotic plants has been and continues to be systematically conducted on both the Santa Ana River and on MCB Camp Pendleton. Giant reed removal has also been initiated within several other watersheds within southern California (Natural Resources Conservation Service 2006). In general, giant reed removal has been effective but will require continued annual efforts to achieve local eradications and address new invasions. Although control of giant reed has made great progress since the early 1990s, invasions by other exotic plants (*e.g.*, *Tamarix* species, perennial pepperweed (*Lepidium latifolium*) continue to degrade existing riparian habitat (Kus and Beck 1998; Hoffman and Zembal 2006).

Cowbird trapping has proven a successful tool to halt Least bell's vireo population declines over the short term within a limited area and have undoubtedly benefited the yellow-breasted chat where their breeding habitats over-lap.

Environmental Baseline

Habitat for the yellow-breasted chat within the action area was defined as mulefat scrub, arroyo willow riparian forest, southern willow scrub, southern coast live oak riparian woodland, southern sycamore riparian woodland, freshwater marsh, and intermittent and perennial rivers and streams. This habitat exists in portions of Gobernadora Creek, San Juan Creek, lower Arroyo Trabuco, Chiquita Creek, lower Cristianitos Creek, and in Prima Deshecha. The action area contains 5,064 ac (2,050 ha) of yellow-breasted chat habitat throughout these drainages including 3,891 ac (1,575 ha) in Subarea 1, where most of the Covered Activities will occur. The action area contains 125 yellow-breasted chat nesting locations, including 116 locations in Subarea 1 (Table A).

Within the action area, five "important" chat populations were identified: 1) Lower Arroyo Trabuco (29 nesting sites), 2) Lower Gobernadora Creek (20 nesting sites), 3) San Juan Creek/Chiquita Canyon (9 nesting sites), 4) San Juan Creek/Bell Creek (17 nesting sites), and 5) Lower Cristianitos Creek between the confluences with Gabino and Talega creeks (11 nesting sites). There are also seven chat locations along Gobernadora Creek within Coto de Caza (Map 175-M in the NCCP/MSAA/HCP).

Effects of the Action

Direct Effects

The action area includes 5,064 ac (2,050 ha) of suitable (riparian) habitat for the yellow-breasted chat (Table A). Over the 75-year term of the permit and within the action area, a total of 189 ac (77 ha) or 4 percent of yellow-breasted chat nesting and foraging habitat will be permanently impacted (Tables B). The impact area includes 14 yellow-breasted chat locations or 11 percent in the action area (Table B).

Table A for Yellow-breasted Chat: Yellow-breasted chat nesting habitat (riparian) and locations in the action area

Action Area Components	**Total Amount of Yellow-breasted Chat Habitat (acres)**	**Yellow-breasted Chat Locations in NCCP Dataset**
Subarea 1		
Proposed RMV	1,407	75
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	332	28
Prima Deshecha Landfill	30	2
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	1,545	11
Supplemental Open Space (Audubon Starr Ranch)	563	0
Other	14	
Subtotal for Subarea 1	***3,891***[3]	**116**
Subarea 2	419	0
Subarea 3	233	7
Subarea 4	521	2
TOTAL	**5,064**	**125**

The proposed RMV Covered Activities, including Ortega Rock, will permanently impact 161 ac (65 ha) or 9 percent of the yellow-breasted chat habitat on RMV lands, which includes 11 chat locations (Table B).

The County Covered Activities at Prima Deshecha Landfill will permanently impact 16 ac (7 ha) or 53 percent of the chat habitat at the Landfill, including the only 2 chat locations present. Avenida La Pata road extension will impact an additional 9 ac (4 ha) of chat habitat within the Habitat Reserve, and 1 chat location. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program" could allow the impact of up to 3 ac (1 ha) of willow riparian habitats in parcels 1-17.

According to Table 13-26 in the NCCP/MSAA/HCP, RMV road and bridge projects will result in 3.4 ac (1 ha) of permanent impacts and 12 ac (5 ha) of temporary impacts to yellow-breasted chat habitat. These road/bridge projects will impact chat habitat in San Juan Creek, Canada Gobernadora Creek, and Cristianitos Creek (Map 175-M of the NCCP/MSAA/HCP) and include from west to east:

- The widening of the bridge crossing over San Juan Creek associated with the build-out of PA1. This crossing appears to be within 150 ft (46 m) of 2 chat locations.
- The realignment of Cow Camp Road will cross Canada Gobernadora Creek just upstream of where it intersects San Juan Creek. This area, known as GERA, contains an "important" population of 20 chat locations. The proposed bridge crossing is approximately 300 ft (92 m) from at least 4 of these chat locations.

Table B for Yellow-breasted Chat: The amount of nesting habitat (riparian) and the number of yellow-breasted chat locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the chat in the action area.

Covered Activities and Conservation Areas	**Habitat Impacts (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS (acres)[1]**	**Habitat with Status Unchanged (acres)**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations in Prima SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	161	1,246			11	64		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		332				28		
Subtotal of impacts and conservation by RMV and SMWD	**161**	**1,578**			**11**	**92**		
Prima Deshecha Landfill	16		14		2		0	
Avenida La Pata on RMV Lands	9	-9			1	-1		
Avenida La Pata in Subarea 4	0				0			
Subtotal of impacts and conservation by the County of Orange	**25**		**14**		**3**			
Subtotal of impacts and assured conservation with adaptive management	**186**	**1,569**	**14**		**14**	**91**		
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 3							
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		1,545				11		
No Covered Activities				1,747				9
TOTAL	**189**	**3,114**	**14**	**1,747[4]**	**14**	**103**	**0**	**9**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 563 ac in existing Starr Ranch SOS.

- In the vicinity of the GERA crossing, Cristianitos Road/ "F" Street, running north/south will cross San Juan Creek. Currently, chats are not found in this portion of San Juan Creek.
- The extension of Avenida Pico crosses Cristianitos Creek and ends at PA8. This bridge crossing seems to be directly adjacent to numerous chat locations in Cristianitos Creek that are a part of the Lower Cristianitos Creek "important" population.
- The realignment of Cow Camp Road will cross San Juan Creek in a second location further east between PA3 and PA4. This crossing could potentially impact three chat locations in the San Juan Creek/Bell Canyon "important" population.

All of these major crossings will be span bridges that have both direct and indirect effects to breeding chats (further discussed in "General Effects" section of this biological opinion), including habitat fragmentation and edge effects, noise, shading, and temporary loss of habitat. These direct and indirect effects may result in lowered reproductive fitness for chats that breed in proximity to these crossings.

Where chat breeding habitat has been removed, birds returning to breed will be forced to compete for adjacent suitable habitat or to seek other habitats further away. If they remain in the same area, they may experience the possible effects of crowding. They may also be delayed in the initiation of, or prevented from, nest building, resulting in fewer nesting attempts per season, a reduced clutch size per attempt, and overall reduction in reproductive output.

In addition to the permanent impacts associated with urban development, the construction and maintenance of bridges, trails, water storage tanks, drainage culverts, and water and sewer lines will temporarily impact three locations and 63 ac (26 ha) of chat habitat: three locations and 44 ac (18 ha) within RMV lands and 19 ac (8 ha) within the SMWD project area. All temporary impacts will be restored to equivalent or better conditions compared to the existing condition at the time of impact (Appendix U in the NCCP/MSAA/HCP).

Other Covered Activities that may impact the yellow-breasted chat, but are not expected to result in a permanent loss of habitat, include maintenance of existing infrastructure such as trails, roads, and utilities and habitat and wildlife management and monitoring activities. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance but should occur outside the chat breeding season. Habitat management and monitoring activities could result in minor disturbance of individuals and temporary loss of habitat, but no direct loss of individuals is anticipated.

"Important" Populations and Other Occurrences

A total of eight yellow-breasted chat locations or 9 percent of the "important" population locations will be lost as a result of the Covered Activities. Upon build-out of PA1, one location in the San Juan Creek/Chiquita Canyon "important" population will be lost. The remaining eight locations may be indirectly impacted by a road crossing over San Juan Creek that is proposed through the western portion of this population. Build-out of PA3 will impact four chat locations in the San Juan Creek/Bell Canyon "important" population. Direct impacts to chat habitat within this area will also occur as a result of a road/bridge crossing over San Juan Creek. Lastly, build-

out of PA8 will impact one chat location in Blind Canyon; however, this location is fairly isolated from other locations and not considered a part of any of the "important" populations. RMV infrastructure improvement projects will impact the remaining three "important" population locations including two in GERA for a pump station and a sewer/water line and one in lower Cristianitos Creek for drainage culverts.

Grazing

In addition to the impacts due to development projects, grazing is a potential stressor to this species. Although cattle have been excluded from GERA in the past, grazing within GERA for fuel modification purposes once every three years between September 15 and October will be a Covered Activity. As noted above, chats usually nest 2-8 ft (0.6-2 m) above the ground in dense shrubs near a stream or river. Although grazing would be restricted to the non-breeding season and only occur once every three years, it could reduce the suitability of habitat within GERA if cattle completely remove or even thin the dense understory that chats prefer for nesting. The cattle may not only remove sensitive vegetation important to nesting riparian birds, but they may also trample the stream banks which, when combined with erosion, widens the stream. As Ohmart (1994) explains, this eventually leads to a lowered water table, which can cause die-off of riparian vegetation and allows the invasion of upland species such as sage (*Artemisia* sp.). Thus, over time, grazing in GERA may result in the loss of suitable nesting habitat for the chat if the habitat does not sufficiently recover during the two and a half year time period when cattle will be excluded.

The re-introduction of cattle into the TRW Pasture has been proposed between the expiration of the lease with Northrop Grumman and the development of PA8. The re-introduction of cattle into the River Pasture, which is within and adjacent to San Juan Creek, has also been proposed. Currently 37 ac (15 ha) of riparian habitat and 6 chat locations are within the River Pasture and 17 ac (7 ha) of riparian habitat and 2 chat locations are present in the TRW pasture.

Indirect Effects

Fragmentation of chat habitat associated with road/bridge crossings may negatively affect the quality of any remaining habitat as a result of construction noise and noise from daily use of these facilities once they are constructed. Fragmentation also creates more edges around nesting sites, which favor avian predators such as the scrub jay and crow and species that parasitize nests such as the brown-headed cowbird. Brown-headed cowbirds may have played a role in the decline of the yellow-breasted chat affecting its distribution in addition to its density (Gaines 1974; Remsen 1978). An increase in the number of residential developments in Subarea 1, combined with the large areas of turf grass associated with parks and school grounds, will result in greater foraging opportunities for cowbirds. This may increase the number of adult cowbirds breeding in the Habitat Reserve. Therefore, nest parasitism of the chat is expected to occur, especially in highly fragmented landscapes and in areas adjacent to cowbird foraging locales, such as livestock and equestrian centers, and urban parklands.

In addition, the road and bridge crossings and the proposed urban developments on RMV may facilitate the invasion of exotic plant and animal species. Invasive plants such as *Arundo donax*

can alter the species composition and structure of the habitat, which may make it less suitable to the chat and also more susceptible to fire. The temporary construction of bridges and roads across GERA may affect adjacent chat territories.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, fire, and grazing, the following conservation measures specific to and/or of particular importance to yellow-breasted chat will be implemented.

Conservation and Restoration. The Habitat Reserve will contain 103 chat locations, or 82 percent of the locations in the action area, including 92 locations on RMV lands and 11 locations within existing County Parks. The Habitat Reserve will also include 3,114 ac (1,261 ha) (62 percent) of suitable chat habitat in the action area, including 1,578 ac (639 ha) on RMV lands and 1,545 ac (626 ha) within existing County Parks. To help offset impacts at Prima Deshecha Landfill and Avenida La Pata, 14 ac (6 ha) of habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the chat.

Yellow-breasted chat populations will be conserved in five areas of the Habitat Reserve including all 29 locations in the Lower Arroyo Trabuco "important" population, 18 locations or 90 percent of the Lower Gobernadora Creek "important" population, 8 locations or 88 percent of the San Juan Creek/Chiquita Canyon "important" population, 13 locations or 76 percent of the San Juan Creek/Bell Canyon "important" population and 10 or 91 percent of the locations in the Lower Cristianitos Creek "important" population. Other conserved chat locations occur in O'Neill Regional Park, Caspers Wilderness Park, middle Chiquita Canyon, and La Paz Canyon.

To off set the loss of riparian habitat (25 ac (10 ha)) for chat at the Prima Deshecha Landfill and within the Habitat Reserve due to the extension of Avenida La Pata, the County will create 6 ac (2 ha) of willow riparian habitat within a 530.7-ac (215-ha) SOS (conservation) area on the Landfill within five years of permit issuance and will manage this area for Covered Species, including the chat, in perpetuity. The creation of the 6 ac (2 ha) of willow scrub will occur to a standard identified in Attachment M-2 Prima Deshecha/Avenida La Pata Mitigation Program of the NCCP/MSAA/HCP and will occur prior to future impacts resulting from the Landfill and road projects. In total, 14 ac (6 ha) of chat habitat will be conserved and adaptively managed on Prima Deshecha Landfill SOS. In addition, the County will control invasive plant species through: 1) payment of in-lieu mitigation fees totaling $600,000 to carry-out the eradication of approximately 24.3 ac (9.8 ha) of *Arundo donax* and other invasive plant species within the San Juan Creek portion of Caspers Wilderness Park, all as more specifically identified/depicted in Appendix J of the NCCP/MSAA/HCP; and 2) payment of $250,000 for ongoing monitoring and maintenance of areas where the invasive species control has occurred. Additionally, as supplemental mitigation, the County will restore willow riparian habitat on a 1:1 basis in Landfill SOS in accordance with the pre-mitigation concept plan set forth in Appendix M of the NCCP/MSAA/HCP. We expect that several pairs of chats will establish breeding territories in the restored willow riparian habitat on the Landfill and that the non-native plant removal

program along San Juan Creek in Caspers Wilderness Park will provide additional opportunities for chat to establish new breeding territories.

In addition to mitigation for the Covered Activities, the County has agreed to enroll 1,545 ac (626 ha) of riparian habitat including 11 chat locations into the Habitat Reserve as soon as is practicable following signatory acceptance of the Plan, but no later than 1 year following this date. These lands are currently managed and conserved as County wilderness or regional parks.

To off-set temporary impacts in the Habitat Reserve, RMV, SMWD, and the County will restore all temporarily disturbed riparian areas as described in the "Project Description" of this biological opinion and Appendix U of the NCCP/MSAA/HCP.

Conserved lands in the Habitat Reserve will be maintained and managed in perpetuity for the benefit of Covered Species, including the yellow-breasted chat. Management actions for chat within the Habitat Reserve will include the control of invasive species through implementation of the Invasive Species Control Plan described in the "Project Description" section of this biological opinion. Under this plan, chats within the Habitat Reserve will be assessed of their risk of parasitism by the brown-headed cowbird. If cowbird parasitism is reducing chat productivity then cowbird trapping will be implemented. Cowbird trapping has been and will continue to be conducted in lower Arroyo Trabuco in conjunction with the operation of the golf course. The Plan states that the initiation of cowbird trapping and other management actions in GERA are anticipated in conjunction with build-out of PA3 (page E-97). The Invasive Species Control Plan will also manage invasive plant species that occur in riparian habitats including *Tamarisk ramosissima* (tamarisk), *Arundo donax* (arundo), and *Ricinus communis* (castor bean). Chat occupied habitats that will benefit from invasive plant control include San Juan Creek, Arroyo Trabuco, GERA, and Cristianitos Creek. Over time, these areas cleared of non-native plants are likely to become suitable for chat nesting, depending on flood dynamics.

After construction of Cow Camp Road, chats returning from migration will likely continue to establish territories within the southern portion of GERA. We anticipate that any chats attracted to these areas post-bridge construction will have or develop a tolerance for the noise and disturbance generated by operation of these new roads. We expect this to occur because noise will be minimized by designing sound reduction elements into the proposed bridge across GERA.

In addition to conservation and management of Habitat Reserve areas for yellow-breasted chat and restoration of temporarily impacted areas, the permittee will implement minimization measures described in Appendix U of the NCCP/MSAA/HCP. These measures include the removal of riparian habitat between September 15 and February 15, which is outside of the breeding season for chat. Should habitat clearing need to take place outside this time period, focused surveys will be undertaken in the habitat for chat ahead of the clearing, and other measures will be implemented to avoid impacts to chat nests and young.

<u>Grazing</u>: To minimize impacts to riparian habitats associated with cattle grazing, cattle will continue to be excluded from Lower Cristianitos Creek via fencing around the perimeter of

Donna O'Neill Conservancy. Riparian habitat in San Juan Creek may benefit from seasonal cattle exclosures for arroyo toad.

Monitoring: Monitoring will be conducted at a species-specific level and also at a habitat landscape level. The detailed monitoring program for yellow-breasted chat will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. The Plan (page 7-212 and E-171) provides a conceptual monitoring program for the yellow-breasted chat that proposes annual field surveys within pre-designated sample plots to monitor changes in the riparian/wetland community and yellow-breasted chat population size. Within two years of the Effective Date, RMV will also establish a riparian habitat baseline in the Habitat Reserve for the purposes of long-term tracking, with the goal of maintaining the approximate existing yellow-breasted chat habitat acreage in the Habitat Reserve.

In addition, RMV will monitor the proposed 32 Covered Species including the yellow-breasted chat, on County Park lands within the Habitat Reserve. County Parks may receive additional funding for adaptive management of Covered Species on their lands through the Coto de Caza "Opt-In-Program" and from grants; however, this funding is not assured.

Analysis of Impacts and Conservation by RMV Planning Area

A summary of yellow-breasted chat locations and habitat that will be impacted and conserved is presented in Table C below. In addition to the conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Conservation of habitat and chat locations greatly exceeds impacts from Covered Activities in each of the Planning Areas (Table C), with the exception of the minor impacts associated with PA6 and PA7. In addition to the conservation identified by Planning Area, there will be conservation and management of the Covered Species including 28 occurrences of yellow-breasted chat and 332 ac (134 ha) of chat habitat on the Prior RMV lands within 6 months of permit issuance. As discussed above, this results in conservation of 91 percent of the chat nesting and foraging habitat and 89 percent of the chat locations on RMV lands and maintains all five of the "important" populations identified within the action area.

Lastly, the analysis by planning area provided above does not include impacts associated with RMV's infrastructure, SMWD, and Ortega Rock in the Habitat Reserve. These projects will permanently impact an additional 35 ac (14 ha) of chat habitat and 3 locations (Table C). These impacts represent a small fraction of the total impacts that will occur over the life of this project, and they will also occur in a phased manner.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 or Alternative Order 1, 4, 3, 2, 5, and 8, cumulative conservation of chat habitat and locations will still greatly exceed impacts from Covered Activities as each of the individual phases is developed.

Table C for Yellow-breasted Chat: Yellow-breasted chat nesting habitat (riparian) and locations permanently impacted and conserved/managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Locations and Habitat Impacted (Cumulative Impacts)**		**Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	3 (3)	6 (6)	3 (3)	53 (53)
PA2	0 (3)	9 (15)	14 (17)	157 (210)
PA3	4 (7)	47 (62)	36 (53)	379 (589)
PA4	0 (7)	15 (77)	0 (53)	1 (590)
PA5	0 (7)	22 (99)	0 (53)	22 (612)
PA6 & PA7	0 (7)	3 (103)	0 (53)	0 (612)
PA8	1 (8)	23 (126)	14 (67)	668 (1,280)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	3 (11)	31 (156)	-3 (64)	-31 (1,249)
Ortega Rock	0 (11)	1 (158)		
Santa Margarita Water District Impacts (Reservoir in Upper Chiquita Conservation Area)	0 (11)	3 (161)		-3 (1,246)
Subtotal for Proposed RMV and Associated Projects	11	161	64	1,246
Prior RMV[1] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			28 (92)	332 (1,581)
TOTAL	**11**	**161**	**92**	**1,578**

[1] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, and the effects of the proposed action, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of the yellow-breasted chat. We base this conclusion on the following:

The species presumably migrates throughout much of North America and winters primarily from northern Mexico to Panama (AOU 1998).

1. The yellow-breasted chat is found throughout much of North America and winters primarily from northern Mexico to Panama. Therefore, the action area for this Plan represents a small fraction of the species' entire distribution.

2. Only 14 yellow-breasted chat locations (11 percent) and a total of 189 ac (77 ha) or 4 percent of chat nesting and foraging habitat in the action area will be permanently impacted by Covered Activities.

3. A total of 3,114 ac (1,261 ha) (61 percent) of the suitable habitat for the species in the action area, including 103 known locations, will be cooperatively managed within the

Habitat Reserve. The Habitat Reserve will include 1,569 ac (635 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 1,545 ac (626 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 14 ac (6 ha) of suitable habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 563 ac (228 ha) of habitat is conserved at NAS Starr Ranch.

5. Combined, 3,691 ac (1,494 ha) or 73 percent of the suitable habitat for chat, including 103 known locations (82 percent), in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[19]

6. All five "important" populations will be included in the Habitat Reserve.

7. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling yellow-breasted chat or eggs will be killed or injured during habitat grading or grubbing.

8. We anticipate that permanent protection of yellow-breasted chat locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the yellow-breasted chat in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA has not been invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid for the following reasons:

1. Impacts from Covered Activities will be reduced to the loss of 11 yellow-breasted chat locations and 161 ac (65 ha) of chat nesting and breeding habitat, which represents 9 percent of the chat locations and only 3 percent of the chat habitat within the action area.

2. The County of Orange will not implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS and County Park lands, and these lands will not be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP. However, a total of 11 chat locations and 1,545 ac (626 ha) of chat nesting and foraging habitat will remain within County Park lands.

3. The conservation proposed by RMV will still be implemented such that 91 percent of the chat nesting and foraging habitat and 89 percent of the chat locations on RMV lands will

[19] There is likely suitable habitat for yellow-breasted chat in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

be conserved and adaptively managed within the Habitat Reserve. This includes all five "important" populations.

4. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling yellow-breasted chat or eggs will be killed or injured during habitat grading or grubbing.

5. We anticipate that permanent protection of yellow-breasted chat locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain yellow-breasted chat in the Southern Subregion and contribute to the range-wide conservation of this species.

Finally, should the RMV and SMWD determine not to participate in this regional conservation effort, the Covered Activities within the action area will be reduced to only those implemented by the County of Orange. Our no jeopardy conclusion for yellow-breasted chat remains valid for the following reasons:

1. Covered Activities will impact only three chat locations and only 25 ac (10 ha) of chat nesting and foraging habitat in the action area, which represent only 2 percent of the chat locations and less than 1 percent of the chat habitat in the action area. None of these locations are part of "important" populations.

2. Eleven (11) chat locations and 1,545 ac (626 ha) of chat habitat will remain in the County Park system. The County will monitor yellow-breasted chat on Prima Deshecha Landfill SOS every five years in perpetuity.

3. The County of Orange will implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS at Prima Deshecha Landfill and within County Park lands to offset impacts to chat from their landfill and road extension projects. We expect that several chat pairs will establish breeding territories in the restored willow riparian habitat on Prima Deshecha Landfill SOS and that the non-native plant removal effort along San Juan Creek in Caspers Wilderness Park will provide additional opportunities for chats to establish new breeding territories.

4. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling yellow-breasted chat or eggs will be killed or injured during habitat grading or grubbing.

5. We anticipate that the conservation actions for the yellow-breasted chat at Prima Deshecha Landfill and within the County Park system will help sustain yellow-breasted chat in the Southern Subregion and contribute to the range-wide conservation of this species.

Yellow warbler

Status of the Species

Listing Status

The yellow warbler (*Dendroica petechia brewsteri*) is designated a Species of Special Concern by the California Department of Fish and Game. This species is not listed under the Federal Endangered Species Act.

Species Description

The yellow warbler is a medium-sized (5 in [13 cm]) wood-warbler with bright yellow plumage over most of its body. Males have distinct chestnut streaking on the breast. There are 43 subspecies of *D. petechia* recognized, and they are divided into three groups: yellow warbler (*aestiva*), golden warbler (*petechia*), and mangrove warbler (*erithachorides*) (Lowther *et al*. 1999). There are nine subspecies of yellow warbler identified including *D. p. morcomi* and *D. p.* brewsteri both of which occur in California (Lowther *et al*. 1999; Unitt 2004).

Habitat Affinities

The yellow warbler breeds most commonly in wet, deciduous thickets, especially those dominated by willows, and in disturbed and early successional habitats (Lowther *et al*. 1999). In southern California, it breeds in mature riparian woodland that include cottonwood, willow, alder, maple and ash trees that have reached their full height (Unitt 2004; Hamilton and Willick 1996). In California, the yellow warbler also breeds in montane chaparral and open ponderosa pine/mixed conifer habitats with substantial amounts of brush (Zeiner *et al*. 1990), although this is thought to be a recent phenomenon (Gaines 1977). During the post-breeding season, yellow warblers will move upslope to middle elevations (Beedy 1975), but the species is scarce at elevations above 8,000 ft (2,440 m) (Gaines 1977).

During spring and fall migration, the yellow warbler occurs in scrub/shrub and semi-open habitats and second growth forests that are often associated with wetlands (Lowther *et al*. 1999). A study of stopover sites in southeastern Arizona led researchers to conclude that riparian patches are important stopover sites for migrants, regardless of size and degree of isolation or connectivity (Skagen *et al*. 1998). Other researchers in Oregon specifically identified “mesic shrub” as a vegetation structure within riparian areas that attracts high numbers of yellow warblers (Sanders and Edge 1998).

In winter, this species occurs in a variety of wooded and scrubby habitats, including gardens, town plazas, second growth, brushy pastures and hedgerows, forest edge, streamside woodlands, wooded marshes, agricultural lands, and other semi-open areas (Lowther *et al*. 1999). In southern California, small numbers winter in the coastal lowlands (Garrett and Dunn 1981). In Central America, it commonly winters in mangrove associations and overlaps with resident golden and mangrove warblers.

Life History

The yellow warbler eats insects and other arthropods and sometimes wild fruits. It gleans and hovers in the upper canopy of deciduous trees and shrubs and occasionally hawks insects from the air (Bent 1953; Ehrlich *et al*. 1988). During the winter, it has been known to feed on the nectar and pollen of the *Inga* sp. tree (Lowther *et al*. 1999).

The yellow warbler breeds from mid-April to early August with peak activity in May and June. Male yellow warblers defend territories that are 0.1 to 2 ac (0.04-0.8 ha) in size (0.5 ac (0.2 ha) appears typical). The open cup nest is built in an upright fork of a bush, sapling, or tree, 2 to 16 ft (0.6-5 m) above the ground. The preferred nest trees are willows, alders, and cottonwoods. Average clutch size for this species is four or five eggs and only one brood per year is attempted. Incubation lasts11 days and the young fledge at 9-12 days of age (Lowther *et al*. 1999). Nest loss has been attributed to severe storm events, but little information has been collected on nest predators. Yellow warbler nests are likely susceptible to the same predators of other avian riparian species such as scrub jays, small mammals, corvids, snakes and domestic cats (Peterson 2002; Brown 1993).

The yellow warbler is a frequent host of the brown-headed cowbird; a consequence, in part, of the warbler's own abundance and broad sympatry with this species (Lowther *et al*. 1999). The yellow warbler frequently responds to cowbird parasitism by building over the parasitized clutch, making multi-tiered nests. One nest was found with five tiers and was 6 in (15 cm) in height. Other responses include desertion of the nest or burying of the cowbird egg (Lowther *et al*. 1999). In cases where both cowbird and yellow warbler eggs have hatched in the same nest, the yellow warbler chick has survived and fledged (Goossen and Sealy 1982). In areas where yellow warbler and brown-headed cowbird are not sympatric, parasitism has been attributed with yellow warbler population declines (Bent 1953; Remsen 1978; Garrett and Dunn 1981; Unitt 2004).

Distribution

Yellow warblers breed from northern Alaska eastward to Newfoundland and southward to northern Baja California and Georgia. The species migrates throughout much of North America and winters from southern California, Arizona, and the Gulf Coast southward to central South America (AOU 1998). In California, Zeiner *et al*. (1990) described the yellow warbler as an uncommon to common summer resident in the north and locally common in the south. It breeds from the northern border of California west of the Sierra Nevada to the coastal slopes of southern California and from coastal and desert lowlands up to 8,000 ft (2,440 m) in the Sierra Nevada and other montane chaparral and forest habitats (Grinnell and Miller 1944).

The yellow warbler occurs as a spring and fall migrant throughout California including the Channel and Farallon islands (DeSante and Ainley 1980; Garrett and Dunn 1981). Individuals have also been documented wintering in southern California although records are rare (Grinnell and Miller 1944; Unitt 2004). Typically, the yellow warbler group winters from northern Mexico south to Bolivia and Brazil.

Rangewide Trends

Lowther *et al*. (1999) described this species as one of the most widespread and abundant warblers in North America. In southern New England, the Great Lakes Plain, St. Lawrence Plain and portions of Canada, the species has shown annual increases from 1966 to 1996 (Sauer *et al*. 2005). Data (Sauer *et al*. 2005) for California from 1990 to 2004, however, show an annual decline of 0.4 percent. Populations in many lowland areas of the southwestern United States have declined dramatically in recent decades (southern California coast, Colorado River, San Joaquin and Sacramento valleys) due to the loss of riparian habitats and the range expansion of the brown-headed cowbird (Lowther *et al*. 1999; Unitt 2004; Garrett and Dunn 1981). In southern California, the yellow warbler is now rare to uncommon in many lowland areas where it was formerly common (McCaskie *et al*. 1979; Garrett and Dunn 1981).

The yellow warbler was nearly absent as a breeding species from the Prado Basin (and possibly western Riverside County) as recently as 1986. However, by the 2003 breeding season, an estimated 650+ pairs were present within the Prado Basin area (USFWS 2004). The increase in the Prado Basin/Santa Ana River population is attributed to recent cowbird management programs and local habitat restoration and rehabilitation efforts. Other breeding areas in Riverside County include Temescal Canyon and its tributaries, Wasson Canyon, Temecula Creek, Murrieta Creek, Vail Lake area, Wilson Creek, San Timoteo Creek, Santa Rosa Plateau, and drainages and woodlands with the San Bernardino National Forest.

In Los Angeles County, the yellow warbler is still found breeding at a few locations including the Sepulveda Basin, Whittier Narrows, and in 2001, 36 territories were dispersed between the Hansen Dam, Santa Fe Dam and the San Gabriel River (Cooper 2001).

In San Diego County, Unitt (2004) found that yellow warbler numbers had been increasing since the mid-1980s due to conservation and restoration of habitat and cowbird trapping programs. The species has refilled all of its San Diego County range from which it had retracted prior to 1980. Areas where the species is exceptionally numerous include the Santa Margarita River north of Fallbrook (60 singing males), the east end of Lake Hodges (50 individuals) and the Tijuana River valley (40 individuals). Unitt (2004) postulates that San Diego County is one of the main population centers for this species in California.

In Orange County, Hamilton and Willick (1996) describe the yellow warbler as a common breeder in dense alder and maple woodlands of the mountains but uncommon in the foothills and lowlands. Confirmed breeding locations include Starr Ranch, Arroyo Trabuco, Gobernadora Creek, Cristianitos Creek and San Juan Creek.

Threats and Conservation Needs

Potential threats to the yellow warbler include destruction of habitat, habitat fragmentation and degradation, river channelization, water diversions, lowered water tables, gravel mining, agricultural development, and cowbird parasitism. As much as 90 percent of the original extent of riparian woodland in California has been eliminated, and it has been reported that most of the remaining 10 percent is in a degraded condition (Smith 1977; Dahl 1990). However, more

recently, destruction and modification of riparian habitat has been curtailed significantly due to regulatory protections, and other efforts not driven by regulatory processes have also promoted increased conservation and restoration if riparian habitat (USFWS 2006). Habitat fragmentation negatively affects abundance and distribution of neotropical migratory songbirds, in part by increasing the incidence of nest predation and parasitism (Whitcomb *et al*. 1981; Small and Hunter 1988; Yahner and DeLong 1992; Sharp 2002; Peterson 2002). Exotic plant invasion has also reduced the quantity and quality of habitat available to the yellow warbler.

The conservation needs of the yellow warbler include the preservation and expansion of large unfragmented riparian habitat tracts, the elimination of invasive exotic plants, and the suppression of cowbird parasitism within the large areas of suitable habitat, particularly major watersheds. Conservation will also depend on the active management of any current or future-identified breeding populations. Area-wide cowbird abatement efforts and monitoring of yellow warbler populations within the action area to detect population trends, dispersal, and demographics are important components of an effective management program.

Within the action area, the following management actions would benefit the yellow warbler: 1) protection of southern willow scrub habitat and maintenance and management of riparian and aquatic habitats along creeks; 2) initiation of cowbird trapping where needed; 3) exotic plant control programs where needed; 4) protection of riparian breeding locations; and 5) protection of habitats downstream of major development projects by maintaining hydrology and water quality.

Outside the action area, one large, regional Habitat Conservation Plan in southern California has addressed the effects of urban development on this species. This plan is expected to provide long-term protection of core occurrences of yellow warbler in western Riverside County (Appendix 2). Since the early 1990s, compliance-driven and voluntary riparian restoration activities throughout the range of the yellow warbler may also be contributing to an increase in riparian habitat, although this cannot be established without a thorough evaluation of riparian habitat within California. The Riparian Habitat Joint Venture, a cooperative association of Federal, State, and private organizations, plans to systematically map existing riparian habitat in California starting in 2007 (RHJV 2006). This mapping effort should provide a more objective measure of ongoing changes to riparian habitat in California.

Within the past decade, control of giant reed and other exotic plants has been and continues to be systematically conducted on both the Santa Ana River and on MCB Camp Pendleton. Giant reed removal has also been initiated within several other watersheds within southern California (Natural Resources Conservation Service 2006). In general, giant reed removal has been effective but will require continued annual efforts to achieve local eradications and address new invasions. Although control of giant reed has made great progress since the early 1990s, invasions by other exotic plants (*e.g.*, *Tamarix* species, perennial pepperweed (*Lepidium latifolium*) continue to degrade existing riparian habitat (Kus and Beck 1998; Hoffman and Zembal 2006).

Cowbird trapping has proven a successful tool to halt vireo population declines over the short term within a limited area and have undoubtedly benefited the yellow warbler where the two species' breeding habitats over-lap.

Environmental Baseline

Habitat for the yellow warbler within the action area was defined as mulefat scrub, arroyo willow riparian forest, southern willow scrub, southern coast live oak riparian woodland, southern sycamore riparian woodland, freshwater marsh, and intermittent and perennial rivers and streams. This habitat exists in portions of Gobernadora Creek, San Juan Creek, lower Arroyo Trabuco, Chiquita Creek, lower Cristianitos Creek, and in Prima Deshecha. The action area contains 5,064 ac (2,050 ha) of yellow warbler habitat throughout these drainages, including 3,891 ac (1,575 ha) in Subarea 1, where most of the Covered Activities will occur. The action area contains 34 yellow warbler nesting locations including 26 locations in Subarea 1 (Table A).

Within the action area, four yellow warbler "important" populations were identified: 1) Lower Arroyo Trabuco (4 nesting sites), 2) Lower Gobernadora Creek (5 nesting sites), 3) San Juan Creek/Chiquita Canyon (2 nesting sites), and 4) San Juan Creek/Bell Creek (4 nesting sites). There are also six yellow warbler locations along Gobernadora Creek within Coto de Caza (Map 175-M in the NCCP/MSAA/HCP).

Table A: Yellow warbler nesting habitat (riparian) and locations in the action area

Action Area Components	**Total Amount of Yellow Warbler Habitat (acres)**	**Yellow Warbler Locations in NCCP Dataset**
Subarea 1		
Proposed RMV[2]	1,407	17
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	332	3
Prima Deshecha Landfill	30	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	1,545	6
Supplemental Open Space (Audubon Starr Ranch)	563	0
Other	14	0
Subtotal for Subarea 1	***3,891***	***26***
Subarea 2	419	1
Subarea 3	233	6
Subarea 4	521	1
TOTAL	**5,064**	**34**

Effects of the Action

Direct Effects

The action area includes 5,064 ac (2,050 ha) of suitable (riparian) habitat for the yellow warbler (Table A). Over the 75-year term of the permit and within the action area, a total of 189 ac (77 ha) or 4 percent of yellow warbler nesting and foraging habitat will be permanently impacted (Tables B); however, no yellow warbler nesting locations will be permanently impacted (Table B).

Table B for Yellow Warbler: The amount of nesting habitat (riparian) and the number of yellow warbler (YEWA) locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the yellow warbler in the action area.

Covered Activities and Conservation Areas	**Habitat Impacts (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS[1] (acres)**	**Habitat with Status Unchanged (acres)**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations in Prima SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infra-structure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	161	1,246			0	17		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		332				3		
Subtotal of impacts and conservation by RMV and SMWD	**161**	**1,578**			**0**	**20**		
Prima Deshecha Landfill	16		14		0		0	
Avenida La Pata on RMV Lands	9	-9			0			
Avenida La Pata in Subarea 4	0				0			
Subtotal of impacts and conservation by the County of Orange	**25**		**14**		**0**			
Subtotal of impacts and assured conservation with adaptive management	**186**	**1,569**	**14**		**0**	**20**		
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 3							
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		1,545				6		
No Covered Activities				1,747				8
TOTAL	**189**	**3,114**	**14**	**1,747[4]**	**0**	**26**	**0**	**8**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 563 ac in existing Starr Ranch SOS.

The proposed RMV Covered Activities, including Ortega Rock, will permanently impact 161 ac (65 ha) or 9 percent of the yellow warbler habitat on RMV lands, which includes no yellow warbler locations (Table B).

The County Covered Activities at Prima Deshecha Landfill will permanently impact 16 ac (7 ha) or 53 percent of the yellow warbler habitat at the Landfill, but no yellow warbler locations. Avenida La Pata road extension will impact an additional 9 ac (4 ha) of yellow warbler habitat within the Habitat Reserve. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program" could allow the impact of up to 3 ac (1 ha) of willow riparian habitats in parcels 1-17.

According to Table 13-26 in the NCCP/MSAA/HCP, RMV road and bridge projects will result in 3.4 ac (1 ha) of permanent impacts and 12 ac (5 ha) of temporary impacts to yellow warbler habitat. These road/bridge projects will impact yellow warbler habitat in San Juan Creek, Canada Gobernadora Creek, and Cristianitos Creek (Map 175-M of the NCCP/MSAA/HCP) and include from west to east:

- The widening of the bridge crossing over San Juan Creek associated with the build-out of PA1. Currently, yellow warblers have not been found in the vicinity of the bridge crossing but do occur approximately 2 mi (3 km) upstream of it.
- The realignment of Cow Camp Road will cross Canada Gobernadora Creek just upstream of where it intersects San Juan Creek. This area, known as GERA, contains an "important" population of five yellow warbler locations. The proposed bridge crossing is approximately 300 ft (92 m) from at least 3 of these yellow warbler locations.
- In the vicinity of the GERA crossing, a second un-named road, running north/south will cross San Juan Creek. Currently, yellow warblers are not found in this portion of San Juan Creek.
- The extension of Avenida Pico crosses Cristianitos Creek and ends at PA8. This bridge crossing seems to be directly adjacent to one yellow warbler location in Cristianitos Creek.
- The realignment of Cow Camp Road will cross San Juan Creek in a second location further east between PA3 and PA4. This crossing is approximately 300 ft (92 m) from the four yellow warbler locations that comprise the San Juan Creek/Bell Canyon "important" population.

All of these major crossings will be span bridges that have both direct and indirect effects to breeding yellow warblers (further discussed in "General Effects" section of this biological opinion), including habitat fragmentation and edge effects, noise, shading, and temporary loss of habitat. These direct and indirect effects may result in lowered reproductive fitness for yellow warblers that breed in proximity to these crossings.

Where yellow warbler breeding habitat has been removed, birds returning to breed will be forced to compete for adjacent suitable habitat or to seek other habitats further away. If they remain in the same area, they may experience the possible effects of crowding. Birds that must seek new areas may be delayed in the initiation of, or prevented from, nest building, resulting in fewer nesting attempts per season or a reduced clutch size per attempt, and an overall reduction in reproductive output.

In addition to the permanent impacts associated with urban development, the construction and maintenance of bridges, trails, water storage tanks, drainage culverts, and water and sewer lines

will temporarily impact one location and 63 ac (26 ha) of yellow warbler habitat: one location and 44 ac (18 ha) within RMV lands and 19 ac (8 ha) within the SMWD project area. All temporary impacts will be restored to equivalent or better conditions compared to the existing condition at the time of impact (Appendix U in the NCCP/MSAA/HCP).

Other Covered Activities that may impact the yellow warbler, but are not expected to result in a permanent loss of habitat, include maintenance of existing infrastructure such as trails, roads, and utilities and habitat and wildlife management and monitoring activities. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance but should occur outside the yellow warbler breeding season. Habitat management and monitoring activities could result in minor disturbance of individuals and temporary loss of habitat, but no direct loss of individuals is anticipated.

Grazing: In addition to the impacts due to development projects, grazing is a potential stressor to this species. Although cattle have been excluded from GERA in the past, grazing within GERA for fuel modification purposes once every three years between September 15 and October will be a Covered Activity. As noted above, yellow warblers in southern California breed in mature riparian woodlands that include cottonwood, willow, alder, maple and ash trees that have reached their full height (Unitt 2004; Hamilton and Willick 1996). Although grazing would be restricted to the non-breeding season and only occur once every three years, it could reduce the suitability of habitat within GERA if cattle completely remove or even thin the willow riparian understory that this species relies on during the breeding season. For example, Taylor and Littlefield (1986) found that yellow warblers were more numerous on transects with abundant willows and little or no cattle than on transects with heavy cattle use and low shrub volume. They conclude that any actions that improve riparian brush habitat in the temperate latitudes would likely cause an increase in population for this species.

The re-introduction of cattle into the TRW Pasture has been proposed between the expiration of the lease with Northrop Grumman and the development of PA8. The re-introduction of cattle into the River Pasture, which is within and adjacent to San Juan Creek, has also been proposed. Currently 37 ac (15 ha) of riparian habitat and 4 yellow warbler locations are within the River Pasture and 17 ac (7 ha) of riparian habitat and 1 yellow warbler location are present in the TRW pasture.

Indirect Effects

Fragmentation of yellow warbler habitat associated with road/bridge crossings may negatively affect the quality of any remaining habitat as a result of construction noise and noise from daily use of these facilities once they are constructed. Fragmentation also creates more edges around nesting sites, which favor avian predators such as the scrub jay and crow and species that parasitize nests such as the brown-headed cowbird. Brown-headed cowbirds may have played a role in the decline of the yellow warbler affecting its distribution in addition to its density (Garrett and Dunn 1981). An increase in the number of residential developments in Subarea 1, combined with the large areas of turf grass associated with parks and school grounds, will result in greater foraging opportunities for cowbirds. This may increase the number of adult cowbirds breeding in the Habitat Reserve. Therefore, nest parasitism of the yellow warbler is expected to

occur, especially in highly fragmented landscapes and in areas adjacent to cowbird foraging locales, such as livestock and equestrian centers, and urban parklands.

In addition, the road and bridge crossings and the proposed urban developments on RMV may facilitate the invasion of exotic plant and animal species. Invasive plants such as *Arundo donax* can alter the species composition and structure of the habitat, which may make it less suitable to the yellow warbler and also more susceptible to fire. The temporary construction of bridges and roads across GERA may affect adjacent yellow warbler territories.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, fire, and grazing, the following conservation measures specific to and/or of particular importance to yellow warbler will be implemented.

Conservation and Restoration. The Habitat Reserve will contain 26 yellow warbler locations, or 77 percent of the locations in the action area, including 20 locations on RMV lands and 6 locations within existing County Parks. The Habitat Reserve will also include 3,114 ac (1,261 ha) (62 percent) of suitable yellow warbler habitat in the action area, including 1,578 ac (639 ha) on RMV lands and 1,545 ac (626 ha) within existing County Parks. To help offset impacts at Prima Deshecha Landfill and Avenida La Pata, 14 ac (6 ha) of habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the yellow warbler.

Yellow warbler populations will be conserved in four areas of the Habitat Reserve including 1) all four locations in the Lower Arroyo Trabuco "important" population, 2) all five locations in the Lower Gobernadora Creek "important" population, 3) both locations in the San Juan Creek/Chiquita Canyon "important" population, and 4) all four locations in the San Juan Creek/Bell Creek "important" population. Furthermore, scattered locations in middle Chiquita, Bell Canyon, Lucas Canyon, upper San Juan creek, middle Arroyo Trabuco and lower Cristianitos Canyon will be included in the Habitat Reserve.

To off set the loss of riparian habitat (25 ac (10 ha)) for yellow warbler at the Prima Deshecha Landfill and within the Habitat Reserve due to the extension of Avenida La Pata, the County will create 6 ac (2 ha) of willow riparian habitat within a 530.7-ac (215-ha) SOS (conservation) area on the Landfill within five years of permit issuance and will manage this area for Covered Species, including the yellow warbler, in perpetuity. The creation of the 6 ac (2 ha) of willow scrub will occur to a standard identified in Attachment M-2 Prima Deshecha/Avenida La Pata Mitigation Program of the NCCP/MSAA/HCP and will occur prior to future impacts resulting from the Landfill and road projects. In total, 14 ac (6 ha) of yellow warbler habitat will be conserved and adaptively managed on Prima Deshecha Landfill SOS. In addition, the County will control invasive plant species through: 1) payment of in-lieu mitigation fees totaling $600,000 to carry-out the eradication of approximately 24.3 ac (9.8 ha) of *Arundo donax* and other invasive plant species within the San Juan Creek portion of Caspers Wilderness Park, all as more specifically identified/depicted in Appendix J of the NCCP/MSAA/HCP; and 2) payment

of $250,000 for ongoing monitoring and maintenance of areas where the invasive species control has occurred. Additionally, as supplemental mitigation, the County will restore willow riparian habitat on a 1:1 basis in Landfill SOS in accordance with the pre-mitigation concept plan set forth in Appendix M of the NCCP/MSAA/HCP. We expect that the non-native plant removal program along San Juan Creek will provide opportunities for yellow warbler to establish new breeding territories.

In addition to mitigation for the Covered Activities, the County has agreed to enroll 1,545 ac (626 ha) of riparian habitat including six yellow warbler locations into the Habitat Reserve as soon as is practicable following signatory acceptance of the Plan, but no later than 1 year following this date. These lands are currently managed and conserved as County wilderness or regional parks.

To off-set temporary impacts in the Habitat Reserve, RMV, SMWD, and the County will restore all temporarily disturbed riparian areas as described in the "Project Description" of this biological opinion and Appendix U of the NCCP/MSAA/HCP.

Conserved lands in the Habitat Reserve will be maintained and managed in perpetuity for the benefit of Covered Species, including the yellow warbler. Management actions for yellow warbler within the Habitat Reserve will include the control of invasive species through implementation of the Invasive Species Control Plan described in the "Project Description" section of this biological opinion. Under this plan, yellow warblers within the Habitat Reserve will be assessed of their risk of parasitism by the brown-headed cowbird. If cowbird parasitism is reducing yellow warbler productivity then cowbird trapping will be implemented. Cowbird trapping has been and will continue to be conducted in lower Arroyo Trabuco in conjunction with the operation of the golf course. The Plan states that the initiation of cowbird trapping and other management actions in GERA are anticipated in conjunction with build-out of PA3 (page E-97). The Invasive Species Control Plan will also manage invasive plant species that occur in riparian habitats including *Tamarisk ramosissima*, *Arundo donax*, and *Ricinus communis* (castor bean). Yellow warbler occupied habitats that will benefit from invasive plant control include San Juan Creek, Arroyo Trabuco, GERA, and Cristianitos Creek. Over time, these areas cleared of non-native plants are likely to become suitable for yellow warbler nesting.

After construction of the realignment of Cow Camp Road, yellow warblers returning from migration will likely continue to establish territories within the southern portion of GERA. We anticipate that any yellow warblers attracted to these areas post-bridge construction will have or develop a tolerance for the noise and disturbance generated by operation of these new roads. We expect this to occur because noise will be minimized by designing sound reduction elements into the proposed bridge across GERA.

In addition to conservation and management of Habitat Reserve areas for yellow warbler and restoration of temporarily impacted areas, the permittee will implement minimization measures described in Appendix U of the NCCP/MSAA/HCP. These measures include the removal of riparian habitat between September 15 and February 15, which is outside of the breeding season for yellow warbler. Should habitat clearing need to take place outside this time period, focused

surveys will be undertaken in the habitat for yellow warbler ahead of the clearing, and other measures will be implemented to avoid impacts to yellow warbler nests and young.

Grazing: To minimize impacts to riparian habitats associated with cattle grazing, cattle will continue to be excluded from Lower Cristianitos Creek via fencing around the perimeter of Donna O'Neill Conservancy. Riparian habitat in San Juan Creek may benefit from seasonal cattle exclosures for arroyo toad.

Monitoring: Monitoring will be conducted at a species-specific level and also at a habitat landscape level. The detailed monitoring program for yellow warbler will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. The Plan (page 7-212 and E-171) provides a conceptual monitoring program for the yellow warbler that proposes annual field surveys within pre-designated sample plots to monitor changes in the riparian/wetland community and yellow warbler population size. Within two years of the Effective Date, RMV will also establish a riparian habitat baseline in the Habitat Reserve for the purposes of long-term tracking, with the goal of maintaining the approximate existing yellow warbler habitat acreage in the Habitat Reserve.

In addition, RMV will monitor the proposed 32 Covered Species including the yellow warbler, on County Park lands within the Habitat Reserve. County Parks may receive additional funding for adaptive management of Covered Species on their lands through the Coto de Caza "Opt-In-Program" and from grants; however, this funding is not assured.

Analysis of Impacts and Conservation by RMV Planning Area

A summary of yellow warbler locations and habitat that will be impacted and conserved is presented in Table C below. In addition to the conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Conservation of yellow warbler habitat greatly exceeds impacts from Covered Activities in each Planning Area, with the exception of the minor impacts associated with PA4, PA6, and PA7 (Table C). In addition to the conservation identified by Planning Area, there will be conservation and management of the Covered Species including 3 occurrences of yellow warbler and 332 ac (134 ha) of yellow warbler habitat on the Prior RMV lands within 6 months of permit issuance. As discussed above, this results in conservation of 91 percent of the yellow warbler nesting and foraging habitat and 100 percent of the yellow warbler locations on RMV lands and maintains all four of the "important" populations identified within the action area.

Lastly, the analysis by planning area provided above does not include impacts associated with RMV's infrastructure, SMWD, and Ortega Rock in the Habitat Reserve. These projects will permanently impact an additional 35 ac (14 ha) of yellow warbler habitat (Table C). These impacts represent a small fraction of the total impacts that will occur over the life of this project, and they will also occur in a phased manner.

Table C for Yellow Warbler: Yellow warbler (YEWA) nesting habitat (riparian) and locations permanently impacted and conserved/managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**YEWA Locations and Habitat Impacted (Cumulative Impacts)**		**YEWA Locations and Habitat Conserved and Managed[1] (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)[1]**
PA1	0	6 (6)	0 (0)	53 (53)
PA2	0	9 (15)	5 (5)	157 (210)
PA3	0	47 (62)	10 (15)	379 (589)
PA4	0	15 (77)	0 (15)	1 (590)
PA5	0	22 (99)	0 (15)	22 (612)
PA6 & PA7	0	3 (103)	0 (15)	0 (612)
PA8	0	23 (126)	2 (17)	668 (1,280)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	0	31 (156)		-31 (1,249)
Ortega Rock	0	1 (158)		
Santa Margarita Water District Impacts (Reservoir in Upper Chiquita Conservation Area)	0	3 (161)		-3 (1,246)
Subtotal for Proposed RMV and Associated Projects	0	161	17	1,246
Prior RMV[1] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			3 (20)	332 (1,578)
TOTAL	**0**	**161**	**20**	**1,578**

[1] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 or Alternative Order 1, 4, 3, 2, 5, and 8, cumulative conservation of yellow warbler habitat still greatly exceeds impacts from Covered Activities as each of the individual phases is developed.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, and the effects of the proposed action, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of the yellow warbler. We base this conclusion on the following:

1. Yellow warblers breed from northern Alaska eastward to Newfoundland and southward to northern Baja California and the State of Georgia. The species migrates throughout much of North America and winters from southern California, Arizona, and the Gulf Coast southward to central South America. Therefore, the action area for this Plan represents a small fraction of the species' entire distribution.

2. Only 189 ac (77 ha) or 4 percent of yellow warbler nesting and foraging habitat in the action area will be permanently impacted by Covered Activities. No yellow warbler locations will be permanently impacted by the Covered Activities.

3. A total of 3,114 ac (1,261 ha) (61 percent) of the suitable habitat for the species in the action area, including 26 known locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 1,569 ac (635 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 1,545 ac (626 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 14 ac (6 ha) of suitable habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 563 ac (228 ha) of habitat is conserved at NAS Starr Ranch.

5. Combined, 3,691 ac (1,494 ha) or 73 percent of the suitable habitat for yellow warbler, including 26 known locations (77 percent), in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[20]

6. All four "important" populations will be included in the Habitat Reserve.

7. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling yellow warblers or eggs will be killed or injured during habitat grading or grubbing.

8. We anticipate that permanent protection of yellow warbler locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the yellow warbler in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA has not been invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid for the following reasons:

1. Impacts from Covered Activities will be reduced to the loss of 161 ac (65 ha) of yellow warbler nesting and breeding habitat, which represents only 3 percent of the yellow warbler habitat within the action area.

2. The County of Orange will not implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS and County Park lands, and these lands will

[20] There is likely suitable habitat for yellow warbler in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

not be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP. However, a total of 6 yellow warbler locations and 1,545 ac (626 ha) of yellow warbler nesting and foraging habitat will remain within County Park lands.

3. The conservation proposed by RMV will still be implemented such that 91 percent of the yellow warbler nesting and foraging habitat and 100 percent of the yellow warbler locations on RMV lands will be conserved and adaptively managed within the Habitat Reserve. This includes all four "important" populations.

4. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling yellow warblers or eggs will be killed or injured during habitat grading or grubbing.

5. We anticipate that permanent protection of yellow warbler locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain yellow warbler in the Southern Subregion and contribute to the range-wide conservation of this species.

Finally, should the RMV and SMWD determine not to participate in this regional conservation effort, the Covered Activities within the action area will be reduced to only those implemented by the County of Orange. Our no jeopardy conclusion for yellow warbler remains valid for the following reasons:

1. Covered Activities will impact only 25 ac (10 ha) of yellow warbler nesting and foraging habitat in the action area, which represents less than 1 percent of the yellow warbler habitat in the action area.

2. Six (6) yellow warbler locations and 1,545 ac (626 ha) of yellow warbler habitat will remain in the County Park system. The County will monitor yellow warbler on Prima Deshecha Landfill SOS every five years in perpetuity.

3. The County of Orange will implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS at Prima Deshecha Landfill and within County Park lands to offset impacts to yellow warbler from their landfill and road extension projects. We expect that the non-native plant removal effort along San Juan Creek in Caspers Wilderness Park will provide opportunities for yellow warblers to establish new breeding territories.

4. With implementation of the conservation measures, we anticipate that no adult, juvenile, or nestling yellow warbler or eggs will be killed or injured during habitat grading or grubbing.

5. We anticipate that the conservation actions for the yellow warbler at Prima Deshecha Landfill and within the County Park system will help sustain yellow warbler in the Southern Subregion and contribute to the range-wide conservation of this species.

Unlisted Fish

Arroyo Chub

Status of the Species

Listing Status

The arroyo chub (*Gila orcutti*) is not listed under the Federal Endangered Species Act. It is considered a California Species of Special Concern by the California Department of Fish and Game.

Species Description

The arroyo chub is a small (up to 4.72 in (120 mm) standard length), chunky fish with large eyes and a small, subterminal mouth. The species is silver or grey to olive-green dorsally, and white ventrally, with a dull grey lateral band (Moyle 2002). Males can be distinguished from females by their larger fins and, when breeding, by the prominent patch of tubercles on the upper surface of the pectoral fins (Tres 1992).

Habitat Affinities

Arroyo chub inhabit both low gradient streams and slow moving sections of high gradient streams (Wells and Diana 1975; Bell 1978). Adults are often collected in pools (Greenfield and Deckert 1973; Warbuton *et al.* 2000) while small juveniles are observed along the wetted edge in standing backwaters (Swift 2001). They can tolerate a wide range of water temperatures. Swift (2001) detected arroyo chubs in 88.7°F (31.5^{o}C) water within the Santa Ana River, and Warburton *et al.* (2000) located them in 48.2°F (9°C) water within Long Canyon, a tributary to the Santa Margarita River. Their ability to tolerate hypoxic (low oxygen) conditions at a range of temperatures (Castleberry and Cech 1986) allows them to survive in drainages of southern California that naturally become intermittent in the summer (Moyle 2002).

Life History

Arroyo chub are considered omnivorous, feeding primarily on filamentous algae, aquatic plants, insect larvae, small crustaceans and molluscs (Greenfield and Deckert 1973; Richards and Soltz 1986). Stomach content analysis of arroyo chub taken from the Cayuma River revealed a diet consisting mainly of filamentous algae and aquatic plants; however, the species was likely targeting invertebrates (nematodes, rotifers, and tendipedids) associated with the algae and plant material (Greenfield and Deckert 1973).

Populations are negatively impacted by the presence of non-native fish species (Warburton *et al.* 2000; Swift 2001). Habitat for adult arroyo chub (*i.e.*, large pools, bordered by emergent vegetation) is favored by non-native species such as largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), black bullhead (*Ameiurus melus*), and others (Warburton *et al.* 2000). In both the Santa Margarita and Santa Ana Rivers, investigators have noted a

decrease in the presence of non-native fish species and increase in the presence of native fish species following years with above average rainfall when flows are sufficient to scour out vegetation and flush exotic species downstream (Swift 2001; Warburton *et al.* 2000).

Reproduction and development of the arroyo chub was investigated by Tres (1992). Arroyo chubs have an extended breeding season (February to August) and are fractional spawners (deposit only portions of their eggs in one spawning run and mature several batches of eggs in the same season). This adaptation allows the arroyo chub to survive in the unpredictable streams of the Los Angeles Basin that have historically undergone periods of flooding and droughts. Egg release is initiated by the male rubbing his snout against the area below the female's pelvic fins. Once released, eggs may be fertilized by more than one male. In captivity, the demersal (near the bottom) and adhesive eggs were observed in rock crevices and over vegetation. Embryos hatched after about 4 days at 75.6°F (24.2^{o}C) and attached to the bottom by their mouths until the yolk sac was consumed on the sixth day. Arroyo chubs become sexually mature at one year of age and may live three to four years.

The arroyo chub is known to hybridize with the Mohave tui chub (*Gila bicolor mohavensis*) in the Mojave River (Hubbs and Miller 1943; Castleberry and Cech 1986) and the California roach in the Cuyama River (Greenfield and Greenfield 1972).

Distribution

The arroyo chub is widely distributed in coastal drainages of California from Arroyo Grande Creek in San Luis Obispo County to San Luis Rey River in San Diego County; however, it is believed to be native only to drainages south of and including Malibu Creek, Los Angeles County (Miller 1968). Translocation of arroyo chub to drainages north of Malibu Creek and to the Mojave River system occurred in the 1930's and 1940's as a result of the use of this species as bait and incidentally with trout and mosquitofish plants (Swift *et al.* 1993).

Within what is considered the native range, the species is found in the following watersheds: Malibu Creek, Los Angeles River, San Gabriel River, Santa Ana River, San Juan Creek, Santa Margarita River, and San Luis Rey River (CNDDB 2005).

Rangewide Trends and Current Threats

According to Moyle (2002) the arroyo chub is abundant and thriving north of Malibu Creek. Because it is considered introduced and because it is so common in some watersheds (*e.g.*, Santa Clara, Gaviota, Santa Ynez, *et al.*), there has been little effort to track the status of this species north of Malibu Creek (M. Cardenas, CDFG, pers. comm.. to C. Medak, CFWO, April 12, 2006; G. Greenwald, SERVICE pers. comm.. to C. Medak, CFWO, April 24, 2006). In southern California, however, the range of the arroyo chub has been significantly reduced. It is no longer found in the lower Los Angeles, San Gabriel, or Santa Ana Rivers where channels are cement lined, divided by dams and drop structures, or otherwise disturbed/dewatered for flood control and water conservation. Altered fluvial processes and impediments to movement have fragmented the remaining range in southern California such that populations function independently of each other and are at risk due to their small size.

The arroyo chub is common in portions of some watersheds in southern California. In Malibu Creek watershed, it is common in Malibu, Las Virgenes and Lindero creeks (C. Swift, Ichthyologist, pers. comm. to C. Medak, CFWO, April 21, 2006). It is abundant below Big Tujunga Dam in Big Tujunga Creek, Los Angeles River watershed (Swift 2002). In the San Juan Creek watershed, it is common in Bell Canyon (CNDDB #24) and Arroyo Trabuco (CNDDB #5, 17), and in the upper Santa Margarita River watershed (Riverside and San Diego Counties), it is common in Rainbow, Temecula, and De Luz creeks (Warburton *et al.* 2000).

Potential threats to the status of the arroyo chub are: 1) habitat loss, degradation, and fragmentation associated with the operation and maintenance of flood control and water diversion structures, cattle grazing, and recreational activities (*i.e.*, swimming, bathing, hiking, suction dredging, fishing, and off-highway vehicle use); 2) reduction in water quality due to increased wastewater discharge and urban run-off; and 3) competition and predation from non-native species.

In 2004, the Service issued a permit for the Western Riverside County MSHCP, which addressed the effects associated with urban development and other activities on the arroyo chub. The MSHCP is expected to provide long-term protection of core occurrences of this species in the Santa Ana River and upper Santa Margarita River through extensive monitoring and management activities (USFWS 2004) (Appendix 2).

Environmental Baseline

In the action area, arroyo chub are found within the San Juan Creek Watershed. San Juan and Trabuco creeks are among the largest remaining natural habitats for the species rangewide (Plan, Appendix E, page 335). The California Natural Diversity Database (2006) includes records for arroyo chub in Oso Creek (1975), Arroyo Trabuco (1992, 1998), Bell Canyon (1998), and San Juan Creek from the western border of the Subregion up into Cleveland National Forest (1992, 1998). The species was collected in Gobernadora Creek from the confluence with San Juan Creek to approximately 1 mi (1.61 km) upstream in 1995 (MBA 1998). The most recent survey within the watershed, conducted in 2004, captured a total of 33 arroyo chubs in San Juan Creek, downstream from La Novia Bidge, in the City of San Juan Capistrano (SMEA 2004).

Habitat within the watershed upstream from the confluence of Bell Canyon with San Juan Creek (within Casper Wilderness Park and Cleveland National Forest) is largely undisturbed; however, the remainder of San Juan Creek including most of its tributaries downstream from the confluence with Bell Canyon has been degraded by flood control structures, cattle grazing, sand and gravel mining, non-native species introductions, and a reduction in surface flows during the summer months.

Within San Juan Creek and Arroyo Trabuco, grade control structures affect the distribution of arroyo chub by limiting upstream migration. In San Juan Creek, structures are located near the entrance station for Casper's Wilderness Park and 500 ft (152 m) downstream from the entrance station to Casper's Wilderness Park (Corps 2005, Table 4.1.1-1). Trabuco Creek has a series of small drop structures (1-3 ft (0.3-0.9 m)) located between the confluence with San Juan Creek

and Del Obispo Street crossing and under the Rancho Viejo, Interstate 5, Camino Capistrano, and Metrolink bridges (Corps 2005, Table 4.1.1-1). In addition, according to the Plan, a culvert at Cow Camp Road crossing over San Juan Creek is a barrier to fish movement.

Previously occupied areas of Oso Creek are currently concrete-lined and likely no longer support the species. According to the Plan, fish passage into Gobernadora Creek is restricted by an impassable barrier, immediately upstream of the confluence with San Juan Creek. The barrier is a series of small waterfalls that were likely formed by excessive scouring in this section of the creek (T. Bomkamp, Glenn Lukos Associates, pers. comm. to C. Medak, CFWO, September 25, 2006). A road crossing in this vicinity ("San Juan Creek Road") is not currently a barrier to fish movement (T. Bomkamp, Glenn Lukos Associates, pers. comm. to C. Medak, CFWO, September 25, 2006). Arroyo chub in Gobernadora Creek are particularly susceptible to extirpation by natural or human-caused events because recolonization of this reach from San Juan Creek is obstructed.

A long history of cattle grazing may have influenced the current width, depth and geometry of creeks within the watershed (PCR *et al.* 2002). Grazing in San Juan Creek stream corridor during the early summer months currently occurs west of Cow Camp Crossing. Grazing in San Juan Creek, east of Cow Camp Crossing was discontinued in 1981 (Plan, Appendix G). The Vineyard and Lower Gobernadora pastures encompass the length of Gobernadora Creek and are grazed from June through September, with the exception of the Gobernadora Ecological Restoration Area (GERA), which is fenced to exclude cattle.

Sand and gravel mining was conducted in San Juan Creek between River Mile (RM) 8 and RM 10.3 (for reference Trampas Canyon is located at RM 8.8) beginning in the 1960's (Corps 2002). As a result of mining activities several deep pits are located in the floodplain (including Cal Mat Lake), the channel within this reach is unnaturally wide, and the low-flow channel is not well-defined. Sediment delivery downstream of this reach was reduced by the artificial trapping and removal of sediment for the mining operations (Corps 2002). Mining activities within San Juan Creek ceased in 1997 (EIR Chapter 3.5.2). Natural stream hydrology (including scouring flows during the winter storm season) is expected to return this area to a natural state over a period of decades.

Emergent marsh habitat within Cal Mat Lake currently supports reproducing populations of bullfrogs (*Rana catesbeiana*) and exotic fish (Ramirez 2003). Additional areas of the watershed likely to support exotic fish species include pools of stagnant or slow-moving water behind barriers and among monotypic stands of the invasive giant reed (*Arundo donax*). Non-native fish species documented in San Juan Creek and Arroyo Trabuco include mosquitofish (*Gambusia affinis*), green sunfish (*Lepomis cyanellus*), bullhead (*Ameiurus sp.*), bluegill (*Lepomis macrochirus*), and largemouth bass (*Micropterus salmoides*) (MBA 1998; Wells and Diana 1975; CNDDB 2006).

Insufficient data is available to evaluate baseline dry season flows (PCR *et al.* 2002); therefore, the distribution of arroyo chub in the action area during the breeding season (and availability of breeding habitat) is unknown. Flows along the central portion of San Juan Creek (between Chiquita and Bell Canyons) are supported, at least seasonally by near-surface groundwater (PCR

et al. 2002) and are currently affected by groundwater withdrawals (PCR Services Corporation and Dudek and Associates 2002). Groundwater is recharged from sub-basins higher in the watershed and conveyed in the alluvium to the central portion of San Juan Creek (Appendix K, page 109). Intermittent conditions likely limit available habitat for arroyo chub within the watershed during the summer months. For example, during a 2001 radio telemetry study of arroyo toads conducted in central San Juan Creek (Ramirez 2003), successful reproduction was observed in only one location (*i.e.*, immediately downstream from Trampas Canyon). Conditions limiting arroyo toad reproduction (*i.e.*, desiccation of breeding pools) would also limit arroyo chub reproduction.

Development in the northern portion of Gobernadora Creek (*i.e.*, Coto de Caza and Wagon Wheel Park) has resulted in an increase in the magnitude and persistence of low flows to the central portion of the watershed and higher peak flows than expected given the inherent conditions (*i.e.*, geology) of the watershed. Changes in hydrology associated with development in the watershed have resulted in channel incision within the lower watershed and concurrent post-development increase in sediment delivery to San Juan Creek (PCR *et al.* 2002). Channel incision may currently be affecting fish passage into Gobernadora Creek from San Juan Creek and has likely contributed to a reduction in habitat available to the arroyo chub.

Effects of the Action

Direct Effects

Planning Area Development: No permanent impacts to habitat for arroyo chub will occur in conjunction with development in the Planning Areas; however, development and infrastructure will border significant portions of San Juan and Gobernadora creeks. Development of PA1 will constrict San Juan Creek, west of Antonio Parkway, to a corridor less than 400 ft (122 m) wide. A bike trail and riding/hiking trail, bordering the north and south banks of San Juan Creek, respectively, within the RMV boundary, will in some sections be located directly adjacent to areas scoured free of vegetation in the recent past (Figures 186-M). Channel constriction can result in reduced channel migration and formation of secondary channels, increased flow velocities, and deepened low flow channels (Poff *et al.* 1997), consequently limiting available pool and backwater habitat for adult and juvenile arroyo chub.

Construction activities within the Planning Areas have the potential to result in habitat degradation by increasing pollution, turbidity, and sedimentation in stream channels occupied by arroyo chub. Pollutants associated with construction (*i.e.*, paints, detergents, wood preservatives, equipment fuels, hydraulic fluids, cleaning solvents, etc.) are potentially toxic to arroyo chub. Turbidity and sedimentation can reduce available food resources for arroyo chub and limit reproductive success. Turbidity limits the light available for photosynthetic production of algae and aquatic plants (Kirk 1985 *in* Henley *et al.* 2000). Sedimentation (the deposition of sediment in the streambed) can fill interstitial spaces in the substrate and reduce habitat for aquatic invertebrates (Ryan 1991 *in* Henley *et al.* 2000). Sedimentation can also reduce available spawning habitat and/or smother eggs that are deposited on the substrate (Ryan 1991 *in* Henley *et al.* 2000).

Infrastructure Improvements

New or improved bridge crossings will be constructed for Cristianitos Road, Cow Camp Road, and Antonio Parkway. Installation of bridges over San Juan Creek for Cristianitos and Cow Camp roads will permanently impact 0.06 ac (0.02 ha) of streambed habitat for the arroyo chub. Construction associated with the widening of Antonio Parkway over San Juan Creek and the Cow Camp road bridge and bike trail over Gobernadora Creek will not result in disturbance to the wetted channel (P. Behrends, Dudek and Associates, pers. comm. to C. Medak, CFWO, September 25 and December 14, 2006) and therefore will not directly impact arroyo chub.

Sewer and water infrastructure will be located along the south bank of San Juan Creek between PA4 and PA5, the north bank of San Juan Creek between PA1 and PA3, across San Juan Creek in three locations, and across Gobernadora Creek in two locations (Figure 188-R). In addition, a total of 25 drainage outlets will be installed to allow discharge of water from development areas into San Juan and Gobernadora creeks (Figure 190-R). No permanent impacts to habitat for arroyo chub are anticipated in conjunction with sewer and water infrastructure because the facilities will be buried and/or located outside of the wetted channel.

Construction of bridges and other infrastructure within or upstream of occupied habitat may directly affect the arroyo chub by crushing, smothering or dewatering fish and/or eggs during construction, degrading streambed habitat (*i.e.*, flattening or removing pool-riffle complexes, altering hydrological processes, removing riparian vegetation, increasing sedimentation), and reducing water quality due to increased turbidity in the water column. The temporary removal of riparian vegetation to prepare for construction activities can result in bank instability (Kondolf and Curry 1986), reduced cover (increased exposure to predation), and increased water temperatures due to lack of shading (Chadwick and Associates 1992; Maloney *et al*. 1999).

Grazing

Livestock grazing will continue in San Juan and Gobernadora creeks in accordance with the Grazing Management Plan (Appendix U of the Plan). Cattle will be held in the River Pasture in May or June and Gobernadora pastures (Vineyard and Lower Gobernadora) from June through September, which includes the breeding season for the arroyo chub. In addition, grazing up to 30 bulls is proposed within the GERA every third year between September 15 and October; however grazing during this time period is expected to typically avoid the breeding season for the chub.

Arroyo chubs spawn in pools or quiet edge waters; therefore, trampling by livestock may crush or smother eggs along San Juan and Gobernadora creeks (outside of GERA) within the Rancho Mission Viejo boundary. Arroyo chub may also be directly affected by habitat degradation associated with grazing including a reduction in water quality (due to turbidity and deposition of manure and urine into the wetted channel), removal of riparian vegetation (resulting in bank instability, reduced cover and increased water temperatures), and an increase in sedimentation (*e.g.*, Fleischner 1994; Belsky *et al.* 1999).

Other Covered Activities

Other Covered Activities that may impact arroyo chub, but will not result in a permanent or determined loss of potential habitat, include maintenance of existing and proposed infrastructure (*i.e.,* roads, trails, and utilities), and habitat and wildlife management and monitoring activities such as removal of invasive species and habitat restoration. Maintenance of existing water/sewer infrastructure (Figure 191-R and 160-M), existing bridge crossings (Figure 119-M) and proposed infrastructure (Figures 186-M, 188-R, and 190-R) may result in disturbance to the wetted channel where these facilities cross Gobernadora and San Juan creeks. Activities requiring disturbance to the wetted channel may directly affect arroyo chub as described above for infrastructure improvements. Maintenance of proposed recreational trails in proximity to the wetted channel (Figure 186-M) may increase the potential for bank instability and deposition of sediment into habitat for arroyo chub. Habitat management and species' monitoring activities may kill or injure arroyo chub that are within active restoration areas or that are trapped and handled during monitoring efforts.

Indirect Effects

Changes in Hydrology/Water Quality: Changes in water quality and quantity are anticipated in association with proposed development of the Planning Areas as described in the Conceptual Water Quality Management Plan (WQMP), dated June 7, 2004, and subsequent memorandum dated September 26, 2005 (Appendix K). However, the WQMP also states that the post project flow duration will be the same as the pre-project flow duration. Water temperatures associated with run-off from suburban areas may be higher than adjacent waterways due to passing over impervious surfaces heated by solar radiation.

Additional changes in water quality and quantity are anticipated in association with operation of proposed water storage reservoirs, Gobernadora Multi-Purpose Basin, and an increase in the withdrawal of groundwater. Water storage reservoirs are proposed in a tributary to Verdugo Canyon (San Juan Creek East 3 Site, up to 4,600 acre-feet), Trampas Canyon (Trampas Canyon Pit Site, 2,020 acre-feet), and Chiquita Canyon (Upper Chiquita Site, 860 acre-feet) (Plan, Chapter 11). The proposed reservoir within Verdugo Canyon is anticipated to eliminate water flow and sediment delivery from this portion of Verdugo Sub-basin to San Juan Creek (GeoSyntec Consultants 2005). Because surface flows in central San Juan Creek are dependent on recharge of groundwater from sub-basins higher in the watershed (including Verdugo Sub-basin), this reservoir will contribute to a reduction in surface flows in central San Juan Creek. Similarly, flows and sediment delivery from Trampas and Chiquita Canyon to San Juan Creek will be reduced.

The proposed Gobernadora Multi-Purpose Basin (400-acre feet) has the potential to reduce surface run-off to lower Gobernadora Creek by approximately 90 percent (Plan, Appendix K, page 186). Changes in hydrology associated with development in the northern portion of Gobernadora Creek have contributed to channel incision and degradation of habitat for the arroyo chub, as discussed in the "Environmental Baseline" section of this conference opinion. A reduction in surface run-off to lower Gobernadora Creek should slow channel incision by decreasing scouring flows and increasing the deposition of sediment within the channel.

Groundwater withdrawal from San Juan Creek by the San Juan Basin Authority and other large pumpers is anticipated to increase from 7,800 acre-feet per year to 9,000 acre-feet per year with project implementation (Appendix E of WQMP). Given that groundwater withdrawals are currently affecting available surface water in central San Juan Creek, an increase in groundwater withdrawals is expected to lengthen the period of intermittent flow conditions in central San Juan Creek, particularly during years with below average rainfall.

Anticipated changes in water quality and quantity are addressed in the WQMP as discussed in the Conservation Measures section below. Sufficient dry season flow to support breeding habitat for arroyo chub is essential for maintenance of the species in the action area; therefore, potential effects to arroyo chub from changes in the availability of dry season flows are discussed in general terms below.

An increase in surface flows during the summer months (*i.e.*, as a result of Planning Area development) has the potential to increase available breeding habitat for arroyo chub in the action area, assuming water quality is adequate for successful reproduction. Infiltration basins will be designed to ensure no dry weather discharges from developed areas reach the streams (WQMP, page 300); therefore we do not anticipate an increase in dry weather flows as a result of development in the Planning Areas.

A reduction in surface flows during the summer months such that flow conditions are changed from perennial to intermittent, or the duration of intermittent flow conditions is extended, will reduce available breeding habitat for arroyo chub. In addition, arroyo chub adults, juveniles and/or eggs trapped in isolated pools during intermittent flow conditions will be particularly vulnerable to predation by non-native predators. A reduction in tributary contribution to San Juan Creek as a result of reservoir operation, combined with increased groundwater withdrawals, could be detrimental to successful reproduction of arroyo chub in central San Juan Creek if this reduction is not offset by an increase in the contribution of surface flows from elsewhere in the watershed. Diversion of the majority of surface flow from Gobernadora Creek during the breeding season may severely limit or otherwise eliminate successful reproduction in Gobernadora Creek.

Recreation

Recreation trails are proposed along both banks of San Juan Creek and the east bank of Gobernadora Creek within the Rancho Mission Viejo Boundary. An increase in the development/open space interface will increase the propensity for unauthorized human use of the Habitat Reserve, which can result in degradation of habitat for arroyo chub in San Juan and Gobernadora creeks. Walking, biking, or horse riding within the wetted channel could crush arroyo chub eggs, and/or reduce water quality.

Invasive Species

Proposed reservoirs and water quality basins will increase available habitat for non-native predators such as bullfrogs, largemouth bass, and crayfish. Increased recreational use within the

Habitat Reserve may facilitate the spread of non-native predators to new locations. An increase in the number of non-native predators in San Juan or Gobernadora creeks could affect the distribution of arroyo chub and/or contribute to a reduction in the population of arroyo chub within the watershed.

Fire

Wildfire and/or prescribed burns could result in temporary degradation of habitat for arroyo chub due to burning of riparian habitat or runoff of ash and sediment into the pools following the burn. Potential wildfire ignition sources will likely increase in association with development of the surrounding area.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, fire, and grazing, the following conservation measures specific to and/or of particular importance to arroyo chub will be implemented.

Conservation and Restoration: To offset impacts to arroyo chub in the action area, habitat in San Juan, Gobernadora, and Arroyo Trabuco creeks will be permanently conserved in the Habitat Reserve.

Reserve Design: Infrastructure located within the Habitat Reserve will be designed so as not to impede natural streambed processes (*i.e.*, base flow or sediment transport/deposition) or fish movement (Plan, Appendix E, page 331). The existing culvert crossing at Cow Camp Road will be redesigned or relocated to allow for fish passage (Plan, Appendix U), thereby re-establishing gene flow with the previously isolated breeding population upstream. In addition, development of PA3 and PA4 will be designed to provide a minimum 1,310 ft (400 m) corridor for San Juan Creek, to avoid constricting the channel along this reach.

Construction-Related Avoidance and Minimization Measures: Because of the potential toxic effects of pollutants normally associated with construction activities and potential for degradation of aquatic habitat from turbidity/sedimentation, the following specific measures will be implemented to ensure construction activities do not result in degradation of habitat for the arroyo chub: 1) an Erosion and Sediment Control Plan (ESCP) will be prepared and implemented to minimize the mobilization of fine sediments into downstream waters; 2) construction mats will be placed under heavy equipment working in or crossing wetlands to minimize soil disturbance; 3) material placed into waters of the United States will be free of pollutants in toxic amounts and 4) surveys for arroyo chub will be required within 1000 ft (305 m) downstream of each Planning Area prior to construction to determine presence (Plan, Appendix U). Maximum allowable turbidity levels[21] will be established for areas with positive survey results.

[21] No more than 10 nephelometric turbidity units (NTU) increase over background levels when background is less than 50 NTU or 20 percent increase in turbidity when the background is more than 50 NTU.

To minimize direct impacts to arroyo chub, preconstruction surveys will be conducted within 1,000 ft (305 m) of the project footprint to determine if arroyo chub are present. Additional measures will be implemented in areas with positive results including removal and relocation of arroyo chub from the project area and diversion of water away from the work area to minimize crushing or stranding of arroyo chub (See Permit Conditions). Temporary impacts to streambed topography will be restored to pre-existing elevations within one month of completion of work. Revegetation will be initiated within three months of restoration of pre-construction elevations and be completed within one growing season (Appendix U of the Plan).

Grazing Management Plan: Although the Plan acknowledges the need for additional information regarding potential adverse affects of grazing on arroyo chub habitat within the Habitat Reserve (Appendix E, page 335), exclusion of cattle from habitat occupied by arroyo chub is not currently proposed in the Grazing Management Plan (Appendix G). Exclusion of cows from the GERA during the breeding season for the least Bell's vireo and southwestern willow flycatcher (Appendix U of the Plan) will avoid the majority of the breeding season for the arroyo chub. The arroyo chub may also benefit somewhat from the exclusion of cows from arroyo toad "active breeding pools" to the "maximum extent practicable" following dedication of lands to the Habitat Reserve if the two species breed at the same time and in the same areas; however, arroyo chub spawning areas outside of the range of the arroyo toad and GERA will not be protected (Appendix U of the Plan).

Hydrology/Water Quality: The Conceptual Water Quality Management Plan (Appendix K) describes the use of a "Water Balance Analysis" to design water quality treatment basins, infiltration basins, and swales adequate to compensate for anticipated changes in water quality and quantity associated with proposed Planning Area development. A long-term adaptive management plan will be implemented in conjunction with the WQMP, such that "hydrologic conditions of concern" and "pollutants of concern" are monitored and corrected as necessary to generally maintain baseline flow and water quality conditions following development of the Planning Areas.

The Corps (2005) specifically requires no change in channel geomorphology (SC I.B.2) or hydrology (SC I.B.1) from pre-project conditions for 3rd order streams receiving project discharges; therefore, we do not anticipate a reduction in surface flows and associated reduction in breeding habitat for the arroyo chub in the action area during the summer months. In addition, the Corps will review and approve a water quality master plan for each Planning Area (SC I.C.2) that is consistent with the Plan.

Maintenance of natural stream hydrology, particularly scouring flows during the winter storm season, will allow for the natural restoration of habitat for arroyo chub in areas previously disturbed by mining operations in central San Juan Creek. Natural flows sufficient to scour out a low-flow channel should also be sufficient to scour out vegetation and flush non-native predators downstream, which could contribute to an increase in the number of arroyo chub in the system.

Operation of the Gobernadora Multi-Purpose Basin to reduce the magnitude and persistence of dry weather flows in Gobernadora Creek should slow channel incision in the lower portion of the

creek. A reduction in water velocity should also contribute to increasing sediment deposition within the channel, which should assist in restoring historic channel morphology and reducing the current barrier to fish passage near the confluence with San Juan Creek.

Monitoring of stream hydrology using stream gages, groundwater levels through collection of well data, visual examination of dry weather base flow conditions in sensitive areas (*i.e.*, arroyo chub breeding habitat), and channel morphology using transect lines will provide important information relevant to habitat conditions for arroyo chub. An annual summary of maintenance and monitoring activities will be prepared and used to identify potential actions and corrective measures necessary to maintain the water balance. This information could also be used to identify and address specific changes in habitat availability for arroyo chub.

Recreation: Public access will be managed to minimize conflicts between people and wildlife through the use of signage, fencing, and education in addition to physical limitations on trails and bikeways (see Project Description). The management of public access will help reduce habitat degradation from hiking, biking, and horseback riding in sensitive areas, the possible spread of non-native aquatic species, and the potential for human-caused fire in wilderness areas.

Management of Non-Native Plants and Aquatic Predators: The Invasive Species Control Plan (Appendix J) will result in removal of non-native plant species from San Juan and Arroyo Trabuco creeks that degrade aquatic habitats and should increase the quality of pools that are used for breeding by arroyo chub. The removal of giant reed in particular will benefit arroyo chub by reducing the amount of suitable breeding habitat for non-native fish species. In addition, because giant reed requires substantially more water than native riparian vegetation, the removal of giant reed may also contribute to an increase in the water supplies available to sustain water through the breeding season (Plan, Appendix E, page 337).

The Invasive Species Control Plan also includes a bullfrog and crayfish control program within permanent and semi-permanent water bodies in San Juan Creek, identification of other bullfrog and crayfish breeding areas that may pose a risk to the arroyo chub and implementation of additional control programs where necessary. The removal of non-native aquatic predators will benefit the arroyo chub by reducing predation pressure and is anticipated to offset the possible spread of non-native species within the Habitat Reserve by new residents.

Fire: The project description summarizes the key elements of the Fire Management Plan including the use of controlled burns to decrease fuel loads and hence the likelihood of catastrophic wildfires. Specific measures to reduce fuel loads in the vicinity of aquatic habitats have not been finalized; however, The Fire Management Plan acknowledges that "riparian areas should be kept fire free if at all possible" (Appendix N, page N2-25). The removal of giant reed from San Juan and Trabuco creeks will contribute to a reduction in hazardous fuel loads from areas occupied by arroyo chub.

Monitoring: The adaptive management program for arroyo chub will focus on protecting and managing occupied arroyo chub habitat within the Habitat Reserve by preserving the "net habitat value" of existing riparian/wetland habitats (*i.e.*, maintaining baseline conditions in terms of quantity and quality riparian vegetation, channel morphology, hydrology, and water quality),

controlling non-native invasive species, and managing fire regimes to avoid aquatic habitats (Appendix E of the Plan). Details of the monitoring program will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. Monitoring will occur every three years following dedication of lands identified as PA3 Open Space (Figure 182-M) to the Habitat Reserve, in approximately 2011 (Plan, Chapter 7, Table 7-17).

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of the arroyo chub. We base this conclusion on the following:

1. The arroyo chub is widely distributed in coastal drainages of California from Arroyo Grande Creek in San Luis Obispo County to San Luis Rey River in San Diego County. Impacts associated with Plan implementation will occur over a small portion of the species' current range.

2. Habitat for arroyo chub in San Juan, Gobernadora, and Arroyo Trabuco creeks will be permanently conserved in the Habitat Reserve and the permanent habitat loss is minimal (0.06 ac (0.02 ha)) for bridge support structures).

3. Implementation of the Invasive Species Control Plan will address the threat of increased predation by non-native species and reduce the amount of suitable breeding habitat available for these species. Similarly, removal of giant reed in San Juan Creek will likely increase the amount of available arroyo chub breeding habitat in the Habitat Reserve.

4. Implementation of the Adaptive Management Plan for arroyo chub will provide information regarding the current distribution of the species that will be used to protect and manage occupied habitat within the Habitat Reserve and will contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the Implementation Agreement is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for arroyo chub remains valid for the following reason:

1. The impacts and conservation will remain the same except that non-native invasive species will not be removed from 24 acres of potential breeding habitat along San Juan Creek in Caspers Wilderness Park. The lack of arundo removal upstream in Caspers Wilderness Park may require RMV to apply more effort in controlling/eliminating arundo on their portion of San Juan Creek to maintain/improve breeding habitat for arroyo chub.

Through the monitoring and adaptive management program, RMV will be able to direct additional effort to arundo control on their portion of San Juan Creek if necessary.

Threespine Stickleback

Status of the Species

Listing Status

The threespine stickleback (*Gasterosteus aculeatus)* is not listed under the Federal Endangered Species Act. One subspecies, *G. a. williamsoni (*unarmored threespine stickleback), was listed as endangered in 1970 (35 FR 16047). This subspecies is also listed as endangered under the California Endangered Species Act. No other subspecies are listed under the Federal or State Endangered Species Acts. The unarmored threespine stickleback has not been documented in the action area.

Species Description

The threespine stickleback is a small (typically 1.18-1.97 in (3-5 cm) total length), laterally compressed fish with terminal mouth, large eyes and a narrow caudal peduncle. The species has three sharp dorsal spines in front of 10 to 24 soft rays and a pelvic fin comprised of a single spine and 1 small ray. Instead of scales they possess from 1 to 35 bony plates on each side. Adults are olive to dark green dorsally and white to gold ventrally. Most breeding males are brightly coloured with red undersides, blue sides, and blue or green eyes (Moyle 2002).

The evolutionary biology and taxonomy of the species has been extensively reviewed and debated in the literature (*e.g.*, Hagen 1967; Miller and Hubbs 1969; Hagen and McPhail 1970; Bell 1976; Lavin and McPhail 1985; Bell and Foster 1994; and McKinnon and Rundle 2002). Miller and Hubbs (1969) recognized three subspecies of threespine stickleback on the Pacific Coast of North America: *G. a. aculeatus* (fully plated), *G. a. microcephalus* (low plated), and *G. a. williamsoni* (unplated), which formed the basis for the federally listed entity. It is more probable, however, that individual non-migratory freshwater populations are endemic to a particular stream and independently derived from anadromous forms (Moyle 2002). Current research shows that plate reduction can evolve rapidly (within decades) in isolated freshwater populations (Bell *et al.* 2004) and that one major chromosome locus (Ectodysplasin) is responsible for controlling the armor plate reduction that is evident in most freshwater populations of sticklebacks located around the world (Colosimo *et al.* 2005).

Habitat Affinities

Threespine stickleback inhabit saltwater, freshwater, or migrate between the two environments (Bell 1979). In Southern California (south of San Luis Obispo County), they are found exclusively in freshwater streams (Swift *et al.* 1993). Specific habitat includes shallow, weedy pools and backwaters, or they are found among emergent plants at stream edges over bottoms of gravel, sand, and mud (Moyle 2002). Clear water is necessary to support emergent aquatic vegetation and filamentous green algae, which is required for nest building, and provides refuge

from stream flows and/or predators (Moyle 2002). In addition, clear water facilitates feeding because the species is a visual feeder (Moyle 2002).

In laboratory studies of threespine stickleback from the Santa Clara River, the species was found to tolerate high temperatures 84° to 95°F (29° - 35°C) depending on acclimation temperature) and low oxygen levels (2 parts per million), which would allow them to survive in drainages that naturally become intermittent in the summer. Threespine stickleback were observed living in intermittent ponds within the Santa Clara River watershed, with water just deep enough to cover the fish's back; however, dead sticklebacks were also observed, which apparently had been stranded by receding waters in this area. Seasonally dry habitats in the Santa Clara River were subsequently recolonized by threespine stickleback from areas upstream with the initiation of the winter storm season (Baskin 1975).

Life History

Most threespine stickleback live for only one year (Moyle 2002) and have the ability to breed year-round (Irwin and Soltz 1982), with breeding activity at its lowest from October to January. Reproduction occurs in areas with adequate aquatic vegetation and a gentle flow of water, where males establish and vigorously defend territories. The male builds a nest of fine plant debris and algal strands and courts all females that enter his territory; a single nest may contain the eggs of several females. The number of eggs within a nest is also dependent on the strain of stickleback and on environmental conditions such as food supply (Irwin and Soltz 1982). Malcolm (1992) reported that 56 young were produced from the eggs of one female; this is the only known record for clutch size in the Shay Creek stickleback population and appears low compared to other stickleback populations (Haglund and Lockhart 2000). Following spawning, the male defends the nest and then the newly hatched fry. Sexual maturity, as observed from a population in the Santa Clara River, occurred when individuals reached 1.7 in (42.4 mm) (Baskin 1975). Population sizes vary according to season and habitat with fish being most common during the spring, summer, and early fall. Peak recruitment occurs in the spring (Baskin 1975).

Threespine stickleback feed mainly on insects (*e.g.*, chironmid larvae), small crustaceans (*e.g.*, copepods, cladocerans, ostracods, isopods) and, to a lesser degree, on other small invertebrates (*e.g.*, mollusks, nematodes, gastropods) (Baskin 1975; Sanchez-Gonzales *et al.* 2001; Valdez and Helm 1971; Markley 1940; Hynes 1950).

Although the presence of sharp dorsal and pelvic spines would appear to make threespine sticklebacks difficult for predators to swallow, they are an important prey item for birds and salmon in some areas (Moyle 2002) and have been eliminated from some systems containing non-native predatory fish (Patankar *et al* 2006; Leidy 1984; Warburton *et al.* 2000). There is some evidence of correlation between the presence of predators and the morphology of the threespine stickleback (as reviewed by Moyle 2002). Anadromous forms are generally fully armored, with a larger body size and larger spines, whereas isolated freshwater populations, presumably evolving in areas with a lower level of predation than the marine environment, have a smaller body size, low numbers of plates and reduced spines.

Distribution

The threespine stickleback is a widespread circumboreal and north temperate species mostly restricted to coastal regions including Japan, the west and northeast coast of North America, and Western Europe (Guillermo et al. 1994). In California, they have been recorded from coastal streams, the Central Valley, and many reservoirs (Moyle 1976).

Rangewide Trends and Current Threats

Threats to the species include (1) habitat loss from urbanization, stream channelization, and water diversions; (2) competition with and predation by nonnative fish; and (3) introgression with other subspecies of sticklebacks.

Environmental Baseline

In the action area, threespine sticklebacks are found within the San Juan Creek watershed. The California Natural Diversity Database (2006) includes records for threespine stickleback in association with collections of arroyo chub in Oso Creek (1975), Arroyo Trabuco (1992, 1998), and San Juan Creek from the western border of the Subregion up into Cleveland National Forest (1992, 1998), although it is not clear if stickleback were located in all areas inhabited by arroyo chub. Prior to 1970 they were also recorded in lower San Juan Creek (Swift *et al.* 1993). In 1995, the species was collected in San Juan Creek from below the confluence with Bell Canyon, downstream 4,921 ft (1,500 m) but not in the remainder of central San Juan Creek, where mosquitofish were numerous (MBA 1998). The lack of overlap in distribution of the two species was attributed to competition for the same food resources (*i.e.*, insect larvae); however, previous surveys of San Juan Creek, near the confluence with Canada Chiquita found both species present (Wells and Diana 1975).

Habitat within the watershed upstream from the confluence of Bell Canyon with San Juan Creek (within Casper Wilderness Park and Cleveland National Forest) is largely undisturbed; however, the remainder of San Juan Creek including most of its tributaries downstream from the confluence with Bell Canyon has been degraded by flood control structures, cattle grazing, sand and gravel mining, non-native species introductions, and a reduction in surface flows during the summer months. Previously occupied areas of Oso Creek are currently concrete-lined and likely no longer support the species.

Within San Juan Creek and Arroyo Trabuco, grade control structures affect the distribution of threespine stickleback by limiting upstream migration. In San Juan Creek, structures are located near the entrance station for Casper's Wilderness Park and 500 ft (152 m) downstream from the entrance station to Casper's Wilderness Park (Corps 2005, Table 4.1.1-1). Trabuco Creek has a series of small drop structures (1 to 3 ft (0.3-0.9 m)) located between the confluence with San Juan Creek and Del Obispo Street crossing and under the Rancho Viejo, Interstate 5, Camino Capistrano, and Metrolink bridges (Corps 2005, Table 4.1.1-1). In addition, according to the Plan, a culvert at Cow Camp Road crossing over San Juan Creek is a barrier to fish movement.

A long history of cattle grazing may have influenced the current width, depth, and geometry of creeks within the watershed (PCR *et al.* 2002). Grazing in San Juan Creek stream corridor during the early summer months currently occurs west of Cow Camp Crossing. Grazing in San Juan Creek, east of Cow Camp Crossing was discontinued in 1981 (Plan, Appendix G).

Sand and gravel mining was conducted in San Juan Creek between River Mile (RM) 8 and RM 10.3 (for reference Trampas Canyon is located at RM 8.8) beginning in the 1960's (Corps 2002). As a result of mining activities several deep pits are located in the floodplain (including Cal Mat Lake), the channel within this reach is unnaturally wide, and the low-flow channel is not well-defined. Sediment delivery downstream of this reach was reduced by the artificial trapping and removal of sediment for the mining operations (Corps 2002). Mining activities within San Juan Creek ceased in 1997 (EIR Chapter 3.5.2). Natural stream hydrology (including scouring flows during the winter storm season) is expected to return this area to a natural state over a period of decades.

Emergent marsh habitat within Cal Mat Lake currently supports reproducing populations of bullfrogs (*Rana catesbeiana*) and exotic fish (Ramirez 2003). Additional areas of the watershed likely to support exotic fish species include pools of stagnant or slow-moving water behind barriers and among monotypic stands of the invasive giant reed (*Arundo donax*). Non-native fish species documented in San Juan Creek and Arroyo Trabuco include mosquitofish (*Gambusia affinis*), green sunfish (*Lepomis cyanellus*), bullhead (*Ameiurus sp.*), bluegill (*Lepomis macrochirus*), and largemouth bass (*Micropterus salmoides*) (Wells and Diana 1975; MBA 1998; CNDDB 2006).

Insufficient data is available to evaluate baseline dry season flows (PCR *et al.* 2002); therefore, the distribution of stickleback in the action area during the breeding season (and availability of breeding habitat) is unknown. Flows along the central portion of San Juan Creek (between Chiquita and Bell Canyons) are supported, at least seasonally by near-surface groundwater (PCR *et al.* 2002) and are currently affected by groundwater withdrawals (PCR Services Corporation and Dudek and Associates 2002). Groundwater is recharged from sub-basins higher in the watershed and conveyed in the alluvium to the central portion of San Juan Creek (Plan, Appendix K, page 109). Intermittent conditions likely limit available habitat for threespine stickleback within the watershed during the summer months. For example, during a 2001 radio telemetry study of arroyo toads conducted in central San Juan Creek (Ramirez 2003), successful reproduction was observed in only one location (*i.e.*, immediately downstream from Trampas Canyon). Conditions limiting arroyo toad reproduction (*i.e.*, desiccation of breeding pools) would also likely limit threespine stickleback reproduction.

Effects of the Action

Direct Effects

Planning Area Development: No permanent impacts to habitat for threespine stickleback will occur in conjunction with development in the Planning Areas; however, development and infrastructure will border significant portions of San Juan Creek. Development of PA1 will constrict San Juan Creek, west of Antonio Parkway, to a corridor less than 400 ft (122 m) wide.

A bike trail and riding/hiking trail, bordering the north and south banks of San Juan Creek, respectively, within the RMV boundary, will in some sections, be located directly adjacent to areas scoured free of vegetation in the recent past (Figures 186-M). Channel constriction can result in reduced channel migration and formation of secondary channels, increased flow velocities, and deepened low flow channels (Poff *et al.* 1997), consequently limiting available pool and backwater habitat for adult and juvenile threespine stickleback.

Construction activities within the Planning Areas have the potential to result in habitat degradation by increasing pollution, turbidity, and sedimentation in stream channels occupied by threespine stickleback. Pollutants associated with construction (*i.e.*, paints, detergents, wood preservatives, equipment fuels, hydraulic fluids, cleaning solvents, etc.) are potentially toxic to threespine stickleback. Turbidity and sedimentation can reduce available food resources for threespine stickleback and limit reproductive success. Turbidity limits the light available for photosynthetic production of algae and aquatic plants (Kirk 1985 *in* Henley *et al.* 2000). Sedimentation (the deposition of sediment in the streambed) can fill interstitial spaces in the substrate and reduce habitat for aquatic invertebrates (Ryan 1991 *in* Henley *et al.* 2000). Sedimentation can also reduce available spawning habitat and/or smother eggs that are deposited on the substrate (Ryan 1991 *in* Henley *et al.* 2000).

Infrastructure Improvements

New or improved bridge crossings will be constructed for Cristianitos Road, Cow Camp Road, and Antonio Parkway. Installation of bridges over San Juan Creek for Cristianitos and Cow Camp roads will permanently impact 0.06 ac (0.02 ha) of streambed habitat for the threespine stickleback. Construction associated with the widening of Antonio Parkway over San Juan Creek will not result in disturbance to the wetted channel (P. Behrends, Dudek and Associates, pers. comm. to C. Medak, CFWO, September 25 and December 14, 2006) and therefore will not directly impact threespine stickleback.

Sewer and water infrastructure will be located along the south bank of San Juan Creek between PA4 and PA5, north bank of San Juan Creek between PA1 and PA3, and across San Juan Creek in three locations (Figure 188-R). In addition, a total of 22 drainage outlets will be installed to allow discharge of water from development areas into San Juan Creek (Figure 190-R). No permanent impacts to habitat for threespine stickleback are anticipated in conjunction with sewer and water infrastructure because the facilities will be buried and/or located outside of the wetted channel.

Construction of bridges and other infrastructure within or upstream of occupied habitat may directly affect the threespine stickleback by crushing, smothering, or dewatering fish and/or eggs during construction, degrading streambed habitat (*i.e.*, flattening or removing pool-riffle complexes, altering hydrological processes, removing riparian vegetation, increasing sedimentation), and reducing water quality due to increased turbidity in the water column. The temporary removal of riparian vegetation to prepare for construction activities can result in bank instability (Kondolf and Curry 1986), reduced cover (increased exposure to predation), and increased water temperatures due to lack of shading (Chadwick and Associates 1992; Maloney *et al*. 1999).

Grazing

Livestock grazing will continue in San Juan Creek in accordance with the Grazing Management Plan (Appendix U). Cattle will be held in the River Pasture in May or June, which is during the breeding season for the threespine stickleback. Threespine stickleback spawn in pools or quiet edge waters; therefore, trampling by livestock may crush or smother eggs along San Juan Creek within the Rancho Mission Viejo boundary. Threespine stickleback may also be directly affected by habitat degradation associated with grazing including a reduction in water quality (due to turbidity and deposition of manure and urine into the wetted channel), removal of riparian vegetation (resulting in bank instability, reduced cover, and increased water temperatures) and an increase in sedimentation (*e.g.*, Fleischner 1994; Belsky *et al.* 1999).

Other Covered Activities

Other Covered Activities that may impact threespine stickleback but will not result in a permanent or determined loss of potential habitat include maintenance of existing and proposed infrastructure (*i.e.*, roads, trails, and utilities), and habitat and wildlife management and monitoring activities, such as removal of invasive species and habitat restoration. Maintenance of existing water/sewer infrastructure (Figure 191-R and 160-M), existing bridge crossings (Figure 119-M), and proposed infrastructure (Figures 186-M, 188-R and 190-R) may result in disturbance to the wetted channel where these facilities cross San Juan Creek. Activities requiring disturbance to the wetted channel may directly affect threespine stickleback as described above for infrastructure improvements. Maintenance of proposed recreational trails in proximity to the wetted channel (Figure 186-M) may increase the potential for bank instability and deposition of sediment into habitat for threespine stickleback. Habitat management and species' monitoring activities may kill or injure threespine stickleback that are within active restoration areas or that are trapped and handled during monitoring efforts.

Indirect Effects

<u>Changes in Hydrology/Water Quality</u>: Changes in water quality and quantity are anticipated in association with proposed development of the Planning Areas as described in the Conceptual Water Quality Management Plan (WQMP), dated June 7, 2004, and subsequent memorandum dated September 26, 2005 (Appendix K). Water temperatures associated with run-off from suburban areas may be higher than adjacent waterways due to passing over impervious surfaces heated by solar radiation.

Additional changes in water quality and quantity are anticipated in association with operation of proposed water storage reservoirs, Gobernadora Multi-Purpose Basin, and an increase in the withdrawal of groundwater. Water storage reservoirs are proposed in a tributary to Verdugo Canyon (San Juan Creek East 3 Site, up to 4,600 acre-feet), Trampas Canyon (Trampas Canyon Pit Site, 2,020 acre-feet), and Chiquita Canyon (Upper Chiquita Site, 860 acre-feet) (Plan, Chapter 11). The proposed reservoir within Verdugo Canyon is anticipated to eliminate water flow and sediment delivery from this portion of Verdugo Sub-basin to San Juan Creek (GeoSyntec Consultants 2005). Because surface flows in central San Juan Creek are dependent

on recharge of groundwater from sub-basins higher in the watershed (including Verdugo Sub-basin), this reservoir will contribute to a reduction in surface flows in central San Juan Creek. Similarly, flows and sediment delivery from Trampas and Chiquita Canyon to San Juan Creek will be reduced.

The proposed Gobernadora Multi-Purpose Basin (400-acre feet) has the potential to reduce surface run-off to lower Gobernadora Creek by approximately 90 percent (Plan, Appendix K, page 186). Changes in hydrology associated with development in the northern portion of Gobernadora Creek have contributed to channel incision and degradation of habitat for the threespine stickleback, as discussed in the "Environmental Baseline" section of this conference opinion. A reduction in surface run-off to lower Gobernadora Creek should slow channel incision by decreasing scouring flows and increasing the deposition of sediment within the channel.

Groundwater withdrawal from San Juan Creek by the San Juan Basin Authority and other large pumpers is anticipated to increase from 7,800 acre-feet per year to 9,000 acre-feet per year with project implementation (Appendix E of WQMP). Given that groundwater withdrawals are currently affecting available surface water in central San Juan Creek, an increase in groundwater withdrawals is expected to lengthen the period of intermittent flow conditions in central San Juan Creek, particularly during years with below average rainfall.

Anticipated changes in water quality and quantity are addressed in the WQMP as discussed in the Conservation Measures section below.. Sufficient dry season flow to support breeding habitat for threespine stickleback is essential for maintenance of the species in the action area; therefore, potential effects to threespine stickleback from changes in the availability of dry season flows are discussed in general terms below.

An increase in surface flows during the summer months (*i.e.*, as a result of Planning Area development) has the potential to increase available breeding habitat for threespine stickleback in the action area, assuming water quality is adequate for successful reproduction. Infiltration basins will be designed to ensure no dry weather discharges from developed areas reach the streams (WQMP, page 300); therefore we do not anticipate an increase in dry weather flows as a result of development in the Planning Areas.

A reduction in surface flows during the summer months such that flow conditions are changed from perennial to intermittent, or the duration of intermittent flow conditions is extended, will reduce available breeding habitat for threespine stickleback. In addition, threespine stickleback adults, juveniles and/or eggs trapped in isolated pools during intermittent flow conditions will be particularly vulnerable to predation by non-native predators. A reduction in tributary contribution to San Juan Creek as a result of reservoir operation, combined with increased groundwater withdrawals, could be detrimental to successful reproduction of threespine stickleback in central San Juan Creek if this reduction is not offset by an increase in the contribution of surface flows from elsewhere in the watershed. Diversion of the majority of surface flow from Gobernadora Creek during the breeding season may severely limit or otherwise eliminate successful reproduction in Gobernadora Creek.

Recreation

Recreation trails are proposed along both banks of San Juan Creek within the Rancho Mission Viejo boundary. An increase in the development/open space interface will increase the propensity for unauthorized human use of the Habitat Reserve, which can result in degradation of habitat for threespine stickleback in San Juan Creek. Walking, biking, or horse riding within the wetted channel could crush threespine stickleback eggs, and/or reduce water quality.

Invasive Species

Proposed reservoirs and water quality basins will increase available habitat for non-native predators such as bullfrogs, largemouth bass, and crayfish. Increased recreational use within the Habitat Reserve may facilitate the spread of non-native predators to new locations. An increase in the number of non-native predators in San Juan or Gobernadora creeks will affect the distribution of threespine stickleback and/or contribute to a reduction in the population of threespine stickleback within the watershed.

Fire

Wildfire and/or prescribed burns could result in temporary degradation of habitat for threespine stickleback due to burning of riparian habitat or runoff of ash and sediment into the pools following the burn. Potential wildfire ignition sources will likely increase in association with development of the surrounding area.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, fire, and grazing, the following conservation measures specific to and/or of particular importance to threespine stickleback will be implemented.

Conservation and Restoration: To offset impacts to threespine stickleback in the action area, habitat in San Juan, Oso, and Arroyo Trabuco Creeks will be permanently conserved in the Habitat Reserve.

Reserve Design: Infrastructure located within the Habitat Reserve will be designed so as not to impede natural streambed processes (*i.e.*, base flow or sediment transport/deposition) or fish movement (Plan, Appendix E, page 331). The existing culvert crossing at Cow Camp Road will be redesigned or relocated to allow for fish passage (Plan, Appendix U), thereby reestablishing gene flow with the previously isolated breeding population upstream. In addition, development of PA3 and PA4 will be designed to provide a minimum 1,310 ft (400 m) corridor for San Juan Creek, so as not to constrict the channel along this reach.

Construction-Related Avoidance and Minimization Measures: Because of the potential toxic effects of pollutants normally associated with construction activities and potential for degradation of aquatic habitat from turbidity/sedimentation, the following specific measures will

be implemented to ensure construction activities do not result in degradation of habitat for the threespine stickleback: 1) an Erosion and Sediment Control Plan (ESCP) will be prepared and implemented to minimize the mobilization of fine sediments into downstream waters; 2) construction mats will be placed under heavy equipment working in or crossing wetlands to minimize soil disturbance; 3) material placed into waters of the United States will be free of pollutants in toxic amounts and 4) surveys for threespine stickleback will be required within 1,000 ft (305 m) downstream of each Planning Area prior to construction to determine presence (Plan, Appendix U). Maximum allowable turbidity levels[22] will be established for areas with positive survey results.

To minimize direct impacts to threespine stickleback, preconstruction surveys will be conducted within 1,000 ft (305 m) of the project footprint to determine if threespine stickleback are present. Additional measures will be implemented in areas with positive results including removal and relocation of threespine stickleback from the construction area and diversion of water away from the construction area to minimize crushing or stranding of threespine stickleback (see Permit Conditions). Temporary impacts to streambed topography will be restored to pre-existing elevations within one month of completion of work. Revegetation will be initiated within three months of restoration of pre-construction elevations and be completed within one growing season (Appendix U of the Plan).

Grazing Management Plan: Although the Plan acknowledges the need for additional information regarding potential adverse affects of grazing on threespine stickleback habitat within the Habitat Reserve (Appendix E, page 335), exclusion of cattle from habitat occupied by threespine stickleback is not currently proposed in the Grazing Management Plan (Appendix G). Exclusion of cows from the GERA during the breeding season for the least Bell's vireo and southwestern willow flycatcher (Appendix U of the Plan) will avoid the majority of the breeding season for the threespine stickleback. The threespine stickleback may also benefit somewhat from the exclusion of cows from arroyo toad "active breeding pools" to the "maximum extent practicable" following dedication of lands to the Habitat Reserve if the two species breed at the same time and in the same areas; however, threespine stickleback spawning areas outside of the range of the arroyo toad and GERA will not be protected (Appendix U of the Plan).

Hydrology/Water Quality: The Conceptual Water Quality Management Plan (Appendix K) describes the use of a "Water Balance Analysis" to design water quality treatment basins, infiltration basins, and swales adequate to compensate for anticipated changes in water quality and quantity associated with proposed Planning Area development. A long-term adaptive management plan will be implemented in conjunction with the WQMP, such that "hydrologic conditions of concern" and "pollutants of concern" are monitored and corrected as necessary to generally maintain baseline flow and water quality conditions following development of the Planning Areas.

The Corps (2005) specifically requires no change in channel geomorphology (SC I.B.2) or hydrology (SC I.B.1) from pre-project conditions for 3rd order streams receiving project

[22] No more than 10 nephelometric turbidity units (NTU) increase over background levels when background is less than 50 NTU or 20 percent increase in turbidity when the background is more than 50 NTU.

discharges; therefore, we do not anticipate a reduction in surface flows and associated reduction in breeding habitat for the threespine stickleback in the action area during the summer months. In addition, the Corps will review and approve a water quality master plan for each Planning Area (SC I.C.2) that is consistent with the Plan.

Maintenance of natural stream hydrology, particularly scouring flows during the winter storm season, will allow for the natural restoration of habitat for threespine stickleback in areas previously disturbed by mining operations in central San Juan Creek. Natural flows sufficient to scour out a low-flow channel should also be sufficient to scour out vegetation and flush non-native predators downstream, which would contribute to an increase in the number of threespine stickleback in the system.

Operation of the Gobernadora Multi-Purpose Basin to reduce the magnitude and persistence of dry weather flows in Gobernadora Creek should slow channel incision in the lower portion of the creek. A reduction in water velocity should also contribute to increasing sediment deposition within the channel which should assist in restoring historic channel morphology and reducing the current barrier to fish passage near the confluence with San Juan Creek.

Monitoring of stream hydrology using stream gages, groundwater levels through collection of well data, visual examination of dry weather base flow conditions in sensitive areas (*i.e.*, threespine stickleback breeding habitat), and channel morphology using transect lines will provide important information relevant to habitat conditions for threespine stickleback. An annual summary of maintenance and monitoring activities will be prepared and used to identify potential actions and corrective measures necessary to maintain the water balance. This information could also be used to identify and address specific changes in habitat availability for threespine stickleback.

Recreation: Public access will be managed to minimize conflicts between people and wildlife through the use of signage, fencing, and education in addition to physical limitations on trails and bikeways (see Project Description). The management of public access will help reduce habitat degradation from hiking, biking, and horseback riding in sensitive areas, the possible spread of non-native aquatic species, and the potential for human-caused fire in wilderness areas.

Management of Non-Native Plants and Aquatic Predators: The Invasive Species Control Plan (Appendix J) will result in removal of non-native plant species from San Juan and Arroyo Trabuco Creeks that degrade aquatic habitats and should increase the quality of pools that are used for breeding by threespine stickleback. The removal of giant reed in particular will benefit threespine stickleback by reducing the amount of suitable breeding habitat for non-native fish species. In addition, because giant reed requires substantially more water than native riparian vegetation, the removal of giant reed may also contribute to an increase in the water supplies available to sustain water through the breeding season (Plan, Appendix E, page 337).

The Invasive Species Control Plan also includes a bullfrog and crayfish control program within permanent and semi-permanent water bodies in San Juan Creek, identification of other bullfrog and crayfish breeding areas that may pose a risk to the threespine stickleback and implementation of additional control programs where necessary. The removal of non-native

aquatic predators will benefit the threespine stickleback by reducing predation pressure and is anticipated to offset the possible spread of non-native species within the Habitat Reserve by new residents.

Fire: The project description summarizes the key elements of the Fire Management Plan, including the use of controlled burns to decrease fuel loads and hence the likelihood of catastrophic wildfires. Specific measures to reduce fuel loads in the vicinity of aquatic habitats have not been finalized; however, The Fire Management Plan acknowledges that "riparian areas should be kept fire free if at all possible" (Appendix N, page N2-25). The removal of giant reed from San Juan and Trabuco Creeks will contribute to a reduction in hazardous fuel loads from areas occupied by threespine stickleback.

Monitoring

The adaptive management program for threespine stickleback will focus on protecting and managing occupied threespine stickleback habitat within the Habitat Reserve by preserving the "net habitat value" of existing riparian/wetland habitats (*i.e.*, maintaining baseline conditions in terms of quantity and quality riparian vegetation, channel morphology, hydrology, and water quality), controlling non-native invasive species, and managing fire regimes to avoid aquatic habitats (Appendix E of the Plan). Details of the monitoring program will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. Monitoring will occur every three years following dedication of lands identified as PA3 Open Space (Figure 182-M) to the Habitat Reserve, in approximately 2011 (Plan, Chapter 7, Table 7-17).

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of the threespine stickleback. We base this conclusion on the following:

1. The threespine stickleback is a widely distributed circumboreal and north temperate species residing primarily in coastal regions including the west and northeast coast of North America, Japan, and Western Europe. Impacts associated with Plan implementation will occur over a small portion of the species' current range;

2. Habitat for threespine stickleback in San Juan, Arroyo Trabuco, and Oso creeks will be permanently conserved in the Habitat Reserve and the permanent habitat loss is minimal (0.06 ac (0.02 ha) for bridge support structures);

3. Implementation of the Invasive Species Control Plan will address the threat of increased predation by non-native species and reduce the amount of suitable breeding habitat available for these species. Similarly, removal of arundo in San Juan Creek will likely increase the amount of available breeding habitat in the Habitat Reserve;

4. Implementation of the Adaptive Management Plan for threespine stickleback will provide information regarding the current distribution of the species that will be used to protect and manage occupied habitat within the Habitat Reserve.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the Implementation Agreement is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for threespine stickleback remains valid for the following reason:

1. The impacts and conservation will remain the same except that non-native invasive species will not be removed from 24 acres of potential breeding habitat along San Juan Creek in Caspers Wilderness Park. The lack of arundo removal upstream in Caspers Wilderness Park may require RMV to apply more effort in controlling/eliminating arundo on their portion of San Juan Creek to maintain/improve breeding habitat for the arroyo chub. Through the monitoring and adaptive management program, RMV will be able to direct additional effort to arundo control on their portion of San Juan Creek if necessary.

Unlisted Reptiles

Belding's Orange-throated Whiptail

Status of the Species

Listing Status

In 2002, Reeder *et al*. presented evidence that *Cnemidophorus*, as previously circumscribed, is not monophyletic and resurrected *Aspidoscelis* for the clade composed of the species native to North America. *Cnemidophoru hyperythrus* became *A. hyperythra* (*C. h. beldingi* became *A. h. beldingi*) (Crother *et al*. 2003). The Belding's orange-throated whiptail (whiptail), *Aspidoscelis hyperythrus beldingi*, is a California Department of Fish and Game Species of Special Concern with a CNDDB rank of G5T2S2 (the full species is secure, but the subspecies Belding's orange-throated whiptail is "endangered" throughout its range) (CNDDB 2006). This species is not federally listed.

Species Description

The whiptail is a moderate-sized gray, reddish brown, dark brown, or black lizard with five to seven pale yellow or tan stripes (Stebbins 2003). Adults have varying degrees of red-orange wash that may occur on all undersurfaces. The orange wash is especially prominent on the throat and chest in breeding males. In hatchlings and juveniles, the tail is a highly visible bright blue (Stebbins 2003).

Habitat Affinities

Whiptails occur primarily in open coastal sage scrub habitat but may also occur in open chaparral, non-native grassland, oak woodland, alluvial fan scrub, and riparian areas (Brattstrom 2000). According to McGurty (1981), most of the whiptail populations were historically known to occur on the floodplains or stream terraces adjacent to other suitable habitat such as coastal sage scrub.

The whiptail may prefer more open scrub habitat because spaces in the canopy could provide better opportunities for the whiptails to forage and thermoregulate (McGurty 1981; Rowland 1992). Another important habitat characteristic is the presence of western subterranean termites (*Reticulitermes hesperus*) as these termites make up the majority of the Belding's orange-throated whiptail's diet (Bostic 1966a). The presence of perennial shrubs, such as California buckwheat, provide substantial amounts of leaf litter as a food source for the termites (Rowland and Brattstrom 2001) so are likely an important component of the habitat.

Vegetation alone is not always a good predictor of whiptail presence. Other habitat characteristics such as cover, soil, and slope are also important for whiptails (Brattstrom 2000). For example, Brattstrom (2000) found that whiptails occurred more frequently on medium to coarse soil, where the coarse soil is important in holding the whiptail burrows open, and medium sized soil may be easier for the whiptail to escape into for cover. Whiptails are also known to occur in areas with light disturbance such as dirt roads and trails within suitable habitat (Brattstrom 2000), perhaps because the disturbance provides openings in the canopy and/or loosens the soil, creating additional opportunities for burrowing.

Life History

The Belding's orange-throated whiptail reproduces sexually, not by parthenogenesis as in some whiptail species. Whiptails' average clutch size is 2.3 eggs (Bostic 1966b). It appears that adult females (2 years of age or older) deposit one clutch of eggs in June and another in mid-July (Bostic 1966b). In contrast, one clutch per season is probably the rule for yearlings, which deposit their eggs in late June through mid-July (Bostic 1966b). Adult whiptails usually enter into hibernation in late July through most of September while immatures enter into hibernation in December; individuals may emerge from hibernation in Late March through April (Bostic 1966c).

Whiptails are diurnal, but on hot days they retreat to shade or shallow burrows in the middle of the day (Milstead 1957). As stated in Brattstrom (2000), Belding's orange-throated whiptails are known to dig their own burrows and seldom use rodent burrows except in emergencies.

Bostic (1965) recorded a mean home range of 0.11 ac (0.04 ha) for adult whiptails. According to Bostic (1965), females have home ranges about twice as large as males; however, Rowland (1992) reported larger home ranges for males in his study. There is little specific data on dispersal distances by Belding's orange-throated whiptail, but other whiptail species can move hundreds of feet (*e.g.*, Garlard 1999).

Whiptails feed primarily on termites, which comprise 72 to 92 percent of the diet. Peak consumption of termites occurs during the swarming of reproductives in April. In late summer, when termites migrate deep into the soil to avoid high surface temperatures, alternate prey items dominate the whiptail's diet.

Predators of whiptail may include the coachwhip snake, striped racer snake, domestic cats and dogs, rattlesnakes, western whiptail lizard, roadrunner, American kestrel, scrub jay, shrike, and mockingbird.

Status and Distribution

The historic and current range of Belding's orange-throated whiptail extends from Orange County and southern San Bernardino County southward through western Riverside and San Diego counties to Loreto, Baja California, Mexico (Jennings and Hayes 1994). The elevation range is from near sea level to 3,400 ft (1,037 m), although 99 percent of observations occur below 2,800 ft (854 m) (Jennings and Hayes 1994; Rowland and Brattstrom 2001). Although the whiptail has a similar range as it did historically, Jennings and Hayes (1994) estimate that about 75 percent of the potential habitat throughout its range has been lost.

Rangewide Trends and Current Threats

No current information exists for rangewide population trends for the Belding's orange-throated whiptail. Habitat destruction and fragmentation as a result of development and agriculture have been identified as the primary threats to the whiptail. In the early 1990s, it was estimated that about 75 percent of the historic range had been lost due to development. Most of the suitable habitat occurs in floodplains and stream terraces, which are the most developed areas in southern California, and remaining populations are highly fragmented because the lower floodplain of most coastal drainages have been developed (Jennings and Hayes 1994). In addition to the loss of habitat, the erosion, degradation, and channelization of streams and washes is a likely threat because these areas probably serve as foraging and dispersal areas for this species (Jennings and Hayes 1994). Roads are likely to increase mortality of whiptail lizards and further fragment their habitat.

Another potential threat to the whiptail is the invasion of non-native Argentine ants, which displaces many native insects and may influence the whiptail's food base (Jennings and Hayes 1994), and domestic cats from homes adjacent to open space.

Invasion by non-native grasses and changes in fire frequency are also potential threats to the whiptail. Excessive fire, which is often associated with urban encroachment into scrublands, can degrade habitat for this species by facilitating invasion by non-native grasses into areas formerly dominated by coastal sage scrub and chaparral (McGurty 1981). In addition, increased fire frequency can eliminate leaf litter, which provides cover for the whiptail and a food source for the western subterranean termite. According to Brattstrom (2000), whiptails were usually found in areas that had not been burned within the last 5 years.

Several large-scale habitat conservation plans have been implemented in southern California in recent years. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 1998, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. In 2004, the Service issued a permit for the Western Riverside County MSHCP. The Belding's orange-throated whiptail is a Covered Species in each of these plans. The permits for these plans have authorized substantial impacts to suitable habitat for the Belding's orange-throated whiptail, but they have also required substantial conservation and habitat management to offset these impacts. Following implementation of these plans, suitable habitat (broadly defined here as scrub, chaparral, and oak woodland) for the whiptail is anticipated to be conserved and developed within each plan area (Appendix 2). Because the whiptail needs specific microhabitat features, such as open areas with leaf litter and medium to coarse soils, the estimates of suitable habitat conserved and impacted by these plans likely overestimate the extent of occupied habitat for this subspecies. It is anticipated that the whiptail in southern California will also benefit from the conservation and habitat management practices, such as control of invasive plant species and non-native predators, in reserve lands associated with these large-scale habitat conservation plans.

Conservation Needs

The conservation needs for this species include conserving large blocks of suitable habitat and conserving connections between the conservation areas. Suitable habitat needs to be conserved, managed, and restored through public and private actions. Management activities can address the threats described above, including controlling encroachment by non-native and domestic species, such as Argentine ants, non-native grasses, and domestic cats. Design features for roads such as bridges and culverts can help in maintaining connectivity and providing for dispersal. Because of the potential threat posed by road mortality, measures such as the installation of low-lying, fine-mesh fences or other barriers in areas likely to be used by whiptails near roads may help minimize this risk.

Environmental Baseline

For the purposes of this analysis, Belding's orange-throated whiptail habitat is defined as coastal sage scrub, chaparral, and woodland and forest. Using this definition, there are a total of 31,935 ac (12,934 ha) of Belding's orange-throated whiptail habitat in the Planning Area. Eighty-one percent (25,917 ac (10,496 ha)) of this habitat is in Subarea 1, where most of the impacts will occur (Table A).

The NCCP database contains 174 observations of Belding's orange-throated whiptails scattered throughout the planning area, including 169 observations in Subarea 1 (Table A). Of the 169 observations of Belding's orange-throated whiptails in Subarea 1, 158 occur in the San Juan Watershed, and 11 occur in the San Mateo Watershed (NCCP Table 3-5). There are three clusters of Belding's orange-throated whiptail observations in the action area that the NCCP considers "important" populations/"key" locations including (1) a cluster of 59 occurrences in coastal sage scrub along the ridge between Chiquita Canyon and Wagon Wheel Canyon south of Oso Parkway; 2) a cluster of 18 occurrences along Chiquadora Ridge; and 3) a cluster of 47

occurrences in the Gobernadora/Central San Juan Creek sub-basins north and east of the Colorspot Nursery (NCCP p. 13-135).

Because the three clusters of Belding's orange-throated whiptail observations are within the survey area for SOCTIIP, the observed densities at these locations are likely due to the result of a greater survey effort in this portion of the planning area. The remaining locations are throughout Subarea 1 with a small number in the Foothill/Trabuco Specific Plan Area in Subarea 2 (Table A). More whiptails are likely to inhabit areas of suitable habitat that were not surveyed. However, estimating whiptail abundance in the action area, by intersecting mapped suitable vegetation types with a typical territory/use area size, would likely overestimate the number present since the whiptail may have stricter habitat requirements (a more open canopy) than the gross level that the vegetation mapping provides and has narrow food source requirements (subterranean termites) that may not be present in areas with suitable habitat. Due to these uncertainties, we did not attempt to further refine population estimates in the action area.

Table A for Orange-throated whiptail: Orange-throated whiptail habitat (coastal sage scrub, chaparral, woodland and forest) and locations in the action area.

Action Area Components	**Total Amount of Orange-throated Whiptail Habitat (acres)**	**Orange-throated Whiptail Locations in NCCP Dataset**
Subarea 1		
Proposed RMV[1]	12,848	146
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	1,804	13
Prima Deshecha Landfill	328	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	8,218	4
Supplemental Open Space (Audubon's Starr Ranch)	2,701	6
Other	18	2
Subtotal for Subarea 1	***25,917***	***171***
Subarea 2	2,632	2
Subarea 3	856	1
Subarea 4[2]	2,530	0
TOTAL	**31,935**	**174**

[1] Includes project footprint for RMV infrastructure in Subarea 4 (14 ac and 0 locations).
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (14 ac and 0 locations).

Effects of the Action

Direct Effects

The action area includes 31,935 ac (12,924 ha) of suitable habitat (coastal sage scrub, chaparral, and woodland and forest) for the Belding's orange-throated whiptail and 174 known occurrences (Table A). Over the 75-year term of the permits, 48 known occurrences or 27 percent of Belding's orange-throated whiptails will be subject to impacts associated with development and

other proposed Covered Activities in 4,092 ac (1,656 ha) (13 percent) of suitable whiptail habitat in the action area (Table B). We anticipate that all of the suitable habitat in the areas permanently impacted by Covered Activities will be developed or otherwise made unsuitable for Belding's orange-throated whiptail.

The proposed RMV, including Ortega Rock, and SMWD Covered Activities will permanently impact 3,815 ac (1,545 ha) or 26 percent of the Belding's orange-throated whiptail suitable habitat and 48 (30 percent) of the known whiptail occurrences on RMV lands (Table B).

The County Covered Activities at Prima Deshecha Landfill will permanently impact 166 ac (67 ha) or 51 percent of the whiptail suitable habitat at the Landfill, but no known occurrences. Avenida La Pata Road extension will impact an additional 42 ac (17 ha) of suitable whiptail habitat within the Habitat Reserve and 10 ac (4 ha) in Subarea 4, but no known locations. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program" could allow the impact of up to 59 ac (24 ha) of suitable whiptail habitat in parcels 1-17.

Seventy-five (75) percent (36 of 48 occurrences) of the whiptail occurrence impacts are within PA3 with the remaining 12 occurrence impacts distributed in PA2 and PA4 (Table C). Most of PA3 and parts of PA2 and PA4 lie within three areas the NCCP identifies as "important" populations/"key" locations (Chiquita Canyon/Wagon Wheel Canyon Ridgeline, Chiquadora Ridge, and Gobernadora/Central San Juan Creek). Although a small number of individuals may escape to adjacent undisturbed habitats, any whiptails within the impact area will likely be crushed or buried and killed by construction equipment and ground disturbing activities.

In addition to permanent impacts to habitat and the associated loss of individuals from development and other Covered Activities, there will be temporary impacts to 101 ac (41 ha) of suitable habitat and eight occurrences in the Habitat Reserve and SOS from RMV and SMWD actions. Habitat temporarily affected will be restored to either pre-existing conditions or a higher performance standard. It is anticipated that after restoration, these areas will again be available for re-colonization by the species. However, within the temporary impact area, it is likely that individual whiptails will be crushed or buried and killed by construction equipment and ground disturbing activities.

Other Covered Activities that may impact whiptails but will not result in a permanent or determined loss of suitable habitat include cattle grazing, prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities such as pitfall trapping and removal of invasive species. Cattle grazing may result in disturbance of breeding areas and occasional trampling of whiptails, and if over-grazing occurs, may degrade upland habitat by removing vegetative cover and increasing erosion rates. Prescribed burns could result in the death of whiptails in the burn area. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may occasionally kill or injure whiptails in the project area. Habitat management and species' monitoring activities may occasionally kill or injure whiptails that are within active restoration areas or that are trapped and handled during monitoring efforts.

Table B for Belding's Orange-throated Whiptail: Belding's orange-throated whiptail occurrences permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and managed in the action area.

Covered Activities and Conservation Areas	**Habitat impacts (acres)**	**Habitat Reserve (acres)**	**Habitat in Prima SOS[1] (acres)**	**Habitat with Status Unchanged (acres)**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations in Prima SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	3,815	9,033			48	98		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		1,804				13		
Subtotal of impacts and conservation by RMV and SMWD	**3,815**	**10,837**			**48**	**111**		
Prima Deshecha Landfill	166		162		0		0	
Avenida La Pata on RMV Lands	42	-42			0			
Avenida La Pata in Subarea 4	10				0			
Subtotal of impacts and conservation by the County of Orange	**218**		**162**		**0**			
Subtotal of impacts and assured conservation with adaptive management	**4,033**	**10,795**	**162**		**48**	**111**		
[2]Subarea 3 Coto de Caza Parcels 1-17	up to 59				0			
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		8,218				4		
No Covered Activities				8,668				11
TOTAL	**4,092**	**19,013**	**162**	**8,668[4]**	**48**	**115**	**0**	**11[4]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 2,701 ac and 6 locations in Audubon Starr Ranch SOS.

Indirect Effects

The Belding's orange-throated whiptail will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion including threats from non-native species such as exotic ants, domestic cats, and invasive plant species, which people can transport and introduce to new locations. Also, because of their susceptibility to mortality and fragmentation due to roads, the whiptail is likely to be vulnerable to indirect effects (*e.g.*, increased vehicle strikes) associated with roads.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access and non-native species and to minimize the effects of construction activities, the following conservation measures specific to the Belding's orange-throated whiptail will be implemented.

Conservation and Restoration. The Habitat Reserve will contain 115 of the known whiptail locations or 66 percent of the locations in the action area, including 111 locations on RMV lands and 4 locations within existing County Parks. The Habitat Reserve will also include 19,013 ac (7,700 ha) (59 percent) of the suitable habitat in the action area, including 10,795 ac (4,372 ha) on RMV lands and 8,218 ac (3,328 ha) within existing County Parks. To help offset impact at Prima Deshecha Landfill, 162 ac (66 ha) of habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the Belding's orange-throated whiptail.

Reserve Design: Following implementation of the Plan, the known whiptail occurrences will be concentrated in Chiquita Canyon and along Chiquadora Ridge. The Reserve will contain large habitat blocks including coastal sage scrub, chaparral, and woodland and forest from about 228 ac (92 ha) in the Radio Tower Road area to about 9,853 ac (3,990 ha) in the southeastern portion of the reserve. Cristianitos Road/"F" Street will bisect whiptail "important" population/"key" locations on Chiquita Canyon/Wagon Wheel Ridge and on Chiquadaora Ridge. Bridges will be built at areas of Chiquadora Ridge so that area will retain contiguous habitat. The Chiquita Canyon/Wagon Wheel areas will not be bridged; however, a large wildlife culvert at Chiquita Narrows may allow some connectivity of populations if individuals disperse through the culvert. Populations will also retain connectivity through contiguous habitat along San Juan Creek to Bell Canyon, along Chiquita Ridge, and linkages in Trampas, Cristianitos, Gabino, La Paz, and Talega canyons in the south and southeast portions of the reserve.

Grazing Management Plan: The Grazing Management Plan (see Appendix G of the Plan and Project Description in this document) includes the management of grazing activities and restoration of upland habitat with native grasses and coastal sage scrub to help ensure that the habitat remains suitable for a wide variety of species, including the whiptail. In addition, the Grazing Management Plan requires exclusion of cattle from benches in San Juan Creek, which could prevent trampling of whiptails inhabiting these areas.

Fire Management Plan: The project description summarizes the key elements of the Fire Management Plan including the use of controlled burns to decrease fuel loads and hence the likelihood of catastrophic wildfires. The Fire Management Plan does not include specific measures for minimizing the effects of controlled burns on whiptails but does include a variety of measures to ensure that controlled burns are contained within the identified area. Controlled burns are proposed to be used in coordination with seeding and chemical and mechanical weed control to restore native coastal sage scrub, which will likely enhance the quality of habitat for whiptails.

Monitoring: Monitoring will be conducted both at a species-specific level and also at a habitat landscape level. The detailed monitoring program for the Belding's orange-throated whiptail as a Covered Species and a candidate focal species will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. The whiptail is noted as a focal species within coastal sage scrub, chaparral, and oak woodland habitats.

Analysis of Impacts and Conservation by Planning Area

RMV has proposed to carry out development in eight Planning Areas and is anticipating development of these Planning Areas in sequential order: PA1 through PA8. Although it is not expected or anticipated, the IA states that RMV can terminate the 75-year permit at any time during their proposed phased development. Therefore, the conservation on a cumulative basis as each Planning Area is developed should be sufficient to avoid/minimize impacts. A summary of whiptail occurrences that will be impacted and conserved by Planning Area is presented in Table C. In addition to the conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Build-out of PA1 will impact zero occurrences of whiptails and 13 ac (5 ha) of suitable habitat but will conserve five occurrences and over 262 ac (106 ha) of suitable habitat.

Build-out of PA2 will impact five known occurrences and 325 ac (132 ha) of suitable habitat and will conserve 72 occurrences of whiptail and 1,299 ac (526 ha) of suitable habitat. The PA2 conservation area includes the "important" population/"key" location in Chiquita Canyon; its conservation will enhance the connectivity of Chiquita Canyon with habitat in Ladera Open Space and San Juan Creek. Combined, build-out of PA1 and 2 will result in conservation of 77 whiptail occurrences, which is significantly more than impacted, and 1,561 ac (632 ha) of suitable habitat, a greater than 4:1 conservation to impact ratio for whiptail newly conserved habitat on RMV lands.

Build-out of PA3 will impact 36 known occurrences and 1,147 ac (465 ha) of suitable habitat and will conserve 17 occurrence of whiptail and 1,898 ac (769 ha) of suitable habitat. The PA3 conservation area includes dispersal habitat along most of San Juan Creek (the portion not conserved in association with PA2) into Caspers Wilderness Park to the northeast, through upland habitat along Gobernadora Creek, and across the corridor between PA 3 and Coto de Caza. Combined, build-out of PA1, 2, and 3 will result in conservation of 94 whiptail occurrences and 3,459 ac (1,401 ha) of suitable habitat on RMV lands, a greater than 2:1

conservation to impact ratio for whiptail occurrences and a greater than 3:1 conservation to impact ratio for newly conserved habitat on RMV lands.

Table C for Belding's Orange-throated Whiptail: Belding's orange-throated whiptail occurrences and habitat permanently impacted and conserved/managed as a result of Covered Activities by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Orange-throated Whiptail Locations and Habitat Impacted (Cumulative Impacts)**		**Orange-throated Whiptail Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	0 (0)	13 (13)	5 (5)	262 (262)
PA2	5 (5)	325 (338)	72 (77)	1,299 (1,561)
PA3	36 (41)	1,147(1,485)	17 (94)	1,898 (3,459)
PA4	1 (42)	945 (2,430)	0 (94)	335 (3,794)
PA5	0 (42)	610 (3,040)	2 (96)	247 (4,041)
PA6 & PA7	0 (42)	50 (3,090)	0 (96)	4 (4,045)
PA8	0 (42)	500 (3,590)	8 (104)	5,136 (9,181)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	6 (48)	139[1] (3,729)	-6 (98)	-125[1] (9,056)
Ortega Rock	0 (48)	63 (3,792)		
Santa Margarita Water District Impacts	0 (48)	23 (3,815)		-23 (9,033)
Subtotal for Proposed RMV and Associated Projects	48	3,815	98	9,033
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			13 (111)	1,804 (10,837)
TOTAL	**48**	**3,815**	**111**	**10,837**

[1]125 ac of infrastructure impact are in the Habitat Reserve, and 14 ac are in SOS.
[2]The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA4 will impact one known occurrence of whiptails and 725 ac (294 ha) of suitable habitat and conserve no additional occurrences and 555 ac (225 ha) of suitable habitat. Connectivity to PA3 open space will be secured. Combined, build-out of PA1 through PA4 will result in the conservation of 94 whiptail occurrences and 4,014 ac (1,626 ha) of suitable habitat on RMV lands and does not significantly change the conservation to impact ratio that follows build-out of PA3.

Build-out of PA5 will impact no known occurrences and 610 ac (247 ha) of suitable habitat and will conserve two whiptail occurrences and 247 ac (100 ha) of suitable habitat. Combined, build-out of PA 1 through PA5 will result in the conservation of 96 occurrences and 4,261 ac (1,726 ha) of suitable habitat on RMV lands and maintains the greater than 2:1 conservation to impact ratio of whiptail occurrences. The conservation to impact ratio for newly conserved habitat is reduced to below 2:1, but build out through PA5 still conserves significantly more habitat than is impacted.

The expansion of agricultural activities and the RMV headquarters in PA6 and 7 will not impact or conserve any whiptail occurrences; however, 50 ac (20 ha) of suitable habitat will be

impacted. The expansion of agricultural activities by 50 ac (20 ha) in PA6 and 7 is not anticipated to interfere with the dispersal of whiptails within the San Mateo Creek watershed and does not significantly change the conservation to impact ratio associated with development of any of the Planning Areas.

Build-out of PA8 will impact no known occurrences and 500 ac (202 ha) of suitable habitat and will conserve eight whiptail occurrences and 5,136 ac (2,080 ha) of suitable habitat. The PA8 conservation area includes a large portion of the San Mateo Creek watershed on RMV property, which will provide connectivity between whiptail occurrences in the San Mateo Creek and San Juan Creek watersheds. Combined, build-out of PA1 through PA8 will impact 3,370 ac (1,365 ha) of suitable habitat and 48 whiptail occurrences on RMV lands and result in the conservation of 9,397 ac (3,806 ha) of suitable habitat and 104 of the 159 whiptail occurrences on RMV lands.

Lastly, the analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure in the Habitat Reserve and SOS or Covered Activities at Ortega Rock Quarry or by SMWD. Impacts to Belding's orange-throated whiptail occurrences and suitable habitat associated with these activities will reduce conservation in the Habitat Reserve by six occurrences and 148 ac (60 ha) of suitable habitat. However, an additional 13 occurrences of whiptails on 1,804 ac (731 ha) of suitable habitat in Prior RMV lands will be included in the Habitat Reserve and adaptively managed. In total, adaptive management will occur for 111 whiptail occurrences (70 percent) on 10,837 ac (4,389 ha) or 74 percent of the suitable habitat on RMV lands, a greater than 2:1 conservation to impact ratio for whiptail occurrences and suitable habitat on RMV lands.

If RMV chooses to phase development by Alternative Order PA1, 3, 2, 4, 5, and 8 or Alternative Order PA1, 4, 3, 2, 5, and 8, new conservation of suitable habitat exceeds the development impact by a ratio of greater than 1:1 in all phases of development. However, in either scenario, implementation of PA3 causes new conservation of whiptail occurrences to lag behind impacts by 14 to 15 occurrences. However, the implementation of the adaptive management program will provide immediate conservation benefit to 13 known whiptail occurrences in prior conserved RMV lands. Thus, the conservation adequately offsets the PA3 impact to whiptail locations, and conservation of known whiptail occurrences in the action area again exceeds impacts with the dedication of PA2 open space.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the Belding's orange-throated whiptail. We base this conclusion on the following:

1. Belding's orange-throated whiptails are distributed from Orange County and southern San Bernardino County southward through western Riverside and San Diego counties to

Loreto, Baja California, Mexico. Therefore, the action area for this Plan represents a small fraction of the species' entire distribution.

2. An estimated 48 known occurrences of Belding's orange-throated whiptail and approximately 4,092 ac (1,657 ha) of suitable habitat for the species will be developed or otherwise made unsuitable for whiptails. The affected occurrences represent approximately 27 percent of the known locations and 13 percent of the suitable habitat for this species in the action area.

3. A total of 19,013 ac (7,700 ha) (59 percent) of the suitable habitat for the species in the action area, including 115 known locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 10,795 ac (4,372 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 8,218 ac (3,328 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 162 ac (66 ha) of suitable habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 2,701 ac (1,094 ha), including 6 known locations, is conserved at NAS Starr Ranch.

5. Combined, 21,876 ac (8,860 ha) or 68 percent of the suitable habitat for Belding's orange-throated whiptail, including 121 known locations (69 percent), in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[23]

6. "Important" populations/"key" locations will be maintained in Chiquita Canyon and Chiquadora Ridge. Connectivity of the "important" population/"key" location at Chiquadora Ridge will be maintained with bridges for roadways; large wildlife culverts will aid in maintaining connectivity for Chiquita Canyon/Wagon Wheel populations.

7. Connectivity will be maintained with conservation of Chiquita Ridge, Chiquita Canyon, Gobernadora Ridge, San Juan Creek, and Cristianitos Canyon linkages.

8. We anticipate that permanent protection of Belding's orange-throated whiptail occurrences and associated suitable habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain Belding's orange-throated whiptail in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and

[23] There is likely suitable habitat for Belding's orange-throated whiptail in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for the Belding's orange-throated whiptail remains valid for the following reasons:

1. The project impacts to suitable whiptail habitat in the action area will be reduced to approximately 3,815 ac (1,545 ha) or 12 percent, although project impacts to occurrences will remain unchanged at 48 known whiptail occurrences.

2. The County of Orange will not implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS and County Park lands, and these lands will not be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP. However, four whiptail occurrences and 8,218 ac (3,328 ha) of the suitable whiptail habitat in the action area will remain within existing County Park lands.

3. The conservation proposed by RMV will still be implemented such that 10,837 ac (4,389 ha) within the action area and 111 known occurrences within the action area will still be conserved and adaptively managed within the Habitat Reserve. This represents conservation of 74 percent of the suitable whiptail habitat and 70 percent of Belding's orange-throated whiptail occurrences on RMV lands, a greater than 2:1 conservation to impact ratio for suitable whiptail habitat and known whiptail occurrences on RMV lands.

4. An additional 2,701 ac (1,094 ha) and six known whiptail occurrences in existing conserved lands at NAS Starr Ranch will remain in the action area. In total, within the action area, 121 of the known occurrences (69 percent) and 21,756 ac (8,811 ha) or 68 percent of the suitable habitat for Belding's orange-throated whiptail will be conserved or remain in open space lands.

5. "Important" populations/"key" locations will be maintained in Chiquita Canyon and Chiquadora Ridge. Connectivity of the "important" population/"key" location at Chiquadora Ridge will be maintained with bridges for roadways; large wildlife culverts will aid in maintaining connectivity for Chiquita Canyon/Wagon Wheel populations.

6. Connectivity will be maintained with conservation of Chiquita Ridge, Chiquita Canyon, Gobernadora Ridge, San Juan Creek, and Cristianitos Canyon linkages.

7. We anticipate that permanent protection of Belding's orange-throated whiptail occurrences and associated suitable habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain Belding's orange-throated whiptail in the Southern Subregion and contribute to the range-wide conservation of this species.

California Glossy Snake

Status of the Species

Listing Status

The California glossy snake (*Arizona elegans occidentalis*) is not designated as a special status species by the Service or the CDFG. It is not listed under the Federal Endangered Species Act.

Species Description

Adult California glossy snakes range in size from about 25-39 in (64-99 cm). The California glossy snake has "smooth, glossy scales" with "chocolate colored body blotches on a tan or light brown ground color" (Fisher and Case 2003). The snake's eyes have slightly vertical pupils, the lower jaw is countersunk, and it possesses a single anal scale. Juveniles appear similar to adults, but the body blotches are darker (Fisher and Case 2003).

Habitat Affinities

The California glossy snake is typically found in loose or sandy soils suitable for burrowing, but some rocks may be present. It occurs most often in valleys or washes or open areas in coastal sage scrub, chaparral, grassland, and sparse woodlands (Holland and Goodman 1998).

Life History

The California glossy snake is an excellent burrower, generally spending most of the day burrowed underground and foraging at night. It eats lizards, snakes, and small mammals. Clutch size for glossy snakes range from 3-23 eggs, which are laid in the summer (Stebbins 1985).

Distribution

The California glossy snake is a subspecies of the glossy snake (*Arizona elegans*). The full species occurs throughout the southwestern United States and Mexico. The California glossy snake occurs in cismontane habitats from the Central Valley in California to northwestern Baja California, Mexico (Stebbins 1985).

There are a limited number of observation records for the California glossy snake. Since it is not a special status species, observations are not recorded in the California Natural Diversity Database, and it may be that because of its tendency to burrow, it is less frequently observed than other species that take refuge under logs and rocks, where they are more likely to be found.

Rangewide Trends and Current Threats

Although the California glossy snake has not been directly studied to determine threats, it can be assumed that it is affected by the same factors as other sensitive herpetofauna, including habitat loss and fragmentation, invasion of habitat by non-native plants such as giant reed, urban-related

predators such as dogs and crows, road mortality (studies of snake mortality on roads have documented high mortality rates for a variety of species, *e.g.*, Bernardino and Dalrymple 1992; Rosen and Lowe 1994), and invasion by non-native ants primarily through their effects on lizards, which are important prey items for glossy snakes. Since glossy snakes often bury themselves in sandy washes and ravines, off-roading and sand and gravel mining activities in these areas likely have the potential to kill buried individuals.

The loss and fragmentation of potential habitat throughout the range of California glossy snake, primarily as a result of development, suggests that the species is currently in decline, and anecdotal evidence suggests that this species is rarely captured in potential habitat (*e.g.*, Fisher and Case 2003).

Several large-scale habitat conservation plans have been implemented in southern California in recent years. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 1998, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County.

The California glossy snake is not a Covered Species for these three large-scale habitat conservation plans, but its distribution includes the areas covered by these plans. Thus, although there is no species-specific analysis of potential effects associated with plan implementation, these plans have authorized impacts to suitable habitat for the California glossy snake and also resulted in conservation and management of suitable habitat for this species. It is also anticipated that California glossy snakes in southern California may benefit from the conservation and general habitat management practices, such as control of invasive plant species and non-native predators, in reserve lands created by these large-scale habitat conservation plans.

Conservation Needs

The conservation of the California glossy snake depends on conserving large blocks of habitat and connections between the conservation areas. In addition, suitable habitat needs to be maintained and restored. Based on the available information, management activities should address the threats described above, including maintaining connectivity by providing bridges and culverts for dispersal, controlling non-native plants and ants and limiting predation by urban predators such as dogs and crows, and managing off-road activity in and adjacent to the sandy washes where California glossy snakes are most likely to occur. Because of the potential threat posed by road mortality, additional measures such as the installation of low-lying fine-mesh fence or barrier fencing in areas likely to be used by snakes may help minimize this source of mortality. Finally, because snakes are viewed as dangerous, humans often kill them; therefore, an education program regarding snakes could reduce this source of mortality.

Environmental Baseline

For the purposes of this analysis, California glossy snake habitat is defined as sandy and loamy soils and rock outcroppings in coastal sage scrub, chaparral, grassland, riparian, stream courses, and woodlands and forest. Using this definition, there are a total of 34,253 ac (13,872 ha) of

suitable California glossy snake habitat in the action area. Eighty-three percent (28,438 ac (11,509 ha)) of this habitat is in Subarea 1, where most of the impacts will occur (Table A).

There are four observations of California glossy snake in the action area, including two observations in coastal sage scrub near San Juan Creek at the entrance to Caspers Park, at the Caspers Park visitor center, and near San Juan Creek at Cow Camp (Plan; pg. 13-123). All four of the observations were in Subarea 1 (Table A). The action area is one of only three locations in southern California where the California glossy snake has recently been observed (Plan, Appendix B, page 16). However, based on the California glossy snake's habitat preferences, it could occur throughout much of the action area.

Table A for California Glossy Snake: habitat and locations in the action area.

Action Area Components	**Total Amount of California Glossy Snake Habitat (acres)**	**California Glossy Snake Locations in NCCP Dataset**
Subarea 1		
Proposed RMV[1]	14,527	1
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	2,173	0
Prima Deshecha Landfill	53	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	9,184	3
Supplemental Open Space (Audubon's Starr Ranch)	2,472	0
Other	29	0
Subtotal for Subarea 1	***28,438***	***4***
Subarea 2	2,699	0
Subarea 3	1,332	0
Subarea 4[2]	1,784	0
TOTAL	**34,253**	**4**

[1] Includes project footprint for RMV infrastructure in Subarea 4 (35 ac and 0 locations).
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (35 ac and 0 locations).

Effects of the Action

Direct Effects

The action area includes 34,253 ac (13,872 ha) of suitable habitat (sandy and loamy soils and rock outcroppings in coastal sage scrub, chaparral, grassland, riparian, stream courses, and woodlands and forest) for the glossy snake and 4 known occurrences (Table A). Over the 75-year term of the permits, a total of 4,421 ac (1,790 ha) (13 percent) of California glossy snake habitat will be permanently impacted in the action area. According to the Plan, none of the four known locations of California glossy snake will be directly impacted (Table B). One location is very near the footprint edge for PA3 at San Juan Creek at Cow Camp Road. However, given the required setbacks from the creek, we do not anticipate that construction activities will impact this location.

Table B for California Glossy Snake: The amount of habitat and the number of California glossy snake locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the glossy snake in the action area.

Covered Activities and Conservation Areas	**Habitat impacts (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS[1] (acres)**	**Habitat with Status Unchanged (acres)**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations in Prima SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	4,290	10,237			0	1		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		2,173			0	0		
Subtotal of impacts and conservation by RMV and SMWD	**4,290**	**12,410**			**0**	**1**		
Prima Deshecha Landfill	21		32		0	0	0	
Avenida La Pata on RMV Lands	33	-33			0			
Avenida La Pata in Subarea 4	0				0			
Subtotal of impacts and conservation by the County of Orange	**54**		**32**		**0**	**0**		
Subtotal of impacts and assured conservation with adaptive management	**4,344**	**12,377**			**0**	**1**		
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 77				**0**	0		
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	0	9,184			0	3		
No Project				8,239				0
TOTAL	**4,421**	**21,561**	**32**	**8,239[4]**	**0**	**4**	**0**	**0[4]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 2,472 ac and no known locations in Audubon Starr Ranch SOS.

The proposed RMV, including Ortega Rock, and SMWD Covered Activities will permanently impact 4,290 ac (1,737 ha) or 26 percent of California glossy snake suitable habitat and no known occurrences on RMV lands (Table B). The County Covered Activities at Prima Deshecha Landfill will permanently impact 21 ac (9 ha) or 40 percent of the snake suitable habitat at the Landfill, but no known occurrences. Avenida La Pata Road extension on RMV lands will permanently impact 33 ac (13 ha), but no known locations. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program" could allow the impact of up to 77 ac (31 ha) of suitable glossy snake habitat in parcels 1-17.

None of the glossy snake known locations is expected to be impacted; however, we anticipate that all of the suitable habitat in the areas permanently impacted by Covered Activities will be developed or otherwise made unsuitable for glossy snake. Although some individuals may escape to adjacent undisturbed habitats, any glossy snakes within the impact area will likely be crushed or buried and killed by construction equipment and ground disturbing activities.

In addition to permanent impacts to habitat and the associated loss of individuals from development and other Covered Activities, there will be temporary impacts to 288 ac (117 ha) (less than 1 percent) of glossy snake suitable habitat but no known locations. Habitat temporarily affected will be restored to either pre-existing conditions or a higher performance standard. It is anticipated that after restoration, these areas will again be available for re-colonization by the species. However, within the temporary impact area, it is likely that individual glossy snakes will be crushed or buried and killed by construction equipment and ground disturbing activities.

Other Covered Activities that may impact California glossy snakes but not result in a permanent or determined loss of suitable habitat include cattle grazing, prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities such as pitfall trapping and removal of invasive species. Cattle grazing may result in disturbance of breeding areas and occasional trampling of glossy snakes, and if over-grazing occurs, may degrade upland habitat by removing vegetative cover and increasing erosion rates. Prescribed burns could result in the death of snakes in the burn area. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may occasionally kill or injure glossy snakes in the project area.

Habitat management and species' monitoring activities may also occasionally kill or injure glossy snakes that are within active restoration areas or that are trapped and handled during monitoring efforts. It is anticipated that any impacts to California glossy snakes from management activities will be minimized by adherence to appropriate guidelines described in Appendix U of the Plan. Removal of invasive plant species within the San Juan Creek portion of Caspers Regional Park will open up habitat for California glossy snake and provide an overall benefit.

Indirect Effects

The California glossy snake will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion including threats from non-native species such as exotic ants, domestic cats, and invasive plant species, which people can transport and introduce to new locations. Also, because of their susceptibility to mortality and fragmentation due to roads, the glossy snake is likely to be vulnerable to indirect effects (*e.g.*, increased vehicle strikes) associated with roads. Increased artificial lighting from new development proposed under the Plan could cause indirect effects to snakes living in adjacent habitats. Artificial lighting could disrupt the snake's nocturnal patterns, increase detection by predators of the snake and/or increase detection by snake prey thereby reducing foraging success. The use of pesticides, specifically rodenticides, could also affect California glossy snake by reducing rodent prey and their burrows that the snake may use for foraging or egg laying.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access and non-native species and to minimize the effects of construction activities, the following conservation measures specific to the California glossy snake will be implemented.

Conservation and Restoration. The Habitat Reserve will contain all four of the known glossy snake locations in the action area, including one location on RMV lands and three locations within existing County Parks. The Habitat Reserve will also include 21,561 ac (8,732 ha) (63 percent) of the suitable habitat in the action area, including 12,377 ac (5,013 ha) on RMV lands and 9,184 ac (3,719 ha) within existing County Parks. To help offset impacts at Prima Deshecha Landfill, 32 ac (13 ha) of suitable habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the California glossy snake.

Reserve Design: Development of the Planning Areas within the Habitat Reserve will create habitat blocks separated by the development areas but linked by conserved habitat linkages. Habitat blocks containing suitable vegetation types for the California glossy snake range in size from 809 ac (328 ha) in the Radio Tower Road mesa block to 13,694 ac (5,546 ha) in the Southeastern block. Linkages likely to be important for the California glossy snake will also be conserved as part of the Habitat Reserve. Conservation of the north-south linkage running between PA3 and PA4 will preserve the connectivity between the two areas where California glossy snake has been located in the action area. Other linkages conserved will contribute to the overall mobility of the California glossy snake within the Habitat Reserve. Features such as bridges and culverts will be constructed where roads traverse linkages to allow wildlife movement and reduce the likelihood of vehicle collisions.

Grazing Management Plan: The Grazing Management Plan (see Appendix G of the Plan and Project Description in this document) includes the management of grazing activities and restoration of upland habitat with native grasses and coastal sage scrub to help ensure that the habitat remains suitable for a wide variety of species, including the California glossy snake.

Fire Management Plan: The project description summarizes the key elements of the Fire Management Plan including the use of controlled burns to decrease fuel loads and hence the likelihood of catastrophic wildfires. The Fire Management Plan does not include specific measures for minimizing the effects of controlled burns on glossy snake, but it does include a variety of measures to ensure that controlled burns are contained within the identified area. Controlled burns are proposed to be used in coordination with seeding and chemical and mechanical weed control to restore native coastal sage scrub, which will likely enhance the quality of habitat for the glossy snake.

Management: In addition to the management actions identified above, rodent controls will be prohibited within the Habitat Reserve, and the use of chemical pesticides in areas directly adjacent to the Habitat Reserve will be minimized to the extent feasible and will follow an approved Integrated Pest Management Program designed to avoid and minimize effects on native species and habitats. Control of Argentine ants will be implemented to reduce impacts to native lizards that are prey for the snake. Collecting of the California glossy snake by the public will be prohibited within the Habitat Reserve. Predation by urban predators such as dogs and cats will be minimized by public education and trapping where necessary. Signage along trails and bike paths in the Habitat Reserve will inform the public of the risk to native species such as snakes from recreational activities. Implementation of the Habitat Restoration Plan will benefit the California glossy snake by restoring coastal sage scrub that is considered suitable habitat for the species.

Monitoring: Monitoring will be conducted both at a species-specific level and also at a habitat landscape level. The detailed monitoring program for the California glossy snake as a Covered Species will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. The Plan approaches management of the California glossy snake at a landscape level through the establishment of sampling plots distributed throughout vegetation communities that support the snake. However, the Science Advisors Report (HCP Appendix B, pg. B-14) recommends specific management activities and species surveys during implementation to monitor and fine-tune conservation requirements for the glossy snake. The Wildlife Agencies, during their future review of the more detailed 5-year MAP, may recommend that more specific management and monitoring be implemented for the glossy snake.

Analysis of Impacts and Conservation by Planning Area

RMV has proposed to carry out development in eight Planning Areas and is anticipating development of these Planning Areas in sequential order: PA1 through PA8. Although it is not expected or anticipated, the Implementation Agreement states that RMV can terminate the 75-year permit at any time during their proposed phased development. Therefore, the conservation on a cumulative basis as each Planning Area is developed should be sufficient to avoid/minimize impacts. A summary of glossy snake occurrences and habitat by Planning Area that will be impacted and conserved is presented in Table C. In addition to the conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Build-out of PA1 will impact 34 ac (14 ha) of suitable habitat for California glossy snake and result in the conservation and management of 368 ac (149 ha); no known occurrences will be impacted or conserved.

Build-out of PA2 will impact 184 ac (74 ha) of suitable habitat and result in the conservation and management of 1,308 ac (530 ha); no known occurrences will be impacted or conserved. Combined the buildout of PA1 and PA2 will impact only 218 ac (88 ha) of suitable glossy snake habitat and result in the conservation and management of 1,676 ac (679 ha), a greater than 7:1 conservation to impact ratio for glossy snake newly conserved habitat on RMV lands.

Table C for California Glossy Snake: Modeled California Glossy Snake Habitat and Locations Permanently Impacted and Conserved/Managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**California Glossy Snake Locations and Habitat Impacted (Cumulative Impacts)**		**California Glossy Snake Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	0 (0)	34 (34)	0 (0)	368 (368)
PA2	0 (0)	184 (218)	0 (0)	1,308 (1,676)
PA3	0 (0)	1,367 (1,585)	1(1)	2,253 (3,929)
PA4	0 (0)	1,006 (2,591)	0 (1)	331 (4,260)
PA5	0 (0)	784 (3,375)	0 (1)	460 (4,720)
PA6 & PA7	0 (0)	50 (3,425)	0 (1)	184 (4,904)
PA8	0 (0)	500 (3,925)	0 (1)	5,599 (10,503)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	0 (0)	262[1] (4,187)		-227[1] (10,276)
Ortega Rock	0 (0)	64 (4,251)		
Santa Margarita Water District Impacts	0 (0)	39 (4,290)		-39 (10,237)
Subtotal for Proposed RMV and Associated Projects	0	4,290	1	10,237
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			0 (1)	2,173 (12,410)
TOTAL	**0**	**4,290**	**1**	**12,410**

[1] 227 ac of infrastructure impact are in the Habitat Reserve, and 35 ac are in SOS.
[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA3 will impact 1,367 ac (554 ha) of suitable habitat for California glossy snake and result in the conservation and management of 2,253 ac (912 ha) and 1 known occurrence; no known occurrences will be impacted. The PA3 conservation area includes dispersal habitat along most of San Juan Creek (the portion not conserved in association with PA2) into Caspers Wilderness Park to the northeast. Combined, build-out of PA1, PA2, and PA3 will impact 1,585 (642 ha) of suitable glossy snake habitat and result in conservation and management of 3,929 ac (1,591 ha), a greater than 2:1 conservation to impact ratio for glossy snake newly conserved habitat on RMV lands.

Build-out of PA4 and PA5 will impact 1,006 ac (407 ha) and 784 ac (317ha) of suitable habitat for California glossy snake, respectively, and result in the conservation and management of 331 ac (134 ha) and 460 ac (186 ha), respectively; no known occurrences will be impacted or conserved. Combined, build-out of PA1 through PA5 will impact 3,375 ac (1,367 ha) and result in conservation and management of 4,720 ac (1,912 ha), reducing the conservation to impact ratio to greater than 1:1; however, development through these phases still conserves more suitable habitat than is impacted.

The expansion of agricultural activities in PA6 and 7 could occur anytime and will impact up to 50 ac (20 ha) of suitable habitat for California glossy snake and result in the conservation and management of 184 ac (74 ha); no known occurrences will be impacted or conserved. Combined, build-out of PA1 through PA7 will impact 3,425 ac (1,387 ha) of glossy snake suitable habitat and result in conservation and management of 4,904 ac (1,986 ha) of habitat, with conservation still exceeding impacts by a greater than 1:1 ratio.

Build-out of PA8 will impact up to 500 ac (202 ha) of suitable habitat for California glossy snake and result in conservation of 5,599 ac (2,267 ha); no known occurrences will be impacted or conserved. Combined, build-out of PA1 through PA8 will impact 3,925 ac (1,590 ha) of glossy snake suitable habitat and result in conservation and management of 10,503 ac (4,254 ha), bringing the conservation to impact ratio to nearly a 3:1 ratio.

The analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure in the Habitat Reserve and SOS or Covered Activities at Ortega Rock Quarry or by SMWD. Impacts to suitable habitat for California glossy snake associated with these activities will reduce conservation in the Habitat Reserve by 365 ac (148 ha); however, an additional 2,173 ac (880 ha) of suitable habitat in Prior RMV lands will be included in the Habitat Reserve and adaptively managed. In total, adaptive management will occur for 1 glossy snake location on at least 12,410 ac (5,026 ha) or 74 percent of the suitable habitat conserved on RMV lands, a greater than 3:1 conservation to impact ratio for suitable habitat on RMV lands.

If RMV chooses to phase development by Alternative Order PA1, 3, 2, 4, 5, and 8 or Alternative Order PA1, 4, 3, 2, 5, and 8, new conservation of California glossy snake suitable habitat still exceeds the development impact by a ratio of greater than 1:1 in all phases of development through PA7 and increases again to a greater than 3:1 conservation to impact ratio with development and associated conservation of PA8.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the California glossy snake. We base this conclusion on the following:

1. The California glossy snake occurs from the Central Valley in California to northwestern Baja California, Mexico. Therefore, the action area for this Plan represents a small fraction of the subspecies' entire distribution.

2. No known occurrences of California glossy snake and approximately 4,421 ac (1,790 ha) or 13 percent of suitable habitat in the action area for the species will be developed or otherwise made unsuitable for glossy snake.

3. A total of 21,561 ac (8,732 ha) or 63 percent of the suitable habitat for California glossy snake in the action area, including four known locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 12,377 ac (5,013 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 9,184 ac (3,719 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 32 ac (13 ha) of suitable habitat for will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 2,472 ac (1,001 ha) of habitat is conserved at NAS Starr Ranch.

5. Combined, 24,065 ac (9,746 ha) or 70 percent of the suitable habitat for California glossy snake, including 4 known locations (100 percent), in the action area, will be conserved or remain in existing dedicated open space following implementation of the Plan.[24]

6. Connectivity between known glossy snake locations will be maintained with conservation of the San Juan Creek linkage.

7. We anticipate that permanent protection of California glossy snake known locations and associated suitable habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the species in the Southern Subregion and contribute to its range-wide conservation.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the Implementation Agreement is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion remains valid for the following reasons:

8. The project impacts to suitable glossy snake habitat in the action area will be reduced to approximately 4,290 ac (1,737 ha) or 13 percent, and there are still no impacts to glossy snake known locations.

[24] There is likely suitable habitat for California glossy snake in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

9. The County of Orange will not implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS and County Park lands, and these lands will not be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP. However, 9,184 ac (3,719 ha) of suitable habitat and 3 known occurrences will remain within existing County Park lands.

10. The conservation proposed by RMV will still be implemented such that 12,410 ac (5,026 ha) of suitable habitat for the California glossy snake and one known location will be conserved and adaptively managed within the Habitat Reserve. This represents conservation of 74 percent of the suitable glossy snake habitat on RMV lands.

11. An additional 2,472 ac (1,001 ha) in existing conserved lands at NAS Starr Ranch will remain in the action area. In total, within the action area, 4 of the known locations (100 percent) and 24,066 ac (9,747 ha) or 70 percent of the suitable habitat for California glossy snake in the action area will be conserved or remain in open space lands**.**

12. Connectivity will be maintained with conservation of the San Juan Creek linkage.

8. We anticipate that permanent protection of California glossy snake occurrences and associated suitable habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the species in the Southern Subregion and contribute to its range-wide conservation.

Coast Patch-nosed Snake

Status of the Species

Listing Status

The coast patch-nosed snake (*Salvadora hexalepis virgultea*) is designated as a California Species of Special Concern by the Department and has a CNDDB rank of G5T3S2S3 (secure in its global range, but considered restricted/rare to endangered in California). It is not listed under the Federal Endangered Species Act.

Species Description

Adult coast patch-nosed snakes range in size from about 22 to 34 in (61 to 86 cm). The coast patch-nosed snake is a slender snake with a "yellow or beige mid-dorsal stripe bordered by dark tan or brown side stripes" with a dull white venter and a large, thick, triangular rostral scale (Fisher and Case 2003). It has large dark eyes with round pupils, smooth scales, and a divided anal scale; juveniles appear similar to adults (Fisher and Case 2003).

Habitat Affinities

The coast patch-nosed snake appears to tolerate a wide variety of habitat conditions and is found in scrub, chaparral, grasslands, washes, and rocky areas (Zeiner *et al.* 1988; Holland and

Goodman 1998) and will use bushes, rock crevices, and mammal burrows for cover (Zeiner *et al*. 1988).

Life History

The coast patch-nosed snake tends to breed in late spring and early summer. Clutch size for ranges from 4 to 10 eggs that that are laid in the summer (Stebbins 1985). Snakes may be active all year in warmer weather, such as found in southern California, although they are most active in the summer (Zeiner *et al*. 1988).

The coast patch-nosed snake is an active diurnal snake. In the summer, it will rest in the shade during the hottest portion of the day. It eats mammals, lizards, and reptile eggs (Zeiner *et al*. 1988). There is little information regarding home range size or dispersal ability.

Distribution

The coast patch-nosed snake is a subspecies of the western patch-nosed snake (*Salvadora hexalepis*). The full species occurs in the southwestern United States in southern California, eastern Nevada, Arizona, southern New Mexico and far-eastern Texas. It also occurs throughout Baja California and in northern and western Mexico. The coast patch-nosed snake occurs in coastal southern California from about Santa Barbara south through the northern third of Baja California. The elevation limits for this species range from sea level to about 7,000 ft (2,134 m) (Stebbins 1985).

There are a limited number of observation records for the coast patch-nosed snake. The CNDDB contains 15 scattered observations in southern California, primarily in western Riverside, Orange, and San Diego counties (CNDDB 2006).

Rangewide Trends and Current Threats

With limited information concerning current and historical distribution, it is difficult to determine range-wide trends. Threats faced by the coast patch-nosed snake include habitat loss and fragmentation; invasion of habitat by non-native plants, such as annual grasses and giant reed; urban-related predators such as dogs and crows; road mortality (studies of snake mortality on roads have documented high mortality rates for a variety of species, *e.g.*, Bernardino and Dalrymple 1992; Rosen and Lowe 1994); and invasion by non-native ants, primarily through their effects on lizards, which are important prey items for snakes.

Several large-scale habitat conservation plans have been implemented in southern California in recent years. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 1998, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. In 2004, the Service issued a permit for the Western Riverside County MSHCP.

The coast patch-nosed snake is not a Covered Species in any of the above plans, but the species' distribution includes all four of these plan areas. These plans have authorized impacts to suitable habitat for the coast patch-nosed snake and also resulted in conservation and habitat management of suitable habitat for this species. It is also anticipated that coast patch-nosed snakes in southern California may benefit from the conservation and general habitat management practices, such as control of invasive plant species and non-native predators, in reserve lands created by these large-scale habitat conservation plans.

San Diego Gas & Electric's NCCP/HCP permit, issued in 1995, addresses coast patch-nosed snake as a Covered Species. However, amount of suitable habitat and snake locations impacted and conserved were not quantified in that Plan because effects on the species were considered insignificant (Appendix 2).

Conservation Needs

The conservation of the coast patch-nosed snake depends on conserving large blocks of habitat and conserving connections between the conservation areas. In addition, suitable habitat needs to be maintained and restored. Based on the available information, management activities should address the threats described above, including maintaining connectivity by providing bridges and culverts for dispersal, controlling non-native plants and ants, and limiting predation by urban predators, such as dogs and ravens. Because of the potential threat posed by road mortality, additional measures such as the installation of low-lying fine-mesh fence or barrier fencing in areas likely to be used by snakes may help minimize this source of mortality. In addition, because snakes are viewed as dangerous, they are often killed by humans, so an education program regarding snakes could reduce this source of mortality.

Environmental Baseline

Coast Patch-Nosed Snake Distribution and Numbers in the Action Area

For the purposes of this analysis, coast patch-nosed snake habitat is defined as coastal sage scrub, chaparral, grassland, and alkali meadow. Using this definition, there are a total of 44,109 ac (17,864 ha) of suitable coast patch-nosed snake habitat in the action area, of which 32,737 ac (13,258 ha) or 74 percent is in Subarea 1, where most impacts will occur. The NCCP database contains three observations of coast patch-nosed snake within the action area (Table A).

The three observations of coast patch-nosed snake in the action area, include one in upper Cristianitos Canyon just south of Ortega Highway, one in Caspers Park on the ridge between Canada Gobernadora and Bell Canyon, and one in Starr Ranch south of Fox Canyon and North of Crow Canyon (The Plan pg. 13-127). All three of the observations are in Subarea 1, but based on the species' habitat preferences, it could occur throughout the action area.

Table A for Coast Patch-nosed Snake: Coast patch-nosed snake habitat (coastal sage scrub, chaparral, grassland and alkali meadow) and locations in the action area.

Action Area Components	**Total Amount of Coast Patch-nosed Snake Habitat (acres)**	**Coast Patch-nosed Snake Locations in NCCP Dataset**
Subarea 1		
Proposed RMV[1]	16,569	1
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	2,953	0
Prima Deshecha Landfill	1,141	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	9,084	1
Supplemental Open Space (Audubon's Starr Ranch)	2,971	1
Other	19	0
Subtotal for Subarea 1	***32,737***	***3***
Subarea 2	2,823	0
Subarea 3	1,099	0
Subarea 4[2]	7,450	0
TOTAL	**44,109**	**3**

[1] Includes project footprint for RMV infrastructure in Subarea 4 (26 ac and 0 locations).
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (26 ac and 0 locations).

Effects of the Action

Direct Effects

The action area includes 44,109 ac (17,864 ha) of suitable habitat (coastal sage scrub, chaparral, grassland, and alkali meadow) for the coast patch-nosed snake and three known locations (Table A). Over the 75-year term of the permits, a total of 5,324 ac (2,156 ha) (12 percent) of coast patch-nosed snake habitat will be permanently impacted. The impact area includes 1 of the 3 coast patch-nosed snake locations documented in the action area (Table B).

The proposed RMV, including Ortega Rock, and SMWD Covered Activities will permanently impact 4,299 ac (1,741 ha) or 22 percent of coast patch-nosed snake suitable habitat and one known location on RMV lands (Table B). The County Covered Activities at Prima Deshecha Landfill will permanently impact 649 ac (263 ha) or 57 percent of the snake suitable habitat at the Landfill, but no known occurrences. Avenida La Pata Road extension on RMV lands will permanently impact 196 ac (79 ha), but no known locations. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program" could allow the impact of up to 74 ac (30 ha) of suitable coast patch-nosed snake habitat in parcels 1-17.

Table B for Coast Patch-Nosed Snake: The amount of habitat (coastal sage scrub, chaparral, grassland, and alkali meadow) and the number of coast patch-nosed snake locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed in the action area.

Covered Activities and Conservation Areas	**Habitat impacts (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS[1] (acres)**	**Habitat with Status Unchanged**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations in Prima SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	4,299	12,270			1	0		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		2,953				0		
Subtotal of impacts and conservation by RMV and SMWD	**4,299**	**15,223**			**1**	**0**		
Prima Deshecha Landfill	649		492		0		0	
Avenida La Pata on RMV Land	196	-196			0			
Avenida La Pata in Subarea 4	106							
Subtotal of impacts and conservation by the County of Orange	**951**		**492**		**0**			
Subtotal of impacts and assured conservation with adaptive management	**5,250**	**15,027**	**492**		**1**	**0**		
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 74				0			
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		9,084				1		
No Covered Activities								1
TOTAL	**5,324**	**24,111**	**492**	**14,182[4]**	**1**	**1**	**0**	**1[4]**

[1]SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2]For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3]County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4]Includes 2,971 ac and 1 location in Audubon Starr Ranch SOS.

We anticipate that all of the suitable habitat in the areas permanently impacted by Covered Activities will be developed or otherwise made unsuitable for coast patch-nosed snake. Although some individuals may escape to adjacent undisturbed habitats, any coast patch-nosed snakes within the impact area will likely be crushed or buried and killed by construction equipment and ground disturbing activities.

In addition to permanent impacts to habitat and the associated loss of individuals from development and other Covered Activities, there will be temporary impacts to 205 ac (83 ha) (less than 1 percent) of coast patch-nosed snake suitable habitat but no known locations. Habitat temporarily affected will be restored to either pre-existing conditions or a higher performance standard. It is anticipated that after restoration, these areas will again be available for re-colonization by the species. However, within the temporary impact area, it is likely that individual coast patch-nosed snakes could be crushed or buried and killed by construction equipment and ground disturbing activities.

Other Covered Activities that may impact coast patch-nosed snake but will not result in a permanent or determined loss of potential habitat include cattle grazing, prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities such as pitfall trapping and removal of invasive species. Cattle grazing may result in disturbance of breeding areas and occasional trampling of snakes, and if over-grazing occurs, may degrade upland habitat by removing vegetative cover and increasing erosion rates. Prescribed burns could result in the death of snakes in the burn area. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may occasionally kill or injure snakes in the project area. Habitat management and species' monitoring activities may occasionally kill or injure snakes that are within active restoration areas or that are trapped and handled during monitoring efforts. Overall, it is anticipated that Covered Activities could result in a low level of death or injury to coast patch-nosed snakes. It is anticipated that any impacts to coast patch-nosed snakes from management activities will be minimized by adherence to appropriate guidelines described in Appendix U of the Plan.

Indirect Effects

The coast patch-nosed snake could be subject to indirect effects from Covered Activities within the Action Area. These include the indirect effects described in the "General Effects" section of this biological opinion. Construction of new roads is one of the Covered Activities within the Habitat Reserve. Because of their susceptibility to road mortality and fragmentation due to roads, the coast patch-nosed snake is likely to be vulnerable to indirect effects (*e.g.*, increased vehicle strikes) associated with roads. Increased artificial lighting from new development sites proposed under the Plan could cause indirect effects to snakes living in the adjacent habitat. The use of pesticides, specifically rodenticides, could also affect coast patch-nosed snake by reducing rodent prey and their burrows, which the snake may use for foraging or egg-laying. New residential developments within the action area could indirectly affect the snake by increasing the presence of household pets. Predation by dogs or cats on coast patch-nosed snakes could occur in habitat near development sites. The construction of new residential developments

within the action area likely will increase presence of Argentine ants, which may impact the native lizard population that are prey for the coast patch-nosed snake.

Conservation Measures

Conservation and Restoration. The Habitat Reserve will contain 1 of 3 known coast patch-nosed snake locations (33 percent) in the action area. The location in the Habitat Reserve is on RMV lands. The Habitat Reserve will also include 24,111 ac (9,764 ha) (55 percent) of the suitable habitat in the action area, including 15,027 ac (6,085 ha) on RMV lands and 9,084 ac (3,679 ha) within existing County Parks. To help offset impact at Prima Deshecha Landfill, 492 ac (199 ha) of suitable habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the coast patch-nosed snake.

Reserve Design: Development of the Planning Areas will build the Habitat Reserve by conserving habitat blocks and habitat linkages. Seven large habitat blocks will be conserved within the Habitat Reserve, which include the conserved location of the coast patch-nosed snake in the Northeastern Habitat Block. These habitat blocks range in size from 732 to 11,985 ac (296 to 4,854 ha) and contain 24,111 ac (9,764 ha) of the conserved habitat for the coast patch-nosed snake. Linkages likely to be important for the coast patch-nosed snake will also be conserved as part of the Habitat Reserve. Except where crossed by roads, all these linkages are broad, with the narrowest one, linkage B, being 1,500 ft (457 m) wide. These habitat linkages should provide adequate interior habitat to support the home range of individual snakes without the repelling effects of a habitat edge (Tracey *et al.* 2005). One of the managing and monitoring objectives listed in the Plan is to implement management and monitoring of identified key habitat linkages to maximize the likelihood of continued function as "live in" and dispersal habitat for coast patch-nosed snake. Measures such as bridges and culverts will be constructed where roads traverse linkages to allow wildlife movement and reduce the likelihood of vehicle collisions.

Management: Management will be implemented primarily at a landscape level and include fire management and invasive species controls, including artichoke thistle in uplands and giant reed along washes that may be used for movement. Rodent controls will be prohibited within the Habitat Reserve, and the use of pesticides in areas adjacent to the Habitat Reserve (*e.g.*, golf course) will be minimized to the extent feasible and will be used in accordance with an approved Integrated Pest Management Program designed to avoid and minimize effects on native species and habitats. Predation by urban predators such as dogs and cats will be minimized by public education and trapping where necessary. Collecting of the coast patch-nosed snake by the public will be prohibited within the Habitat Reserve. Signage along trails and bike paths in the Habitat Reserve will be used to inform the public of the risk to native species such as snakes and amphibians from recreational activities. Argentine ant controls will be implemented to reduce impacts on native lizards that are prey for the coast patch-nosed snake. Habitat restoration activities implemented at the discretion of the Reserve Manager and Science Panel to benefit this species include sage scrub and grassland restoration on Chiquita Ridge, in Sulphur Canyon, and on Chiquadora Ridge.

Monitoring: Monitoring for the coast patch-nosed snake will be at the landscape levels, although anecdotal observations at the species level will be recorded. The detailed monitoring program for the coast patch-nosed snake will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies.

Analysis of Impacts and Conservation by Planning Area

RMV has proposed to carry-out development in eight Planning Areas and is anticipating development of these Planning Areas in sequential order: PA1 through PA8. Although it is not expected or anticipated, the Implementation Agreement states that RMV can terminate the 75-year permit at any time during their proposed phased development. Therefore, the conservation on a cumulative basis as each Planning Area is developed should be sufficient to avoid/minimize impacts. A summary of coast patch-nosed snake locations that will be impacted and conserved is presented in Table C below. In addition to the conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Table C: Coast Patch-nosed Snake Habitat (coastal sage scrub, chaparral, grassland, and alkali meadow) and Locations Permanently Impacted and Conserved/Managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Patch-nosed Snake Locations and Habitat Impacted (Cumulative Impacts)**		**Patch-nosed Snake Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	0 (0)	232 (232)	0 (0)	847 (847)
PA2	0 (0)	324 (556)	0 (0)	1,542 (2,389)
PA3	0 (0)	1,242 (1,798)	0 (0)	1,907 (4,296)
PA4	0 (0)	903 (2,701)	0 (0)	390 (4,686)
PA5	0 (0)	737 (3,438)	0 (0)	438 (5,124)
PA6 & PA7	1 (1)	50 (3,488)	0 (0)	370 (5,494)
PA8	0 (1)	500 (3,988)	0 (0)	6,998 (12,492)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	0 (1)	211[1] (4,199)		-185[1] (12,307)
Ortega Rock	0 (1)	63 (4,262)		
Santa Margarita Water District Impacts	0 (1)	37 (4,299)		-37 (12,270)
Subtotal for Proposed RMV and Associated Projects	0 (1)	4,299	0	12,270
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			0 (0)	2,953 (15,223)
TOTAL	**1**	**4,299**	**0**	**15,223**

[1] 185 ac of infrastructure impact are in the Habitat Reserve, and 26 ac are in SOS.
[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA1 will impact 232 ac (94 ha) of suitable habitat for coast patch-nosed snake and no known locations and result in the conservation and management of 847 ac (343 ha) and no locations.

Build-out of PA2 will impact 324 ac (131 ha) of suitable habitat for coast patch-nosed snake and result in the conservation and management of 1,542 ac (624 ha); no known locations are impacted or conserved. The PA2 conservation will enhance the connectivity of Chiquita Canyon with habitat in Ladera Open Space and San Juan Creek. Combined, build-out of PA1 and PA2 will impact 556 ac (225 ha) and result in the conservation and management of 2,389 ac (967 ha) of suitable coast patch-nosed snake habitat in these Planning Areas, a conservation to impact ratio greater than 2:1.

Build-out of PA3 will impact 1,242 ac (503 ha) of potential habitat for coast patch-nosed snake and will result in the conservation and management of 1,907 ac (772 ha); no known locations are impacted or conserved. The PA3 conservation area includes dispersal habitat along most of San Juan Creek into Caspers Wilderness Park to the northeast, through upland habitat along Gobernadora Creek, and across the corridor between PA3 and Coto de Caza. Combined, build-out of PA1, PA2, and PA3 will impact 1,798 ac (728 ha) and result in conservation and management of 4,296 ac (1,740 ha) of suitable coast patch-nosed snake habitat in these Planning Areas, maintaining a conservation to impact ratio of greater than 2:1.

Build-out of PA4 will impact 903 ac (366 ha) of suitable habitat for coast patch-nosed snake and will result in the conservation and management of 390 ac (158 ha) (30 percent); no known locations are impacted or conserved. Connectivity to PA3 open space will be secured. Combined, build-out of PA1 through PA4 will impact 2,701 ac (1,094 ha) and result in the conservation and management of 4,686 ac (1,898 ha) of suitable coast patch-nosed snake habitat in these Planning Areas and maintains the conservation to impact ratio to just under 2:1.

Build-out of PA5 will impact 737 ac (298 ha) of potential habitat for coast patch-nosed snake and will result in the conservation and management of 438 ac (177 ha) (37 percent); no known locations are impacted or conserved. Combined, build-out of PA1 through PA5 will impact 3,438 ac (1,392 ha) and result in the conservation and management of 5,124 ac (2,075 ha) of suitable habitat for coast patch-nosed snake in these Planning Areas, which reduces the conservation to impact ratio to greater than 1:1, although the conservation still exceeds the impact significantly by 1,686 ac (683 ha).

The expansion of agricultural activities in PA6 and 7 could occur at any time and will impact up to 50 ac (20 ha) of suitable habitat for coast patch-nosed snake and one occurrence and will result in the conservation and management of 370 ac (150 ha) (88 percent) but no locations. The expansion of agricultural activities in PA6 and PA7 is not anticipated to interfere with the dispersal of snakes within the San Mateo Creek watershed. Combined, build-out of PA1 through PA7 will impact 3,488 ac (1,4132 ha) and result in the conservation and management of 5,494 ac (2,225 ha) of suitable patch-nosed snake habitat in these Planning Areas, maintaining the greater than 1:1 conservation to impact ratio with the conservation again exceeding the impact significantly by 2,006 ac (812 ha).

Build-out of PA8 will impact no locations and up to 500 ac (202 ha) of suitable habitat for coast patch-nosed snake. An estimated 6,998 ac (2,834 ha) but no occurrences will be conserved and managed in association with PA8. In addition, the PA8 conservation area includes a large

portion of the San Mateo Creek watershed on RMV property, which will provide connectivity between the San Mateo Creek and San Juan Creek watersheds. Combined, build-out of PA1 through PA8 will impact 3,988 ac (1,615 ha) and result in the conservation and management of an estimated 12,492 ac (5,059 ha) of coast patch-nosed snake suitable habitat and the loss of the one coast patch-nosed snake location on RMV lands, a greater than 3:1 conservation to impact ratio.

The analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure in the Habitat Reserve and SOS or Covered Activities at Ortega Rock Quarry or by SMWD. Impacts to suitable habitat for coast patch-nosed snake associated with these activities will reduce conservation in the Habitat Reserve by 222 ac (90 ha); however, an additional 2,953 ac (1,196 ha) of suitable habitat in Prior RMV lands will be included in the Habitat Reserve and adaptively managed. In total, adaptive management will occur on 15,223 ac (6,165 ha) or 78 percent of the suitable coast patch-nosed snake habitat conserved, a greater than 3:1 conservation to impact ratio for suitable habitat on RMV lands.

If RMV chooses to phase development by Alternative Order PA1, 3, 2, 4, 5, and 8 or Alternative Order PA1, 4, 3, 2, 5, and 8, new conservation of suitable habitat exceeds the development impact by a ratio greater than 1:1 in all phases of development.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the coast patch-nosed snake. We base this conclusion on the following:

1. The coast patch-nosed snake occurs in coastal southern California from about Santa Barbara south through the northern third of Baja California, Mexico. Therefore, the area of impact within the action area represents a small portion of the species' entire distribution.

2. An estimated 5,324 ac (2,156 ha) (12 percent) of suitable habitat for the species in the action area will be developed or otherwise made unsuitable for the coast patch-nosed snake; the single occurrence impacted is one of three in the action area. The habitat impacts represent a small proportion of habitat across the range of the species.

3. A total of 24,111 ac (9,764 ha) (55 percent) of the suitable habitat for the species in the action area, including 1 known location, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 15,027 ac (6,086 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 9,084 ac (3,679 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 492 ac (199 ha) of suitable habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 2,971 ac (1,203 ha) and one known location is conserved at NAS Starr Ranch.

5. Combined, 27,574 ac (11,167 ha) or 63 percent of the suitable habitat for coast patch-nosed snake, including 2 of 3 known locations, in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[25]

6. Implementation of the Plan will conserve, monitor, and manage large habitat blocks and associated linkages within the Habitat Reserve for the benefit of this species.

7. We anticipate that the permanent protection of at least one coast patch-nosed snake location and associated suitable habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the species in the Southern Subregion and contribute to its range-wide conservation.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the Implementation Agreement is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for coast patch-nosed snake remains valid for the following reasons:

1. The project impacts to suitable coast patch-nosed snake habitat will be reduced to approximately 4,299 ac (1,741 ha) or 10 percent in the action area. The impacts to coast patch-nosed snake locations remain unchanged at one.

2. The County of Orange will not implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS and County Park lands, and these lands will not be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP. However, 9,084 ac (3,679 ha) of suitable habitat and 1 known location will remain within existing County Park lands.

3. The conservation proposed by RMV will still be implemented such that 15,223 ac (6,165 ha) of suitable habitat for the coast patch-nosed snake will be conserved and adaptively managed within the Habitat Reserve. This represents conservation of 78 percent of the suitable coast patch nose snake habitat on RMV lands.

4. An additional 2,971 ac (1,203 ha) of suitable coast patch-nosed snake habitat in existing conserved lands at NAS Starr Ranch, including one known location of coast patch-nosed snake, will remain in the action area. In total, within the action area, 2 of the 3 known locations of coast patch-nosed snake and 27,278 ac (11,046 ha) or 62 percent of the

[25] There is likely suitable habitat for coast patch-nosed snake in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

suitable habitat for coast patch-nosed snake in the action area will be conserved or remain in open space lands.

5. Implementation of the Plan will conserve, monitor, and manage large habitat blocks and associated linkages within the Habitat Reserve for the benefit of this species.

6. We anticipate that the permanent protection of suitable habitat for the coast patch-nosed snake combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the species in the Southern Subregion and contribute to its range-wide conservation.

Northern Red-diamond Rattlesnake

Status of the Species

Listing Status

The northern red-diamond rattlesnake (*Crotalus ruber ruber*) is designated as California Species of Special Concern by CDFG and has a CNDDB rank of G4T3T2S2? (restricted but apparently secure in its global range, but possibly endangered in California). It is not listed under the Federal Endangered Species Act.

Species Description

Adult northern red-diamond rattlesnakes range in size from about 29-63 in (74-160 cm). The northern red-diamond rattlesnake is a large snake with tan, pink, or reddish dorsal color and light-edged diamonds; the tail has conspicuous black and white rings, and the eyes have a broad vertical eye stripe (Fisher and Case 2003). As with other rattlesnakes, this species is venomous, with a large triangular-shaped head and keeled scales. Juveniles have a pattern consisting of dark and light grey hues, which become reddish with age (Fisher and Case 2003).

Habitat Affinities

The northern red-diamond rattlesnake is found in a wide variety of habitats, but it is most common in dense chaparral in the foothills, cactus or boulder associated coastal sage scrub, and desert slope scrub associations with heavy brush and large rocks or boulders (Klauber 1971; Stebbins 1985). Hibernation sites include mammal burrows and rock crevices.

Life History

Northern red-diamond rattlesnakes generally breed in spring and give birth in late summer or early fall (Stebbins 1985). Clutch size for northern red-diamond rattlesnakes ranges from three to twenty young (Stebbins 1985), which emerge immediately from thin-skinned egg sacks upon birth. During the winter, rattlesnakes will generally hibernate in dens formed by mammal burrows or rock crevices (Klauber 1971).

A study of northern red-diamond rattlesnakes in San Diego County documented activity range sizes averaging 3 ac (1 ha) for resident females and 8 ac (3 ha) for resident males; average annual movement distance was 0.48 mi (0.8 km) per year for resident females and 0.86 mi (1 km) per year for resident males (Brown *et al.* 2005). Snakes in the study tended to use the same activity ranges and the same or nearby over-wintering sites year after year. These activity ranges and movement distances are less than those exhibited by other rattlesnakes, particularly for large-bodied snakes such as the northern red-diamond rattlesnake (Brown *et al.* 2005).

Rattlesnakes generally ambush their prey as they wait beside potential game trails and strike at creatures that pass by, killing or incapacitating victims with their venom. Principal food sources for adult northern red-diamond rattlesnakes include small mammals such as mice, rats, gophers, ground squirrels, and rabbits, but they are opportunistic feeders and will also eat frogs, toads, lizards, birds, and other snakes (Klauber 1971; Stebbins 1985). Rattlesnakes are most active in the evening and at night, but they are also diurnal, particularly in the spring and fall, when daytime temperatures are cooler.

Distribution

The northern red-diamond rattlesnake is a subspecies of the red-diamond rattlesnake (*Crotalus ruber*). The full species occurs in southwestern California from southern Los Angeles and San Bernardino counties southward to the southern end of Baja California, Mexico. The northern red-diamond rattlesnake occupies most of this range, occurring in southern California south to about Loreto in Baja California Sur, Mexico. The cape red rattlesnake (*Crotalus ruber lucansensis*) extends from Loreto south to the Cape. The elevation limits for the northern red-diamond rattlesnake range from sea level to about 5,000 ft (1,524 m) (Stebbins 1985).

Rangewide Trends and Current Threats

Threats faced by the northern red-diamond rattlesnake include habitat loss and fragmentation, invasion of habitat by non-native plants, such as annual grasses, urban-related predators such as dogs and crows, road mortality (studies of snake mortality on roads have documented high mortality rates for a variety of species, *e.g.*, Bernardino and Dalrymple 1992; Rosen and Lowe 1994), and invasion by non-native ants, primarily through their effects on lizards, which are important prey items for young rattlesnakes. Fisher and Case (2003) note it as a species in decline.

Several large-scale habitat conservation plans have been implemented in southern California in recent years. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 2004, the Service issued a permit for the Western Riverside County MSHCP. These plans have authorized development in areas supporting suitable habitat for northern red-diamond rattlesnake and also created large reserve systems that include substantial suitable habitat for this snake. While the northern red-diamond rattlesnake is a Covered Species only for the western Riverside County plan (Appendix 2), it is anticipated this species will benefit from the overall conservation and management practices associated with these large-scale habitat conservation plans.

Conservation Needs

The conservation of the northern red-diamond rattlesnake depends on conserving large blocks of habitat and conserving connections between the conservation areas. In addition, suitable habitat needs to be maintained and restored. Based on the available information, management activities should address the threats described above, including maintaining connectivity by providing bridges and culverts for dispersal, controlling non-native plants and ants, and limiting predation by urban predators, such as dogs and ravens. Because of the potential threat posed by road mortality, additional measures such as the installation of low-lying fine-mesh fence or barrier fencing in areas likely to be used by snakes may help minimize this source of mortality. In addition, because rattlesnakes are viewed as dangerous, they are often killed by humans, so an education program regarding rattlesnakes could reduce this source of mortality.

Environmental Baseline

For the purposes of this analysis, northern red-diamond rattlesnake habitat is defined as coastal sage scrub, chaparral, grassland, and alkali meadow. Using this definition, there are a total of 44,109 ac (17,864 ha) of suitable northern red-diamond rattlesnake habitat in the action area (Table A). Of this total, 32,737 ac (13,258 ha) of suitable habitat is in Subarea 1 (Table A). The NCCP database (pg. 13-131 of the Plan) contains 18 observations of northern red-diamond rattlesnake scattered throughout the action area; an additional location not noted in the NCCP database is from 2001 in Arroyo Trabuco (CNDDB 2006). Sixteen of these observations are in Subarea 1 (Table A).

Table A for Northern Red-Diamond Rattlesnake: Northern red-diamond rattlesnake habitat (coastal sage scrub, chaparral, grassland, and alkali meadow) and locations in the action area.

Action Area Components	**Total Amount of Red-diamond Rattlesnake Habitat (acres)**	**Red-diamond Rattlesnake Locations in NCCP Dataset**
Subarea 1		
Proposed RMV[1]	16,569	11
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	2,953	4
Prima Deshecha Landfill	1,141	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	9,084	0
Supplemental Open Space (Audubon's Starr Ranch)	2,971	1
Other	19	0
Subtotal for Subarea 1	***32,737***	***16***
Subarea 2	2,823	1
Subarea 3	1,099	0
Subarea 4[2]	7,450	2
TOTAL	**44,109**	**19**

[1] Includes project footprint for RMV infrastructure in Subarea 4 (26 ac and 0 locations).
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (26 ac and 0 locations).

Effects of the Action

Direct Effects

The action area includes 44,109 ac (17,864 ha) of suitable habitat for the northern red-diamond rattlesnake and 19 known locations (Table A). Over the 75-year term of the permits, a total of 5,324 ac (2,156 ha) (12 percent) of northern red-diamond rattlesnake habitat will be permanently impacted, including 6 of the 19 (32 percent) known locations (Table B).

The proposed RMV, including Ortega Rock, and SMWD will permanently impact 4,299 ac (1,741 ha) or 22 percent of northern red-diamond rattlesnake suitable habitat and 6 known occurrences (40 percent) on RMV lands (Table B). The County Covered Activities at Prima Deshecha Landfill will permanently impact 649 ac (263 ha) or 57 percent of the suitable habitat for the snake at the Landfill, but no known occurrences. Avenida La Pata road extension on RMV lands will permanently impact 196 ac (79 ha), but no known locations. In Subarea 3, the Coto de Caza voluntary Opt-in Program could allow the impact of up to 74 ac (30 ha) of suitable snake habitat in parcels 1-17. All impacts to rattlesnake locations will occur in Subarea 1 resulting from RMV/SMWD Covered Activities.

In addition to permanent impacts to habitat and the associated loss of individuals from development and other Covered Activities, there will be temporary impacts to 211 ac (85 ha) (less than 1 percent) of rattlesnake suitable habitat and 2 known locations. In total, 8 of the 19 known locations (42 percent) will be either permanently or temporarily impacted by Covered Activities. Habitat temporarily affected will be restored to either pre-existing conditions or a higher performance standard. It is anticipated that after restoration, these areas will again be available for re-colonization by the species. However, within the temporary impact area, it is likely that individual rattlesnakes will be crushed or buried and killed by construction equipment and ground disturbing activities.

Other Covered Activities that may impact northern red-diamond rattlesnakes but not result in a permanent or determined loss of suitable habitat include cattle grazing, prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities such as pitfall trapping and removal of invasive species. Cattle grazing may result in disturbance of breeding areas and occasional trampling of rattlesnakes, and if over-grazing occurs, may degrade upland habitat by removing vegetative cover and increasing erosion rates. Prescribed burns could result in the death of snakes in the burn area. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may occasionally kill or injure rattlesnakes in the project area.

Habitat management and species' monitoring activities may also occasionally kill or injure northern red-diamond rattlesnakes that are within active restoration areas or that are trapped and handled during monitoring efforts. It is anticipated that any impacts to the species from management activities will be minimized by adherence to appropriate guidelines described in Appendix U of the Plan.

Table B for Northern Red-diamond Rattlesnake: The amount of habitat (coastal sage scrub, chaparral, grassland, and alkali meadow) and the number of northern red-diamond rattlesnake locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the rattlesnake in the action area.

Covered Activities and Conservation Areas	**Habitat impacts (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS[1] (acres)**	**Habitat with Status Unchanged (acres)**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations in Prima SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	4,299	12,270			6	5		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		2,953				4		
Subtotal of impacts and conservation by RMV and SMWD	**4,299**	**15,223**			**6**	**9**		
Prima Deshecha Landfill	649		492		0		0	
Avenida La Pata on RMV Land	196	-196			0			
Avenida La Pata in Subarea 4	106				0			
Subtotal of impacts and conservation by the County of Orange	**951**		**492**		**0**			
Subtotal of impacts and assured conservation with adaptive management	**5,250**	**15,027**	**492**		**6**	**9**		
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 74				0			
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		9,084				0		
No Covered Activities				14,182				4
TOTAL	**5,324**	**24,111**	**492**	**14,182[4]**	**6**	**9**	**0**	**4[4]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 2,971 ac and 1 location in Audubon Starr Ranch SOS.

Indirect Effects

The northern red-diamond rattlesnake will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion including threats from non-native species such as exotic ants, domestic dogs and cats, and invasive plant species, which people can transport and introduce to new locations. Also, because of their susceptibility to mortality and fragmentation due to roads, the rattlesnake is likely to be vulnerable to indirect effects (*e.g.*, increased vehicle strikes) associated with roads. Increased artificial lighting from new development proposed under the Plan could cause indirect effects to snakes living in adjacent habitats. Artificial lighting could disrupt the snake's nocturnal patterns, increase detection by predators of the snake and/or increase detection by snake prey thereby reducing foraging success. The use of pesticides, specifically rodenticides, could also affect northern red-diamond rattlesnake by reducing rodent prey and their burrows that the snake may use for foraging or egg laying.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access and non-native species and to minimize the effects of construction activities, the following conservation measures specific to the northern red-diamond rattlesnake will be implemented.

Conservation and Restoration. The Habitat Reserve will contain 9 of 19 (47 percent) known rattlesnake locations in the action area, all on RMV lands. The Habitat Reserve will also include 24,111 ac (9,764 ha) (55 percent) of the suitable habitat in the action area, including 15,027 ac (6,085 ha) on RMV lands and 9,084 ac (3,679 ha) within existing County Parks. To help offset impact at Prima Deshecha Landfill, 492 ac (199 ha) of suitable habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the northern red-diamond rattlesnake.

Reserve Design: Development of the PAs within the Habitat Reserve will create habitat blocks separated by the development areas but linked by conserved habitat linkages. Seven large habitat blocks will be conserved within the Habitat Reserve and 8 of the 10 conserved locations of northern red-diamond rattlesnake are in these blocks. These habitat blocks range in size from 732-11,985 ac (296-4,854 ha) and contain a total of 24,111 ac (9,764 ha) of habitat for the northern red-diamond rattlesnake. Linkages likely to be important for the red-diamond rattlesnake will also be conserved as part of the Habitat Reserve. Except where crossed by roads, all of the linkages are broad, with the narrowest one, Linkage B, being 1,500 ft (457 m) wide. The habitat linkages should provide adequate interior habitat to support the home range of individual rattlesnakes. Features such as bridges and culverts will be constructed where roads traverse linkages to allow wildlife movement and reduce the likelihood of vehicle collisions.

Grazing Management Plan: The Grazing Management Plan (see Appendix G of the Plan and Project Description in this document) includes the management of grazing activities and restoration of upland habitat with native grasses and coastal sage scrub to help ensure that the

habitat remains suitable for a wide variety of species, including the northern red-diamond rattlesnake.

Fire Management Plan: The project description summarizes the key elements of the Fire Management Plan including the use of controlled burns to decrease fuel loads and hence the likelihood of catastrophic wildfires. The Fire Management Plan does not include specific measures for minimizing the effects of controlled burns on the rattlesnake, but it does include a variety of measures to ensure that controlled burns are contained within the identified area. Controlled burns are proposed to be used in coordination with seeding and chemical and mechanical weed control to restore native coastal sage scrub, which will likely enhance the quality of habitat for the rattlesnake.

Management: Implementation of the Plan will result in habitat fragmentation and urbanization that will likely increase vehicle strikes and human harassment of the northern red-diamond rattlesnake. The HRMP states that road kill data will be collected to determine if specific areas within the Habitat Reserve have unusually high mortality rates. Areas with higher than normal mortality rates will be evaluated for ways to prevent or reduce mortality (*e.g.*, installation of permanent drift fences). Predation by urban predators such as dogs and cats will be minimized by public education and trapping where necessary. Harassment by humans will be minimized by signage and public education about rattlesnakes. Vegetation communities will be mapped within the Habitat Reserve within 2 years of executing IA to establish a baseline for long-term tracking of the Reserve and will be updated every 5 years. Implementation of the Habitat Restoration Plan will benefit the northern red-diamond rattlesnake by restoring coastal sage scrub, which is considered suitable habitat for the snake.

Monitoring: Monitoring will be conducted both at a species-specific level and also at a habitat landscape level. The detailed monitoring program for the northern red-diamond rattlesnake as a Covered Species will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies.

Analysis of Impacts and Conservation by Planning Area

RMV has proposed to carry out development in eight Planning Areas and is anticipating development of these Planning Areas in sequential order: PA1 through PA8. Although it is not expected or anticipated, the Implementation Agreement states that RMV can terminate the 75-year permit at any time during their proposed phased development. Therefore, the conservation on a cumulative basis as each Planning Area is developed should be sufficient to avoid/minimize impacts. A summary of northern red-diamond rattlesnake occurrences and habitat by Planning Area that will be impacted and conserved is presented in Table C.

Build-out of PA1 will impact 232 ac (94 ha) of suitable habitat for the northern red-diamond rattlesnake and result in conservation and management of 847 ac (343 ha); 1 known occurrence will be impacted and none will be conserved.

Build-out of PA2 will impact 324 ac (131 ha) of suitable habitat and 1 known location and result in conservation and management of 1,542 ac (624 ha) and 3 locations. Combined the build-out

of PA1 and 2 will impact 556 ac (225 ha) of suitable northern red-diamond rattlesnake habitat and result in the conservation and management of 2,389 ac (967 ha), a greater than 4:1 habitat conservation to impact ratio.

Table C for Northern Red-diamond Rattlesnake habitat (coastal sage scrub, chaparral, grassland, and alkali meadow) and locations permanently impacted and conserved/ managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Red-diamond Rattlesnake Locations and Habitat Impacted (Cumulative Impacts)**		**Red-diamond Rattlesnake Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	1 (1)	232 (232)	0 (0)	847 (847)
PA2	1 (2)	324 (556)	3 (3)	1,542 (2,389)
PA3	0 (2)	1,242 (1,798)	0 (3)	1,907 (4,296)
PA4	0 (2)	903 (2,701)	0 (3)	390 (4,686)
PA5	1 (3)	737 (3,438)	0 (3)	438 (5,124)
PA6 & PA7	1 (4)	50 (3,488)	0 (3)	370 (5,494)
PA8	1 (5)	500 (3,988)	4 (7)	6,998 (12,492)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	1 (6)	211[1] (4,199)	-1 (6)	-185[1] (12,307)
Ortega Rock	0 (6)	63 (4,262)		
Santa Margarita Water District Impacts	0 (6)	37 (4,299)		-37 (12,270)
Subtotal for Proposed RMV and Associated Projects	6	4,299	5	12,270
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			4 (9)	2,953 (15,223)
TOTAL	**6**	**4,299**	**9**	**15,223**

[1]185 ac of infrastructure impact are in the Habitat Reserve, and 26 ac are in SOS.
[2]The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA3 will impact 1,242 ac (503 ha) of suitable habitat and result in conservation and management of 1,907 ac (772 ha); no known occurrences will be impacted or conserved. The PA3 conservation area includes dispersal habitat along most of San Juan Creek (the portion not conserved in association with PA2) into Caspers Wilderness Park to the northeast, through upland habitat along Gobernadora Creek, and across the corridor between PA 3 and Coto de Caza. Combined, build-out of PA 1, 2, and 3 will impact 1,798 ac (728 ha) of suitable northern red-diamond rattlesnake habitat and result in conservation and management of 4,296 ac (1,748 ha), a greater than 2:1 habitat conservation to impact ratio.

Build-out of PA4 and 5 will impact 903 and 737 ac (366 and 298 ha), respectively, of suitable habitat and result in conservation and management of 390 and 438 ac (158 and 177 ha), respectively; 1 known location in PA5 will be impacted and no additional locations will be

conserved. Connectivity to PA3 open space will be secured. Combined, build-out of PA1 through PA5 will impact 3,438 ac (1,392 ha) and result in conservation and management of 5,124 ac (2,075 ha) of suitable habitat and 3 locations in these PAs. This is approximately a 1:1.5 habitat conservation to impact ratio.

The expansion of agricultural activities and the RMV headquarters in PA6 and 7 will impact 50 ac (20 ha) of suitable habitat and one known location of northern red-diamond rattlesnake. No additional habitat will be conserved or managed. Combined, build-out of PA1 through PA7 will impact 3,488 ac (1,413 ha) of suitable rattlesnake habitat and result in conservation and management of 5,494 ac (2,225 ha), with conservation still exceeding impacts by greater than 1:1.5 ratio.

Build-out of PA8 will impact 500 ac (202 ha) of suitable habitat and one known location of the rattlesnake and result in conservation and management of 6,998 ac (2,834 ha) and 4 additional known locations. The PA8 conservation area includes a large portion of the San Mateo Creek watershed on RMV lands, which will provide connectivity for northern red-diamond rattlesnakes in the San Mateo Creek and San Juan Creek watersheds. Combined, build-out of PA1 through PA8 will impact 3,988 ac (1,615 ha) of suitable habitat and result in conservation and management of 12,492 ac (5,059 ha) and 6 known locations of the species. This represents a greater than 3:1 habitat conservation to impact ratio.

The analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure in the Habitat Reserve and SOS or Covered Activities at Ortega Rock Facility or by SMWD. Impacts to suitable habitat for northern red-diamond rattlesnake associated with these activities will reduce conservation in the Habitat Reserve by 311 ac (126 ha); however, an additional 2,953 ac (1,196 ha) of suitable habitat in Prior RMV lands will be included in the Habitat Reserve and adaptively managed. In total, adaptive management will occur for 9 northern red-diamond rattlesnake locations on 15,223 ac (6,165 ha), a nearly 4:1 conservation to impact ratio of suitable habitat on RMV lands.

If RMV chooses to phase development by Alternative Order PA1, 3, 2, 4, 5, and 8 or Alternative Order PA1, 4, 3, 2, 5, and 8, new conservation of red-diamond rattlesnake habitat still exceeds the development impact by a ratio of greater than 1:1 in all phases of development and the Plan also ensures the adaptive management of this suitable habitat.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the northern red-diamond rattlesnake. We base this conclusion on the following:

1. Northern red-diamond rattlesnakes occur in southern California south to about Loreto in Baja California Sur, Mexico. Therefore, the action area for this Plan represents a small fraction of the subspecies' entire distribution.

2. An estimated 6 known occurrences of red-diamond rattlesnakes and approximately 5,324 ac (2,156 ha) (12 percent) of suitable habitat will be developed or otherwise made unsuitable within the action area. The affected occurrences represent approximately 32 percent of the 19 known locations in the action area.

3. A total of 24,111 ac (9,764 ha) (55 percent) of the suitable habitat for the species in the action area, including 9 known locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 15,027 ac (6,086 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 9,084 ac (3,679 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 492 ac (199 ha) of suitable habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 2,971 ac (1,203 ha) and one known location is conserved at NAS Starr Ranch.

5. Combined, 27,574 ac (11,167 ha) or 63 percent of the suitable habitat for northern red-diamond rattlesnake, including 10 of 19 (53 percent) known locations, in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[26]

6. Connectivity between northern red-diamond rattlesnake locations will be maintained with conservation of Chiquita Ridge, Chiquita Canyon, Gobernadora Ridge, San Juan Creek, and Cristianitos Canyon linkages.

7. We anticipate that permanent protection of northern red-diamond rattlesnake known locations and associated suitable habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the species in the Southern Subregion and contribute to its range-wide conservation.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the Plan by both the County and RMV. Should the County determine not to participate in this important regional conservation effort, our no jeopardy conclusion for red-diamond rattlesnake remains valid for the following reasons:

1. The project impacts to northern red-diamond rattlesnake in the action area will be reduced to 4,299 ac (1,741 ha) or 10 percent, and impacts to 6 known locations would

[26] There is likely suitable habitat for northern red-diamond rattlesnake in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

still occur on RMV lands. The affected occurrences represent 32 percent of the 19 known locations in the action area.

2. The County of Orange will not implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS and County Park lands, and these lands will not be managed in accordance with the overall conservation goals of the Plan. However, 9,084 ac (3,679 ha) (21 percent) of suitable habitat and no known locations will remain within existing County Park lands.

3. The conservation proposed by RMV will still be implemented such that 15,223 ac (6,165 ha) of suitable habitat for the northern red-diamond rattlesnake and 9 known locations will be conserved and adaptively managed within the Habitat Reserve. This represents conservation of 78 percent of the suitable rattlesnake habitat on RMV lands.

4. An additional 2,971 ac (1,203 ha) in existing conserved lands at NAS Starr Ranch will remain in the action area. In total, within the action area, 10 known locations (53 percent) and 27,278 ac (11,046 ha) or 62 percent of the suitable habitat for northern red-diamond rattlesnake will be conserved or remain within open space lands. The status of three locations in Subareas 2 and 4 will remain unchanged.

5. Connectivity between northern red-diamond rattlesnake locations will be maintained with conservation of Chiquita Ridge, Chiquita Canyon, Gobernadora Ridge, San Juan Creek, and Cristianitos Canyon linkages.

8. We anticipate that permanent protection of northern red-diamond rattlesnake known locations and associated suitable habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the species in the Southern Subregion and contribute to its range-wide conservation.

Finally, should the RMV and SMWD determine not to participate in this regional conservation effort, the Covered Activities within the action area will be reduced to only those implemented by the County of Orange. Our no jeopardy conclusion for northern red-diamond rattlesnake remains valid for the following reasons:

1. No known occurrences of red-diamond rattlesnakes and approximately 1,025 ac (415 ha) (2 percent) of suitable habitat will be developed or otherwise made unsuitable at Prima Deshecha Landfill, La Pata Avenue, and Coto de Caza.

2. Approximately 531 ac (215 ha) of supplemental open space at Prima Deshecha Landfill will be conserved and managed. About 185 ac (75 ha) of created CSS in SOS on Prima Deshecha Landfill will benefit County Covered Species, including the northern red-diamond rattlesnake.

3. County Park lands containing about 9,084 ac (3,679 ha) (21 percent) of suitable habitat but no known occurrences will remain and provide live-in and dispersal habitat for northern red-diamond rattlesnakes.

4. Any funds from the Opt-in Program for Coto de Caza could be used for additional restoration and management on County Park lands.

Red coachwhip

Status of the Species

Listing Status

The red coachwhip (also referred to as the red racer, *Masticophis flagellum piceus*) is not designated as a special status species by the Service or the CDFG. It is not listed under the Federal Endangered Species Act. The red coachwhip is a subspecies of the coachwhip (*Masticophis flagellum*).

Species Description

The red coachwhip is a long, thin snake with black or brown banding or blotches on the neck and a tan, gray, brown or reddish color on the rest of the body, often with light banding or patterns on the middle of the body, and a more uniform color on the tail (Fisher and Case 2003). The venter is pink. The snake has large eyes with round pupils. Juveniles have black, brown, or tan transverse bands on a lighter background, and the dark neck coloration is either absent or faint (Fisher and Case 2003). Adult red coachwhips range in size from about 24 to 54 in (61 to 137 cm).

Habitat Affinities

The coachwhip is generally found in dry, open habitat, including scrub, grassland, chaparral, desert, and pasture (Stebbins 1985; Zeiner *et al*. 1988). They use rodent burrows, bushes, trees, and rocks for cover and bury themselves in about 1 ft (0.3 m) of soil or sand to hibernate (Zeiner *et al*. 1988).

Life History

The coachwhip typically mates in late spring (April and May); eggs are laid in summer (June and July); and the first young are seen in the early fall (late August and early September) (Zeiner *et al*. 1988). Clutch size ranges from 4 to 16 eggs, with an average of 8 to 10, and eggs are incubated for several months before hatching (Zeiner *et al*. 1988). Coachwhips usually hibernate starting in about November and ending in March (Zeiner *et al*. 1988).

For most of the year, the coachwhip is an active diurnal forager, particularly in mid-morning and late afternoon, and eats rodents, lizards, snakes, birds and eggs, young turtles, insects, and carrion (Zeiner *et al*. 1988).

In a study of coachwhip movement in the Mojave Desert, coachwhips covered large distances during foraging, with average activity ranges of 131 ac (53 ha), average daily movements of more than 600 ft (182 m), and a number of daily movements over 3,000 ft (914 m) (Secor 1995).

Distribution

The full coachwhip species occurs throughout the southern United States and northern Mexico. The red coachwhip occurs throughout most of Arizona, southwestern Nevada, and southern California (Stebbins 1985).

There are a limited number of observation records for the red coachwhip. Since it is not a special status species, observations are not recorded in the California Natural Diversity Database.

Rangewide Trends and Current Threats

Threats faced by the red coachwhip include habitat loss and fragmentation, invasion of habitat by non-native plants, such as annual grasses and arundo, urban-related predators such as dogs and crows, road mortality since studies of snake mortality on roads have documented high mortality rates for a variety of species (*e.g.*, Bernardino and Dalrymple 1992; Rosen and Lowe 1994), and invasion by non-native ants, primarily through their effects on lizards which are important prey items for red coachwhips.

The red coachwhip is one of the most threatened reptiles in Orange County based on its active nature and large home range and low tolerance for habitat fragmentation (urban development and roads where it is subject to a high level of mortality) (P. Bloom, Western Foundation of Vertebrate Zoology, pers. comm. to J. Terp, CFWO, 2006). No rangewide population estimate is available.

Several large-scale habitat conservation plans have been implemented in southern California in recent years. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 1998, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. In 2004, the Service issued a permit for the Western Riverside County MSHCP. The red coachwhip is not a Covered Species in any of the above plans. Since its distribution includes all four of these plan areas, impacts to suitable habitat for the red coachwhip will likely occur. However, these plans will also result in conservation and habitat management of habitats that likely support the subspecies such as scrub, chaparral, and grasslands.

Conservation Needs

The conservation of the red coachwhip depends on conserving large blocks of habitat and conserving connections between the conservation areas. In addition, suitable habitat needs to be maintained and restored. Based on the available information, management activities should address the threats described above, including maintaining connectivity by providing bridges and culverts for dispersal, controlling non-native plants and ants, and limiting predation by urban

predators, such as dogs and ravens. Because of the potential threat posed by road mortality, additional measures such as the installation of low-lying fine-mesh fence or barrier fencing in areas likely to be used by snakes may help minimize this source of mortality. In addition, because snakes are viewed as dangerous, they are often killed by humans, so an education program regarding snakes could reduce this source of mortality.

Environmental Baseline

For the purposes of this analysis, red coachwhip habitat is defined as coastal sage scrub, chaparral, grassland, and alkali meadow. Using this definition, there are a total of 44,109 ac (17,964 ha) of suitable northern red coachwhip habitat in the Planning Area, of which 32,737 ac (13,258 ha) or 74 percent of are in Subarea 1, where most of the impacts from Covered Activities will occur (Table A).

According to the Plan, there are three locations of red coachwhip in the planning area, including two locations in O'Neill Regional Park and one next to San Juan Creek in Rancho Mission Viejo, about 1.5 mi (2.4 km) from the western boundary of the ranch. All three of the observations were in Subarea 1. Based on the red coachwhip's habitat preferences, it could occur throughout much of the planning area.

Table A for Red Coachwhip: Red coachwhip habitat (coastal sage scrub, chaparral, grassland and alkali meadow) and locations in the action area.

Action Area Components	**Total Amount of Red Coachwhip Habitat (acres)**	**Red Coachwhip Locations in NCCP Dataset**
Subarea 1		
Proposed RMV[1]	16,569	1
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	2,953	0
Prima Deshecha Landfill	1,141	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	9,084	2
Supplemental Open Space (Audubon's Starr Ranch)	2,971	0
Other	19	0
Subtotal for Subarea 1	***32,737***	***3***
Subarea 2	2,823	0
Subarea 3	1,099	0
Subarea 4[2]	7,450	0
TOTAL	**44,109**	**3**

[1]Includes project footprint for RMV infrastructure in Subarea 4 (26 ac and 0 locations).
[2]Does not include project footprint for RMV infrastructure in Subarea 4 (26 ac and 0 locations).

EFFECTS ANALYSIS

The action area includes 44,109 ac (17,864 ha) of suitable habitat (coastal sage scrub, chaparral, grasslands, and alkalai meadow) for the red coachwhip. Over the 75-year term of the permits, red coachwhips will be subject to impacts associated with development and other proposed Covered Activities within 5,324 ac (2,156 ha) (12 percent) of this habitat (Table B). We anticipate that all of the suitable habitat in the areas permanently impacted by Covered Activities will be destroyed or otherwise made unsuitable for the red coachwhip.

The proposed RMV, including Ortega Rock, and SMWD Covered Activities will permanently impact 4,299ac (1,741 ha) or 22 percent of red coachwhip suitable habitat and one known location on RMV lands (Table B). The County Covered Activities at Prima Deshecha Landfill will permanently impact 649 ac (263 ha) or 57 percent of the red coachwhip suitable habitat at the Landfill, but no known occurrences. Avenida La Pata Road extension on RMV lands will permanently impact 196 ac (79 ha), but no known locations. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program" could allow the impact of up to 74 ac (30 ha) of suitable red coachwhip habitat in parcels 1-17.

We anticipate that all of the suitable habitat in the areas permanently impacted by Covered Activities will be developed or otherwise made unsuitable for red coachwhip. Although some individuals may escape to adjacent undisturbed habitats, any red coachwhips within the impact area will likely be crushed or buried and killed by construction equipment and ground disturbing activities.

In addition to permanent impacts to potential habitat and the associated loss of species locations from development and other Covered Activities, there will be temporary impacts to 205 ac (83 ha) of suitable habitat in the habitat reserve and SOS from RMV and SMWD actions; no known locations will be impacted. Habitat temporarily affected will be restored to either pre-existing conditions or a higher performance standard. It is anticipated that after restoration, these areas will again be available for re-colonization by the species. However, within the temporary impact area, it is likely that individual red coachwhips could be crushed or buried and killed by construction equipment and ground disturbing activities.

Other Covered Activities that may impact red coachwhips, but will not result in a permanent or determined loss of suitable habitat, include cattle grazing, prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities such as pitfall trapping and removal of invasive species. Cattle grazing may result in disturbance of breeding areas, and if over-grazing occurs, may degrade upland habitat by removing vegetative cover and increasing erosion rates. Prescribed burns could result in the death of coachwhips in the burn area. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may occasionally kill or injure snakes in the project area. Habitat management and species' monitoring activities may occasionally kill or injure coachwhips that are within

Table B for Red Coachwhip: The amount of habitat (coastal sage scrub, chaparral, grassland, and alkali meadow) and the number of red coachwhip locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the coachwhip in the action area.

Covered Activities and Conservation Areas	**Habitat impacts (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS (acres)[1]**	**Habitat with Status Unchanged (acres)**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations in Prima SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	4,299	12,270			1	0		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		2,953				0		
Subtotal of impacts and conservation by RMV and SMWD	**4,299**	**15,223**			**1**	**0**		
Prima Deshecha Landfill	649		492		0		0	
Avenida La Pata on RMV Lands	196	-196			0			
Avenida La Pata in Subarea 4	106							
Subtotal of impacts and conservation by the County of Orange	**951**		**492**		**0**			
Subtotal of impacts and assured conservation with adaptive management	**5,250**	**15,027**	**492**		**1**	**0**		
[2]Subarea 3 Coto de Caza Parcels 1-17	Up to 74							
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		9,084				2		
No Project				14,182				0
TOTAL	**5,324**	**24,111**	**492**	**14,182[4]**	**1**	**2**	**0**	**0[4]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 2,971 ac and 0 locations in Audubon Starr Ranch SOS.

active restoration areas or that are trapped and handled during monitoring efforts. Overall, it is anticipated that Covered Activities could result in a low level of death or injury to red coachwhips. It is anticipated that any impacts to red coachwhips from management activities will be minimized by adherence to appropriate guidelines described in Appendix U of the Plan.

Indirect Effects

The red coachwhip will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological/conference opinion including non-native species such as exotic ants, domestic predators, and invasive plant species, which people can transport and introduce to new locations. Also, because of their susceptibility to mortality and fragmentation due to roads, the red coachwhip is likely to be vulnerable to indirect effects (*e.g.*, increased vehicle strikes) associated with roads.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access and non-native species and to minimize the effects of construction activities and grazing, the following conservation measures that specifically benefit the red coachwhip will be implemented.

Conservation and Restoration. The Habitat Reserve will contain two of three known red coachwhip locations in the action area, both within County Park lands. The Habitat Reserve will also include 24,111 ac (9,764 ha) (55 percent) of the suitable habitat in the action area, including 15,027 ac (6,085 ha) on RMV lands and 9,084 ac (3,679 ha) within existing County Parks. To help offset impact at Prima Deshecha Landfill, 492 ac (199 ha) of suitable habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the red coachwhip.

Reserve Design: The Habitat Reserve will contain large habitat blocks including coastal sage scrub, chaparral, and grasslands. Infrastructure for the development will bisect habitat suitable for coachwhips. In some areas bridges will provide for continued habitat connectivity (San Juan Creek, Chiquadora Ridge) but at Chiquita Narrows a box culvert will provide connection under Cristianitos/F Street. While a large wildlife culvert at Chiquita Narrows may allow some connectivity, it is more likely that connectivity will be maintained in the greater population through other contiguous habitat along San Juan Creek to Bell Canyon, along Chiquita Ridge, and linkages in Trampas, Cristianitos, Gabino, La Paz, and Talega canyons in the south and southeast portions of the reserve.

Fire Management Plan: The project description summarizes the key elements of the Fire Management Plan including the use of controlled burns to decrease fuel loads and hence the likelihood of catastrophic wildfires. The Fire Management Plan does not include specific measures for minimizing the effects of controlled burns on coachwhips but does include a variety of measures to ensure that controlled burns are contained within the identified area. Controlled burns are proposed to be used in coordination with seeding and chemical and mechanical weed

control to restore native coastal sage scrub, which would likely enhance the quality of habitat for red coachwhips.

Monitoring: Monitoring will be conducted at a habitat landscape level. The monitoring program for the red coachwhip as a Covered Species will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife agencies.

Analysis of Impacts and Conservation by Planning Area

RMV has proposed to carry out development in eight Planning Areas and is anticipating development of these Planning Areas in sequential order: PA1 through PA8. Although it is not expected or anticipated, the Implementation Agreement states that RMV can terminate the 75-year permit at any time during their proposed phased development. Therefore, the conservation on a cumulative basis as each Planning Area is developed should be sufficient to avoid/minimize impacts. A summary of red coachwhip occurrences and habitat by Planning Area that will be impacted and conserved is presented in Table C. In addition to the conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Table C for Red Coachwhip: Red coachwhip habitat (coastal sage scrub, chaparral, grassland and alkali meadow) and locations permanently impacted and conserved/managed by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Red Coachwhip Locations and Habitat Impacted (Cumulative Impacts)**		**Red Coachwhip Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	0 (0)	232 (232)	0 (0)	847 (847)
PA2	0 (0)	324 (556)	1 (1)	1,542 (2,389)
PA3	0 (0)	1,242 (1,798)	0 (1)	1,907 (4,296)
PA4	0 (0)	903 (2,701)	0 (1)	390 (4,686)
PA5	0 (0)	737 (3,438)	0 (1)	438 (5,124)
PA6 & PA7	0 (0)	50 (3,488)	0 (1)	370 (5,494)
PA8	0 (0)	500 (3,988)	0 (1)	6,998 (12,492)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	1 (1)	211[1] (4,199)	-1(0)	-185[1] (12,307)
Ortega Rock	0 (1)	63 (4,262)		
Santa Margarita Water District Impacts	0 (1)	37 (4,299)		-37 (12,270)
Subtotal for Proposed RMV and Associated Projects	1	4,299	0	12,270
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			0 (0)	2,953 (15,223)
TOTAL	**1**	**4,299**	**0**	**15,223**

[1] 185 ac of infrastructure impact are in the Habitat Reserve, and 26 ac are in SOS.
[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA1 will impact 232 ac (94 ha) of habitat but will conserve 847 ac (343 ha) of suitable habitat; no known locations of red coachwhip are impacted or conserved.

Build-out of PA2 will impact 324 ac (131 ha) of habitat but will conserve 1,542 ac (624 ha) of suitable habitat. Combined, build-out of PA1 and PA2 will impact 556 ac (225 ha) and result in the conservation and management of 2,389 ac (967 ha) of suitable red coachwhip habitat in these Planning Areas, a conservation to impact ratio greater than 2:1. One red coachwhip location is encompassed by the conserved lands associated with PA2, but this location is anticipated to be developed by future infrastructure.

Build-out of PA3 will impact 1,242 ac (503 ha) of suitable habitat for red coachwhip and will result in the conservation and management of 1,907 ac (772 ha); no known locations are impacted or conserved. The PA3 conservation area includes dispersal habitat along most of San Juan Creek into Caspers Wilderness Park to the northeast, through upland habitat along Gobernadora Creek, and across the corridor between PA3 and Coto de Caza. Combined, build-out of PA1, PA2, and PA3 will impact 1,798 ac (728 ha) and result in conservation and management of 4,296 ac (1,740 ha) of suitable red coachwhip habitat in these Planning Areas, maintaining a conservation to impact ratio of greater than 2:1.

Build-out of PA4 will impact 903 ac (366 ha) of suitable habitat for coast patch-nosed snake and will result in the conservation and management of 390 ac (158 ha) (30 percent); no known locations are impacted or conserved. Connectivity to PA3 open space will be secured. Combined, build-out of PA1 through PA4 will impact 2,701 ac (1,094 ha) and result in the conservation and management of 4,686 ac (1,898 ha) of suitable red coachwhip habitat in these Planning Areas and maintains the conservation to impact ratio to just under 2:1.

Build-out of PA5 will impact 737 ac (298 ha) of potential habitat for coast patch-nosed snake and will result in the conservation and management of 438 ac (177 ha) (37 percent); no known locations are impacted or conserved. Combined, build-out of PA1 through PA5 will impact 3,438 ac (1,392 ha) and result in the conservation and management of 5,124 ac (2,075 ha) of suitable habitat for red coachwhip in these Planning Areas, which reduces the conservation to impact ratio to greater than 1:1, although the conservation still exceeds the impact significantly by 1,686 ac (683 ha).

The expansion of agricultural activities in PA6 and PA7 could occur at any time and will impact up to 50 ac (20 ha) of suitable habitat for red coachwhip but will not result in the conservation and management of any suitable habitat for red coachwhip or locations. The expansion of agricultural activities in PA6 and PA7 is not anticipated to interfere with the dispersal of snakes within the San Mateo Creek watershed because large connected habitat areas will remain and be managed. Combined, build-out of PA1 through PA7 will impact 3,488 ac (1,413 ha) and result in the conservation and management of 5,494 ac (2,225 ha) of suitable red coachwhip habitat in these Planning Areas, maintaining the greater than 1:1 conservation to impact ratio. The conservation again exceeds the impact significantly by 2,006 ac (812 ha).

Build-out of PA8 will impact 500 ac (202 ha) of habitat and conserve 6,998 ac (2,834 ha) of suitable red coachwhip habitat; no known locations are impacted or conserved The PA8 conservation area includes a large portion of the San Mateo Creek watershed on RMV property, which will provide connectivity for red coachwhip in the San Mateo Creek and San Juan Creek

watersheds. Combined, build-out of PA1 through PA8 will impact 3,988 ac (1,615 ha) and result in the conservation and management of 12,492 ac (5,059 ha) of suitable habitat for red coachwhip, a greater than 3:1 conservation to impact ratio.

The analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure in the Habitat Reserve and SOS or Covered Activities at Ortega Rock Quarry or by SMWD. Impacts to suitable habitat for red coachwhip associated with these activities will reduce conservation in the Habitat Reserve by 222 ac (90 ha) and impact one location; however, an additional 2,953 ac (1,196 ha) of suitable habitat in Prior RMV lands will be included in the Habitat Reserve and adaptively managed. In total, adaptive management will occur on 15,223 ac (6,165 ha) or 78 percent of the suitable red coachwhip habitat conserved, a greater than 3:1 conservation to impact ratio for suitable habitat on RMV lands.

If RMV chooses to phase development by Alternative Order PA1, 3, 2, 4, 5, and 8 or Alternative Order PA1, 4, 3, 2, 5, and 8, the cumulative conservation to impact ratio of suitable red coachwhip habitat is maintained at greater than 1:1 ratio through development of each phase and increases to a greater than 3:1 ratio with development and conservation of habitat associated with PA8.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the red coachwhip. We base this conclusion on the following:

1. Red coachwhips occur throughout most of Arizona, southwestern Nevada, and southern California. Therefore, the action area for this Plan represents a small fraction of the subspecies' entire distribution.

2. Approximately 5,324 ac (2,156 ha) (12 percent) of suitable habitat for red coachwhip in the action area will be developed or otherwise made unsuitable for this species; the single occurrence impacted is one of three in the action area. The habitat impacts represent a small proportion of habitat across the range of the species.

3. A total of 24,111 ac (9,764 ha) (55 percent) of the suitable habitat for the species in the action area, including 2 known locations, will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 15,027 ac (6,086 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 9,084 ac (3,679 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 492 ac (199 ha) of suitable habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 2,971 ac (1,203 ha) is conserved at NAS Starr Ranch.

5. Combined, 27,574 ac (11,167 ha) or 63 percent of the suitable habitat for red coachwhip, including two of three (67 percent of) known locations, in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[27]

6. Implementation of the Plan will conserve, monitor, and manage large habitat blocks and associated linkages within the Habitat Reserve for the benefit of this species.

7. We anticipate that the permanent protection of red coachwhip known locations and associated suitable habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the species in the Southern Subregion and contribute to its range-wide conservation.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the Implementation Agreement is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for red coachwhip remains valid for the following reasons:

1. The project impacts to suitable red coachwhip habitat will be reduced to approximately 4,299 ac (1,741 ha) or 10 percent in the action area. The impacts to red coachwhip locations remain unchanged at one.

2. The County of Orange will not implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS and County Park lands, and these lands will not be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP. However, 9,084 ac (3,679 ha) of suitable habitat and two known location will remain within existing County Park lands.

3. The conservation proposed by RMV will still be implemented such that 15,223 ac (6,165 ha) of suitable habitat for the red coachwhip will be conserved and adaptively managed within the Habitat Reserve. This represents conservation of 78 percent of the suitable red coachwhip habitat on RMV lands.

4. An additional 2,971 ac (1,203 ha) of suitable red coachwhip habitat in existing conserved lands at NAS Starr Ranch will remain in the action area. In total, within the action area, 2 of the 3 known locations of red coachwhip and 27,278 ac (11,046 ha) or 62 percent of

[27] There is likely suitable habitat for red coachwhip in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

the suitable habitat for red coachwhip in the action area will be conserved or remain in open space lands.

5. Implementation of the Plan will conserve, monitor, and manage large habitat blocks and associated linkages within the Habitat Reserve for the benefit of this species.

6. We anticipate that the permanent protection of suitable habitat for the red coachwhip combined with long-term management and monitoring actions within the Habitat Reserve will help sustain the species in the Southern Subregion and contribute to its range-wide conservation.

San Diego Horned Lizard

Status of the Species

Listing Status

The San Diego horned lizard (*Phrynosoma coronatum blainvillei*) had been considered as a subspecies of the coast horned lizard (*Phrynosoma coronatum*), but since the 1990s, subspecies of *P. coronatum* have not been recognized (Grismer and Mellink 1994; Brattstrom 1997). The February 2006 CDFG Special Animals list treats the San Diego horned lizard as a population ("*blainvillei"* population) of coast horned lizard. The common name San Diego horned lizard will be used in this biological opinion to refer to the *blainvillei* population of coast horned lizard. Neither the San Diego horned lizard nor the coast horned lizard is listed under the Federal Endangered Species Act.

The San Diego horned lizard is a CDFG Species of Special Concern and has a CNDDB rank of G4G5S3S4 (restricted/rare in California with some potential threats). The coast horned lizard is apparently secure but some factors, such as loss of habitat range-wide, are cause for concern.

Species Description

San Diego horned lizards have distinctive wide, flat bodies with two horns at the back of the head that are longer than surrounding spines, two rows of pointed scales on the margin of the lower jaw, two rows of fringed scales down the side, enlarged pointed scales on the back, and alternating dark and light wavy bands of brown, gray, or yellowish color down the back (Fisher and Case 2003). The venter is beige or yellow with black spotting (Fisher and Case 2003). Adults are 2.3 to 4.2 in (5.8 to 10.7 cm) (Fisher and Case 2003). Juveniles are similar to adults, with shorter cranial spines.

Habitat Affinities

The San Diego horned lizard is found in a wide variety of vegetation types including coastal sage scrub, annual grassland, chaparral, oak woodland, riparian woodland and coniferous forest (Klauber 1939; Stebbins 2003; Jennings and Hayes 1994). However, it is most common in shrub-dominated communities. Key habitat elements include loose, fine soils with a high sand

fraction, an abundance of native ants, open areas with limited overstory for basking and areas with low, dense shrubs for refuge (Jennings and Hayes 1994). In inland areas within dense brush habitats, San Diego horned lizards are restricted to areas with pockets of open microhabitat, created by disturbance (*e.g.*, floods, fire, roads, grazed areas, fire breaks) (Jennings and Hayes 1994).

Life History

The San Diego horned lizard emerges from hibernation in March and becomes surface active in April through July, after which most adults aestivate again (summer hibernation) (Hagar 1992). The adults reappear again briefly in late summer and return to overwintering sites between August and early October depending upon elevation (Klauber 1939; Hagar 1992).

In southern California, the reproductive cycle for male San Diego horned lizards begins during mid to late March and ends in June as testes decrease in size. Female San Diego horned lizards are oviparous, laying clutches of 6 to 17 eggs (average of 11 to 12.5) between May and July each year (Stebbins 2003; Goldberg 1983). Hatchlings appear in late July to early August and require 2 to 3 years to reach reproductive age (Pianka and Parker 1975; Goldberg 1983).

San Diego horned lizards are diurnal foragers, burrowing into the substrate at night and also during the midday when temperatures exceed about 105 degrees Fahrenheit (41 degrees Celsius) (Heath 1965). Over 95 percent of the diet of the San Diego horned lizard consists of native ants, primarily harvester ants (*Messor* and *Pogonomyrmex* sp.) and acrobat ants (*Crematogaster californica*) (Pianka and Parker 1975; Suarez and Case 2002). Other slow moving insects, such as beetles, flies, and caterpillars are consumed opportunistically when encountered (Pianka and Parker 1975). This species does not appear to eat non-native Argentine ants (Jennings and Hayes 1994), which have displaced the native ants in much of coastal southern California (Suarez *et al.* 2000). Estimated activity range size for San Diego horned lizards is about 29 ac (12 ha) (Fisher *et al.* 2002).

Potential predators of the San Diego horned lizard include snakes, leopard lizards, raptors, corvids, roadrunners, loggerhead shrikes, badgers, foxes, coyotes, and domestic dogs and cats (Jennings and Hayes 1994; Zeiner *et al.* 1988). The San Diego horned lizard's primary defense against predators is crypsis (Jennings and Hayes 1994), but other defensive methods used include hissing, inflating lungs to increase apparent size (Pianka and Parker 1975), raising their horns by lowering their snout to make themselves more difficult to swallow (Pianka and Parker 1975), and squirting blood from the corner of the eye (which seems to repel or distract coyotes, dogs and cats) (Pianka and Parker 1975).

Distribution

In California, the San Diego horned lizard (*i.e.,* the *blainvillei* population of coast horned lizard) ranges from the Transverse Ranges south to the Mexican border west of the deserts, although the taxon occurs on scattered sites along the extreme western desert slope of the Peninsular Ranges (Jennings 1988). The known elevation range of this species is from 32.8 ft (10 m) at the El Segundo dunes (Los Angeles County) to approximately 6,986 ft (2,130 m) at Tahquitz Meadow,

on San Jacinto Mountain, in Riverside County (Jennings and Hayes 1994). The coast horned lizard (the species to which the *blainvillei* population belongs) extends further north along central and coastal California, as far north as Sonoma County along the coast and Tehama County in central California. The San Diego horned lizard seems to have disappeared from about 45 percent of its former range in southern California, in particular on the coastal plain and alluvial fans where it was once common (Jennings and Hayes 1994).

Rangewide Trends and Current Threats

The taxidermy and live-animal trade in the late 1800s to early 1900s was a large source of mortality for horned lizards in the greater Los Angeles Basin. An estimated 115,000 were taken in a 45-year period, mostly between 1890 and 1910, mainly in the basin and its adjacent areas (Jennings 1987). In addition, habitat loss from agricultural development was another factor in reducing the population in that time period. The specialized diet, habitat requirements, and site fidelity make the San Diego horned lizard vulnerable to habitat destruction and disturbance, the current threat to the species. In addition to the direct loss of habitat, agriculture and urbanization lead to a variety of edge-associated effects, including an altered fire regime, invasion by non-native species, off-road vehicles, accessibility to collectors, use by domesticated animals, and road-associated effects (Jennings and Hayes 1994). At present, there are no population trend figures across the species' range.

The defensive method of remaining immobile rather than fleeing and its affinity for open spaces, such as roads and trails, makes the San Diego horned lizard particularly vulnerable to collectors/poachers, domesticated pets, and to being killed by vehicles (Jennings and Hayes 1994). The continued displacement and elimination of its food base of native ants by the Argentine ant is a major threat to the San Diego horned lizard. Argentine ants colonize around disturbed soils associated with building foundations, roads and landfills and expand into adjacent natural areas, eliminating native ant colonies (Ward 1987). The Argentine ant also appears to be dependent on moisture in arid environments (Hertzer 1930). Moisture associated with adjacent development such as water runoff from residential/commercial irrigation systems that flow into open space may result in favorable conditions for the Argentine ant (Suarez *et al.* 1998). Argentine ants can follow roads deep into native habitat reserves and into the larger fragments (Suarez *et al.* 1998). Suarez *et al.* (1998) suggest that urban reserves are only effective at maintaining natural populations of native ants at distances of 656 ft (200 m) or greater from an edge.

Within areas where Argentine ants have invaded, the diet of the horned lizard changes significantly to include more of the other arthropod species (Suarez *et al.* 2000). Suarez and Case (2002) fed horned lizard hatchlings a diet of arthropods typical of invaded areas and found the average growth rates near zero. This may have detrimental effects on the San Diego horned lizard since high initial growth from a hatchling to an adult is necessary for lizards to reach reproductive maturity by their second year (Fisher *et al.* 2002). In addition, horned lizards are sit and wait predators that expend little energy waiting at ant colony entrances or foraging trails for ants in exchange for the benefit of capturing a relatively large prey item, preferably the harvester ant in the case of the San Diego horned lizard. This species may not be able to adjust its

behavior of a sit and wait predator to capture prey items typical of an Argentine ant invaded area (Suarez and Case 2002).

Habitat conversion from shrub communities to exotic grasslands due to increased fire frequency or other disturbances may impact resident species populations, including the San Diego horned lizard (Holland and Goodman 1998). Similarly, roads and fire breaks not only result in direct loss of native habitat but also function as corridors for the invasion and establishment of exotic plant species into natural areas (Holland and Goodman 1998).

Several large-scale habitat conservation plans have been implemented in southern California in recent years. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 1998, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. These plans have authorized substantial impacts to suitable habitat for the San Diego horned lizard, but they have also resulted in substantial conservation and habitat management. San Diego horned lizard is a Covered Species in each of these four large-scale habitat conservation plans (Appendix 2). It is also anticipated that San Diego horned lizards in southern California will benefit from the conservation and habitat management practices, such as control of invasive plant species and non-native predators, in reserve lands associated with these large-scale habitat conservation plans.

Conservation Needs

The conservation of the San Diego horned lizard depends on conserving large blocks of suitable habitat and conserving connections between the conservation areas. In addition, suitable habitat needs to be maintained and restored. Based on the available information, the most important management need for San Diego horned lizards is maintaining a healthy population of native ants by controlling the non-native Argentine ant population. Other management activities should address the threats described above, including maintaining connectivity by providing bridges and culverts for dispersal, controlling invasive plants, and limiting predation by urban predators, such as dogs and ravens. Because of the potential threat posed by road mortality, additional measures such as the installation of low-lying fine-mesh fence or barrier fencing in areas likely to be used by lizards may be help minimize this source of mortality.

Environmental Baseline

For the purposes of this analysis, San Diego horned lizard habitat is defined as coastal sage scrub and chaparral. Although San Diego horned lizards are found in other habitat types, they are most often found in coastal sage scrub and chaparral. Using this definition, there are a total of 29,209 ac (11,830 ha) of suitable San Diego horned lizard habitat in the action area. Eighty percent (23,476 ac [9,508 ha]) of this habitat is in Subarea 1, where most of the impacts will occur (Table A). Because San Diego horned lizards need specific microhabitat features, such as fine soils with a high sand fraction, an abundance of native ants, open areas with limited overstory, and areas with low, dense shrubs, these estimates of suitable habitat likely overestimate the extent of occupied habitat for this species.

Table A for San Diego Horned Lizard: San Diego horned lizard habitat (coastal sage scrub and chaparral) and locations in the action area.

Action Area Components	**Total Amount of San Diego Horned Lizard Habitat (acres)**	**San Diego Horned Lizard Locations in NCCP Dataset**
Subarea 1		
Proposed RMV[1]	11,551	43
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	1,687	4
Prima Deshecha Landfill	326	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	7,546	1
Supplemental Open Space (Audubon's Starr Ranch)	2,350	0
Other	16	0
Subtotal for Subarea 1	***23,476***	***48***
Subarea 2	2,456	0
Subarea 3	807	2
Subarea 4[2]	2,470	1
TOTAL	**29,209**	**51**

[1] Includes project footprint for RMV infrastructure in Subarea 4 (11 acres and 0 locations).
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (11 acres and 0 locations).

The NCCP database contains 51 observations of San Diego horned lizard scattered throughout the action area, including 48 observations of San Diego horned lizards in Subarea 1 (Table A). There are two clusters of San Diego horned lizard observations in the action area that the NCCP considers "important" populations/"key" locations including (1) a cluster of 15 occurrences in coastal sage scrub along the ridge between Chiquita Canyon and Wagon Wheel Canyon south of Oso Parkway; and (2) a cluster of 14 occurrences in the upper Cristianitos and southern Trampas canyon sub-basins located between Cristianitos Road and Cristianitos Creek" (NCCP p.13-142). Because the clusters of horned lizard observations are within the survey area for SOCTIIP, the observed densities at these locations are likely due to the result of a greater survey effort in this portion of the planning area. The remaining locations are throughout Subarea 1 with a small number in Coto de Caza and Cities in Subareas 3 and 4 (Table A). More horned lizards are likely to inhabit areas of suitable habitat that were not surveyed. However, estimating horned lizard abundance in the action area would likely overestimate the number present, since the horned lizard may have stricter habitat requirements (a more open canopy) and prey needs than the gross level of vegetation mapping available can provide. Due to these uncertainties, we did not attempt to further refine population estimates in the action area.

Effects of the Action

Direct Effects

The action area includes 29,209 ac (11,830 ha) of suitable habitat (coastal sage scrub and chaparral) for the San Diego horned lizard and 51 known occurrences (Table A). Over the 75-year term of the permits, 12 known occurrences of San Diego horned lizard will be subject to

impacts associated with development and other proposed Covered Activities in 3,627 ac (1,469 ha) or 12 percent of suitable horned lizard habitat in the action area (Table B). We anticipate that all of the suitable habitat in the areas permanently impacted by Covered Activities will be developed or otherwise made unsuitable for San Diego horned lizard.

The proposed RMV, including Ortega Rock, and SMWD Covered Activities will permanently impact 3,351 ac (1,357 ha) or 25 percent of the San Diego horned lizard suitable habitat and 12 (26 percent) of the known horned lizard occurrences on RMV lands (Table B).

The County Covered Activities at Prima Deshecha Landfill will permanently impact 165 ac (67 ha) or 51 percent of the horned lizard suitable habitat at the Landfill, but no known occurrences. Avenida La Pata road extension will impact an additional 42 ac (17 ha) of suitable horned lizard habitat within the Habitat Reserve and 10 ac (4 ha) in Subarea 4, but no known locations. In Subarea 3, the Coto de Caza voluntary "Opt-In-Program" could allow the impact of up to 59 ac (24 ha) of suitable horned lizard habitat in parcels 1-17.

Eleven of the 12 horned lizard occurrence impacts are within PA2 and PA6 (six and five locations, respectively); the twelfth location is in PA3. The Plan identifies "important" populations in "key" locations for horned lizard at Chiquita Canyon/Wagon Wheel Canyon Ridgeline and Upper Cristianitos Canyon; most of PA6 falls within the Upper Cristianitos Canyon area. Although a small number of individuals may escape to adjacent undisturbed habitats, any horned lizards within the impact area will likely be crushed or buried and killed by construction equipment and ground disturbing activities.

In addition to permanent impacts to suitable habitat and the associated loss of individuals from development and other Covered Activities, there will be temporary impacts to 81 ac (33 ha) of suitable habitat in the Habitat Reserve and SOS from RMV and SMWD actions; no known locations will be impacted. Habitat temporarily affected will be restored to either pre-existing conditions or a higher performance standard. It is anticipated that after restoration, these areas will again be available for re-colonization by the species. However, these temporary impacts have the potential to kill or injure individual horned lizards within the temporary impact area.

Other Covered Activities that may impact horned lizards but will not result in a permanent or determined loss of suitable habitat include cattle grazing, prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities such as pitfall trapping and removal of invasive species. Cattle grazing may result in disturbance of breeding areas and occasional trampling of horned lizards, and, if over-grazing occurs, may degrade upland habitat by removing vegetative cover and increasing erosion rates. Prescribed burns could result in the death of horned lizards in the burn area. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may occasionally kill or injure horned lizards in the project area. Habitat management and species' monitoring activities may occasionally kill or injure horned lizards that are within active restoration areas or that are trapped and handled during monitoring efforts.

Table B for San Diego Horned Lizard: The amount of habitat (coastal sage scrub and chaparral) and the number of San Diego horned lizard locations permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed for the horned lizard in the action area.

Covered Activities and Conservation Areas	**Habitat impacts (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS[1] (acres)**	**Habitat with Status Unchanged (acres)**	**Locations Impacted**	**Locations in Habitat Reserve**	**Locations in Prima SOS[1]**	**Locations with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	3,351	8,200			12	31		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		1,687				4		
Subtotal of impacts and conservation by RMV and SMWD	**3,351**	**9,887**			**12**	**35**		
Prima Deshecha Landfill	165		161		0		0	
Avenida La Pata on RMV Lands	42	-42			0			
Avenida La Pata in Subarea 4	10				0			
Subtotal of impacts and conservation by the County of Orange	**217**		**161**		**0**			
Subtotal of impacts and assured conservation with adaptive management	**3,568**	**9,845**	**161**		**12**	**35**		
[2]Subarea 3 Coto de Caza Parcels 1-17	up to 59				0			
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		7,546				1		
No Covered Activities				8,030				3
TOTAL	**3,627**	**17,391**	**161**	**8,030[4]**	**12**	**36**	**0**	**3[4]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 2,350 acres and no known locations in SOS at Audubon Starr Ranch.

Indirect Effects

The San Diego horned lizard will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion including non-native species such as exotic ants, domestic predators, and invasive plant species that people can transport and introduce to new locations. Also, because of their susceptibility to mortality and fragmentation due to roads, the horned lizard is likely to be vulnerable to indirect effects (*e.g.*, increased vehicle strikes) associated with roads.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access and non-native species and to minimize the effects of construction activities and grazing, the following conservation measures specific to the horned lizard will be implemented.

Conservation and Restoration. The Habitat Reserve will contain 36 known horned lizard locations or 71 percent of the locations in the action area, including 35 locations on RMV lands and 1 location within existing County Parks. The Habitat Reserve will also include 17,391 ac (7,043 ha) (60 percent) of the suitable habitat in the action area, including 9,845 ac (3,987 ha) on RMV lands and 7,546 ac (3,056 ha) within existing County Parks. To help offset impact at Prima Deshecha Landfill, 161 ac (65 ha) of habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including the San Diego horned lizard.

Reserve Design; Following implementation of the Plan, the known horned lizard occurrences will be concentrated in Chiquita Canyon. The Reserve will contain large habitat blocks including coastal sage scrub and chaparral. Cristianitos Road/"F" Street will bisect horned lizard "important" population/"key" locations on Chiquita Canyon/Wagon Wheel Ridge and that area will not be bridged. Generally, horned lizards have limited home ranges and small daily movement distances. Therefore, while a large wildlife culvert at Chiquita Narrows may allow some connectivity, it is more likely that connectivity will be maintained in the greater population through other contiguous habitat along San Juan Creek to Bell Canyon, along Chiquita Ridge, and linkages in Trampas, Cristianitos, Gabino, La Paz, and Talega canyons in the south and southeast portions of the reserve.

Fire Management Plan: The project description summarizes the key elements of the Fire Management Plan including the use of controlled burns to decrease fuel loads and hence the likelihood of catastrophic wildfires. The Fire Management Plan does not include specific measures for minimizing the effects of controlled burns on horned lizards but does include a variety of measures to ensure that controlled burns are contained within the identified area. Controlled burns are proposed to be used in coordination with seeding and chemical and mechanical weed control to restore native coastal sage scrub, which would likely enhance the quality of habitat for horned lizards.

Monitoring: Monitoring will be conducted both at a species-specific level and also at a habitat landscape level. The detailed monitoring program for the San Diego horned lizard as a Covered Species and a candidate focal species will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. The horned lizard is noted as a focal species within coastal sage scrub and chaparral habitats.

Analysis of Impacts and Conservation by Planning Area

RMV has proposed to carry out development in eight Planning Areas and is anticipating development of these Planning Areas in sequential order: PA1 through PA8. Although it is not anticipated, the IA states that RMV can terminate the 75-year permit at any time during their proposed phased development. Therefore, the conservation on a cumulative basis as each Planning Area is developed should be sufficient to avoid/minimize impacts. A summary of horned lizard occurrences that will be impacted and conserved by Planning Area is presented in Table C. In addition to the conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from 6 months of the date of permit issuance.

Table C for San Diego Horned Lizard. San Diego Horned Lizard Locations and Habitat Permanently Impacted and Conserved/Managed as a Result of Covered Activities by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Locations and Habitat Impacted (Cumulative Impacts)**		**Locations and Habitat Conserved and Managed (Cumulative Conservation)**	
	Locations	**Habitat (acres)**	**Locations**	**Habitat (acres)**
PA1	0	10 (10)	0 (0)	236 (236)
PA2	6	285 (295)	17 (17)	1,207 (1,443)
PA3	1	1,046 (1,341)	3 (20)	1,700 (3,143)
PA4	0	842 (2,183)	0 (20)	323 (3,466)
PA5	0	412 (2,595)	0 (20)	141 (3,607)
PA6 & PA7	5	50 (2,645)	0 (20)	3 (3,610)
PA8	0	500 (3,145)	11 (31)	4,722 (8,332)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	0	120[1] (3,265)		-109[1] (8,223)
Ortega Rock	0	63 (3,328)		
Santa Margarita Water District Impacts	0	23 (3,351)		-23 (8,200)
Subtotal for Proposed RMV and Associated Projects	12	3,351	31	8,200
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)			4 (35)	1,687 (9,887)
TOTAL	**12**	**3,351**	**35**	**9,887**

[1] 109 acres of infrastructure impact are in the Habitat Reserve, and 11 acres are in SOS.
[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA1 will impact 10 ac (4 ha) of habitat but will conserve 236 ac (96 ha) of suitable habitat; no known occurrences are impacted or conserved.

Build-out of PA2 will impact 6 known occurrences and 285 ac (115 ha) of habitat and will conserve 17 occurrences of horned lizards and 1,207 ac (489 ha) of suitable habitat. The PA2 conservation area includes the "important" population/"key" location in Chiquita Canyon; its conservation will enhance the connectivity of Chiquita Canyon with habitat in Ladera Open Space and San Juan Creek. Combined, build-out of PA 1 and 2 will result in conservation of 1,443 ac (584 ha) of suitable habitat in these Planning Areas or a habitat conservation to impact ratio of almost 4:1. The conservation associated with PA2 ensures that 17 (36 percent) of the 47 known occurrences on RMV lands will be conserved and managed.

Build-out of PA3 will impact one known occurrence and 1,046 ac (424 ha) of habitat and will conserve 3 occurrence of horned lizard and 1,700 ac (689 ha) of suitable habitat. The PA3 conservation area includes dispersal habitat along most of San Juan Creek (the portion not conserved in association with PA2) into Caspers Wilderness Park to the northeast, through upland habitat along Gobernadora Creek, and across the corridor between PA 3 and Coto de Caza. Combined, build-out of PA 1, 2, and 3 will result in conservation of 3,143 ac (1,273 ha) of suitable habitat in these Planning Areas, maintaining a habitat conservation to impact ratio greater than 2:1. With the conservation associated with PA 1, 2, and 3, 20 occurrences of San Diego horned lizard or 43 percent on RMV lands will be conserved and managed.

Build-out of PA4 and 5 will impact 842 (341 ha) and 412 ac (167 ha), respectively, of suitable habitat and conserve 323 (131 ha) and 141 ac (57 ha), respectively, of suitable habitat; no known occurrences are impacted or conserved. Connectivity to PA3 open space will be secured. Combined, build-out of PA1 through PA5 will result in the conservation of 20 horned lizard occurrences (43 percent) and 3,607 ac (1,461 ha) of suitable habitat in these Planning Areas, reducing the habitat conservation to impact ratio below 2:1; but overall, build out through PA 5 still conserves more habitat than is impacted.

The expansion of agricultural activities and the RMV headquarters in PA6 and 7 will impact five horned lizard occurrences and 50 ac (20 ha) of suitable habitat but conserve no additional suitable habitat or occurrences. The expansion of agricultural activities in PA6 and 7 is not anticipated to interfere with the dispersal of horned lizards within the San Mateo Creek watershed and does not significantly change the conservation to impact ratio associated with development of the Planning Areas.

Build-out of PA8 will impact no known occurrences and 500 ac (202 ha) of habitat and will conserve 11 horned lizard occurrences and 4,722 ac (1,912 ha) of suitable habitat. In addition, the PA8 conservation area includes a large portion of the San Mateo Creek watershed on RMV property, which will provide connectivity between horned lizard occurrences in the San Mateo Creek and San Juan Creek watersheds. Combined, build-out of PA1 through PA8 will result in the conservation of 31 horned lizard occurrences and 8,332 ac (3,374 ha) of suitable habitat on RMV lands.

Lastly, the analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure in the Habitat Reserve and SOS or Covered Activities at Ortega Rock Quarry or by SMWD. Impacts to San Diego horned lizard suitable habitat associated with these activities will reduce conservation in the Habitat Reserve by 132 ac (53 ha) but will not affect any additional horned lizard occurrences. However, an additional four occurrences of horned lizards on 1,687 ac (683 ha) of suitable horned lizard habitat in Prior RMV lands will be included in the Habitat Reserve and adaptively managed. In total, adaptive management will occur for 35 San Diego horned lizard occurrences (74 percent) on 9,845 ac (3,987 ha) or 73 percent of the suitable habitat conserved on RMV lands, about a 3:1 conservation to impact ratio for horned lizard occurrences and a greater than 3:1 ratio for suitable habitat on RMV lands.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 or Alternative Order 1, 4, 3, 2, 5, and 8, new conservation of horned lizard habitat still exceeds the development impact by a ratio of greater than 1:1 in all phases of development through PA4. However, the early conservation and adaptive management of Prior RMV lands more than offsets the higher ratio of impacts/conservation associated with the build-out of PA4 prior to the significant conservation of PA3.

In either of the above alternative phasing scenarios, the cumulative conservation to impact ratio of San Diego horned lizard locations is maintained at greater than 1:1 ratio following each development phase.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the San Diego horned lizard. We base this conclusion on the following:

1. San Diego horned lizards (*blainvillei* population) are distributed from the Transverse Ranges south to the Mexican border, and the entire coast horned lizard species (to which the *blainvillei* population belongs) extends further north along central and coastal California, as far north as Sonoma County along the coast and Tehana County in central California. Therefore, the action area for this Plan represents a small fraction of the species' entire distribution.

2. An estimated 12 known occurrences of horned lizard and approximately 3,627 ac (1,469 ha) or 12 percent of suitable habitat for the species will be permanently impacted within the action area. The affected occurrences represent approximately 24 percent of the known locations in the action area. Temporary impacts will occur on an additional 81 ac (33 ha) of suitable habitat in the Habitat Reserve and SOS from RMV and SMWD actions, but no known locations will be impacted.

3. A total of 17,391 ac (7,043 ha) (60 percent) of the suitable habitat for the species in the action area, including 36 known locations, will be cooperatively managed within the

Habitat Reserve. The Habitat Reserve will include 9,845 ac (3,987 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 7,546 ac (3,056 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 161 ac (65 ha) of suitable habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 2,350 ac (952 ha) is conserved at NAS Starr Ranch.

5. Combined, 19,902 ac (8,060 ha) or 68 percent of the suitable habitat for San Diego horned lizard, including 36 known locations (71 percent), in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[28]

6. One of two "important" populations/"key" locations will be maintained in Chiquita Canyon.

7. Connectivity will be maintained with conservation of Chiquita Ridge, Chiquita Canyon, Gobernadora Ridge, San Juan Creek, and Cristianitos Canyon linkages.

8. We anticipate that permanent protection of San Diego horned lizard occurrences and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain San Diego horned lizard in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for San Diego horned lizard remains valid for the following reasons:

1. The project impacts to suitable San Diego horned lizard habitat in the action area will be reduced by 276 ac (112 ha) to include approximately 3,351 ac (1,357 ha), which still represents 11 percent of the suitable horned lizard habitat in the action area. No change to the number of horned lizard occurrences impacted is anticipated.

2. The County of Orange will not implement and/or fund habitat creation, restoration, and enhancement actions on their existing SOS and County Park lands, and these lands will not be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP. However, 7,546 ac (3,056 ha) of suitable habitat and one additional San Diego horned lizard occurrence will remain within existing County Park lands.

[28] There is likely suitable habitat for San Diego horned lizard in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

3. The conservation proposed by RMV will still be implemented such that 9,887 ac (4,001 ha) of suitable horned lizard habitat and 35 known occurrences of San Diego horned lizard will still be conserved and adaptively managed within the Habitat Reserve. This represents conservation of 75 percent of the horned lizard suitable habitat and 74 percent of the known horned lizard occurrences on RMV lands, a greater than 3:1 conservation to impact ratio for suitable horned lizard habitat and nearly a 3:1 conservation to impact ratio for known horned lizard occurrences on RMV lands.

4. An additional 2,350 ac (952 ha), but no known horned lizard occurrences, in existing conserved lands at NAS Starr Ranch will remain in the action area. In total, within the action area, 36 of the known occurrences (71 percent) and 19,783 ac (8,012 ha) or 68 percent of the suitable habitat for San Diego horned lizard will be conserved or remain in open-space lands.

5. One of two "important" populations/"key" locations will be maintained in Chiquita Canyon.

6. Connectivity will be maintained with conservation of Chiquita Ridge, Chiquita Canyon, Gobernadora Ridge, San Juan Creek, and Cristianitos Canyon linkages.

7. We anticipate that permanent protection of San Diego horned lizard occurrences and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain San Diego horned lizard in the Southern Subregion and contribute to the range-wide conservation of this species.

Southwestern Pond Turtle

Status of the Species

Listing Status

The southwestern pond turtle (*Emys marmorata pallida*) is designated as California Species of Special Concern by the Department and has a CNDDB rank of G3G4T2T3S2 (restricted/rare to apparently secure in its global range, but "endangered" in California). This species is not listed under the Federal Endangered Species Act.

Until recently, the southwestern pond turtle was in the genus *Clemmys*, but genetic and physiological studies by Feldman and Parham (2002) showed that the western pond turtle (of which the southwestern pond turtle is a subspecies) is more closely related to species in the genus *Emys*.

Species Description

Adult southwestern pond turtles have a low-domed carapace that is olive, dark brown, or blackish with a network of lines, spots, or dashes that ranges from about 4 to 7.5 in (10 to 19 cm) in length. Limbs and head are olive, yellow, or brown, often with darker lines, flecks, or spots

(Fisher and Case 2003; Stebbins 2003). Relative to females, males have a lighter throat, a much longer tail, and a concave shell bottom. Juveniles are similar in appearance to adults, with tails almost as long as their shells.

Habitat Associations

The southwestern pond turtle is an aquatic freshwater turtle. This species inhabits slow moving, permanent, or intermittent streams, small ponds, small lakes, permanent and ephemeral shallow wetlands, arroyos, vernal pools, and altered aquatic habitats (*e.g.*, reservoirs, stock ponds, sewage treatment ponds) (Rathbun *et al.* 1992; Holland 1994). The preferred aquatic habitat for this species consists of pools within streams (Bury 1972). Typical habitat characteristics in these aquatic environments include submerged and exposed logs, rocks, and roots, mudbanks, and ledges, which provide sites for basking and refugia (Holland 1994). Pond turtles are sometimes found in highly altered habitats (*e.g.*, golf course ponds and channelized streams), but many of these populations may not be viable over the long-term because they become isolated from other populations and often lack suitable upland habitat for nesting (Holland 1991; 1994; Reese and Welsh 1997).

Depending on environmental conditions, pond turtles will often aestivate for a portion of the year, either in surrounding upland habitat or in aquatic sites, such as mud at the bottom of a watercourse, undercuts along streambanks, or under logs (Holland 1994). Upland habitats used by the pond turtle for overwintering include grasslands, oak woodlands, hardwood and conifer forests, chaparral, and coastal sage scrub and often contain a thick layer of leaf litter or heavy brush (Holland 1994; Reese and Welsh 1997; Rathbun *et al*. 1992). Aestivation sites have been observed up to 1,640 ft (500 m) from the nearest water resource in a northern California population of pond turtles (Reese and Welsh 1997), but estimates of average distance from the nearest water source have ranged from 164 to 666 ft (50 to 203 m) depending on the population being studied (Reese and Welsh 1997; Rathbun *et al*. 2002).

Nesting occurs along pond edges or stream margins or in upland habitat up to 1300 ft (397 m) or more from the water's edge (Rathbun *et al*. 1992). Nesting sites generally consist of well-drained clay or silt soils, are relatively flat (less than 15 degrees), and are dominated by grasses and herbaceous vegetation without large shrubs or trees (Spinks *et al*. 2003). Agricultural areas and grazing pastures provide suitable habitat for nesting pond turtles, but certain practices, such as plowing and irrigation, could destroy nests (Crump 2001). Areas with soils that are too wet, including irrigated sites such as lawns and golf courses, are generally unsuitable for nesting because pond turtles have hard-shelled eggs that absorb water, expand, and crack when the soil reaches a certain moisture level (Feldman 1982; Spinks *et al*. 2003). Areas with soil that is too dry are also unsuitable for nesting because the eggs desiccate (Zeiner *et al*. 1988).

Life History

Southwestern pond turtles mature slowly and have low fecundity but are potentially long-lived (Jennings *et al.* 1992). Females typically begin breeding at 8 to 14 years of age, although sexual maturity may be reached as early as 6 to 7 years in the southern part of its range (Holland 1994; Gray 1995; Goodman 1997). Many females do not lay eggs every year, and complete failure of

nests is not uncommon in some years or locations (Holland 1994). Hatchlings and first-year juveniles have low survivorship, averaging about 8 to 12 percent (unpublished data as cited in Jennings *et al.* 1992). Annual survivorship is approximately 8 to 15 percent for 1 to 3-year age classes (Holland 1991; Lovich 1999), and adult survival rates have been estimated to be about 45 percent (Gray 1995). The potential life span of the southwestern pond turtle is over 40 years (Holland 1991; Gray 1995). In the northern portions of their range, hatchlings remain in the nest through the winter, but in southern California, most emerge in the early fall (Holland 1994).

Courtship and mating behaviors of the southwestern pond turtle have been observed starting in February (Holland 1988; Buskirk 1991; Goodman 1997). The nesting season is from late April through August and peaks from late May through early July (Holland 1994). Incubation periods vary with latitude but are typically 80 to 126 days (Holland 1994; Goodman 1997). Gender in pond turtles is determined by incubation temperature. Below about 86 degrees Fahrenheit (30 degrees Centigrade), embryos develop into males, and above about 86 degrees Fahrenheit (30 degrees Centigrade), embryos develop into females (Ewert *et al.* 1994).

In areas with cold winters, pond turtles will aestivate during the winter months, becoming active again in the spring. Throughout the southern portion of its range, however, the southwestern pond turtle will remain active all winter (Stebbins 2003). In areas where the aquatic habitat dries during the summer, pond turtles will aestivate in late summer and return to the aquatic habitat after winter rains (Rathbun *et al*. 2002).

The southwestern pond turtle is generally diurnal, and daily activity revolves around thermoregulation and foraging patterns. In the early morning and evening, pond turtles may move up or downstream, moving from one pool to the next in search of basking sites, mates, or foraging areas. In the summer, pond turtles will often remain sheltered or at the bottom of the pond in the middle of the day to avoid the heat (Bury 1972).

Home range size and configuration varies between age class, gender, and location. Bury (1972) studied a pond turtle population in a northern California stream and found that adult males had the largest range, averaging 2.42 ac (0.98 ha) with a mean length of 3,202 ft (977 m). Adult female home ranges averaged 0.62 ac (0.25 ha) with a mean length of 814 ft (248 m). Juvenile home ranges averaged 0.89 ac (0.36 ha) and 1,191 ft (363 m). Female pond turtles in two southern California streams had home ranges that were longer and smaller (Goodman and Stewart 2000) than those observed by Bury (1972), likely because the streams in southern California tend to be narrower so pond turtles have to move further distances to obtain sufficient resources. Pond turtles are capable of dispersing substantial distances. Overland movement has been documented up to 3 mi (5 km) (Holland 1994; Holland and Goodman 1998), and movements between drainages can occur, but are uncommon (Holland 1994).

The southwestern pond turtle is an opportunistic predator with a broad feeding niche. Adults eat some plant material, but they generally prefer live or dead animal prey (Bury 1986). Among the many types of food items eaten by this species are plants, insects, worms, fish, and carrion (Stebbins 2003).

Distribution

The historical range of the western pond turtle (*Clemmys marmorata*) extended along most of the west coast of North America, primarily west of the Cascade-Sierra crest, from western British Colombia to northern Baja California, Mexico (Ernst *et al.* 1994; Holland 1994). There are two recognized subspecies of western pond turtle. The northwestern pond turtle (*Clemmys marmorata marmorata*) occurs north of the American River in California, and the southwestern pond turtle (*Clemmys marmorata pallida*) occurs from the coastal area south of San Francisco, California (Stebbins 2003). The San Joaquin Valley in central California is considered to be a zone of intergradation between the two subspecies (Holland 1991, 1994). The elevational range for the species is from sea level to about 6,000 ft (1,830 m) (Stebbins 2003).

Rangewide Trends and Current Threats

The southwestern pond turtle is still extant throughout most of its range, but a number of populations have been extirpated. Between Ventura County and the Mexican border, known localities decreased from 87 sites in 1960 to 53 sites by 1987, and many of the remaining populations are small and/or isolated (Brattstrom and Messer 1988).

Development and flood control operations and infrastructure are the primary threats to the southwestern pond turtle. Over 90 percent of wetland habitat within its historic California range has been eliminated by agricultural development, flood control and water diversion projects (*e.g.*, dams, reservoirs, channelization), and urbanization (Brattstrom and Messer 1988; 58 FR 42717). Loss of upland habitat adjacent to pond turtle populations can isolate pond turtles from surrounding populations and eliminate potential nesting sites and thus the ability to successfully reproduce (Nordby 1992; Holland 1994; Spinks *et al*. 2003). Therefore, although pond turtle populations in developed areas may persist for years, they can become functionally extinct long before they are extirpated (Spinks *et al*. 2003).

Development can also lead to habitat degradation as a result of down cutting and erosion, which can eliminate pools, basking sites, and refugia used by pond turtles and isolate the aquatic environment from the surrounding upland environment. Furthermore, roads may impact pond turtle populations as a result of road kill and population fragmentation (Gibbs and Shriver 2002).

Other primary threats to southwestern pond turtles include degradation of habitat as a result of invasion by non-native aquatic plant species, such as arundo, predation by non-native and urban-related species including non-native fish, bullfrogs, crayfish, dogs, and corvids, and competition from non-native turtles, such as the red-eared slider.

Other possible threats to the species include water pollution, overexploitation due to collection and past commercial harvesting practices, accidental capture from fishing practices (*e.g.*, hooks, lines, nets), boating, off-road vehicles, grazing (*e.g.*, trampling, manure, and loss of streamside vegetation), mining, and logging. These threats can cause direct mortality and/or degrade habitat (Brattstrom and Messer 1988; Holland 1991; Jennings *et al.* 1992).

Pond turtles are also susceptible to drought conditions. Observations in California during 1987-1992 indicated that many populations in the southern and central portions of the State were severely impacted by drought, displaying declines of up to 85 percent and possibly more. Repeated sampling of several of populations indicated that many have failed to recover (*i.e.*, capture rates remained low during subsequent surveys). Coupled with anthropogenic factors, drought may have a locally and regionally significant negative impact on western pond turtle populations (Holland 1991, 1994).

Several large-scale habitat conservation plans have been implemented in southern California in recent years. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 1998, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. In 2004, the Service issued a permit for the Western Riverside County MSHCP. The pond turtle is a Covered Species for the two plans in San Diego County and the plan in western Riverside County. These plans have created large reserve systems that include substantial habitat for southwestern pond turtle and requirements for monitoring and management actions beneficial to the long-term conservation of the species (Appendix 2). Southwestern pond turtle is not a Covered Species in the Central and Coastal Orange County NCCP/HCP.

In addition to potential effects on wetland and riparian habitat, these plans will affect upland habitat used for southwestern pond turtles for breeding and foraging. The Western Riverside MSHCP estimated that sixty-seven percent (55,479 of 81,679 ac (22,469 to 33,080 ha)) of modeled upland habitat for southwestern pond turtles would be conserved, while the rest would be subject to development. Calculations of potential impact to upland habitat for southwestern pond turtle were not made in the three other plans.

It is anticipated that southwestern pond turtles in each of the plan areas will benefit from the conservation and general habitat management practices, such as control of invasive plant species and non-native predators, in reserve lands created by these large-scale habitat conservation plans.

Conservation Needs

The conservation needs for this species include conserving large blocks of suitable aquatic and upland habitat and conserving connections between the conservation areas. Management activities should address these threats, including maintaining connectivity by providing suitable habitat linkages for dispersal, controlling non-native plants such as arundo, controlling non-native aquatic predators and competitors such as fish, bullfrogs, crayfish, and red-eared sliders, and limiting predation by urban predators, such as dogs and ravens. Because of the potential threat posed by road mortality, measures such as the installation of low-lying fine-mesh fence or barrier fencing in areas likely to be used by turtles may help minimize this source of mortality. In addition, since southwestern pond turtles may be collected as pets or non-native red-eared sliders purchased from the pet store could be released into the wild, public education regarding these effects would benefit this species.

Environmental Baseline

Distribution in the Plan Area

The NCCP database includes eight locations of southwestern pond turtle (Table A) from three presumed breeding sites: San Juan Creek (six locations), a stock pond in upper Cristianitos Canyon (one location), and Jerome's Lake in upper Gabino Canyon (one location). Seven of the eight locations are identified as "key" locations in the Plan. The observation not identified as a "key" location was a pond turtle in an active nursery north of San Juan Creek without any suitable breeding or upland habitat in the surrounding environment. All of the observations in the NCCP database are in Subarea 1 of the action area. Pond turtle observations in the action area are based on visual surveys as opposed to trapping, so population sizes are likely underestimated, although most of the breeding sites were likely documented since there are only a few locations that have the perennial water necessary to support pond turtles, and all of these were surveyed.

In addition, CNDDB (2006) includes a 1993 observation of southwestern pond turtle in Oso Creek in Subarea 4. Oso Creek is currently surrounded by development, the habitat appears to be of relatively low quality, and it is not known whether southwestern pond turtles are still extant in the creek. Therefore, this observation is not considered a "known location" in the action area.

Most of the pond turtle observations in Subarea 1 are in proximity to water sources that have been dammed so that they are deeper and hold water for more of the year. Four of the six pond turtle observations in San Juan Creek are near CalMat Lake, which has been dammed to hold water, and both the cattle pond in Cristianitos Canyon and Jerome's Lake in upper Gabino Canyon are dammed as well. CalMat Lake was created by mining operations, which were halted in 1997, and the lake is not maintained, so future flooding could erode the berm that maintains the lake, potentially degrading or eliminating the site as a breeding pool for southwestern pond turtle. The stock ponds are currently maintained through periodic dredging so that they hold water longer for cattle, which likely maintains the ponds as suitable breeding habitat for pond turtles as well.

Under current conditions, there is likely occasional dispersal between the three identified pond turtle populations in Subarea 1. At its closest point, San Juan Creek is about 1.3 mi (2.1 km) north of the cattle pond in Cristianitos Canyon, and CalMat Lake is about another 1.2 mi (1.9 km) west. Past studies have documented pond turtles dispersing over 3 mi (5 km) (Holland 1994; Holland and Goodman 1998), so occasional dispersal between San Juan Creek and Cristianitos Canyon is likely. Potential barriers for turtles dispersing between San Juan Creek and Cristianitos Canyon include SR74, which runs parallel to and south of San Juan Creek, and Cristianitos Road, which runs between San Juan Creek and Cristianitos Canyon. Both of these roads could present a barrier and source of mortality for dispersing turtles.

At its closest point, San Juan Creek is about 2.2 mi (3.5 km) west of Jerome's Lake, and CalMat Lake is about another 2.2 mi (3.5 km) west. This is beyond the observed range of pond turtle dispersal, but dispersal between these two locations may occur infrequently. SR74 runs between

San Juan Creek and Jerome's Lake, so this road may present a barrier and source of mortality for turtles dispersing between these two locations.

The analysis of project-related effects to southwestern pond turtles is based primarily on documented locations rather than a habitat estimate. This approach is used because the restrictive requirements for southwestern pond turtle breeding locations (*i.e.*, deep ponds with sufficient upland habitat for egg-laying and aestivating) means that the documented pond turtle breeding locations (*i.e.*, San Juan Creek, the stock pond in upper Cristianitos Canyon, and Jerome's Lake) likely represent almost all of the locations in the action area, so habitat modeling would be of limited use in quantifying the impacts.

Table A for Southwestern Pond Turtle: Southwestern Pond Turtle Locations in the Action Area[1]

Action Area Components	**Southwestern Pond Turtle Locations**
Subarea 1	
Proposed RMV	8
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	0
Avenida La Pata	0
Prima Deshecha Landfill	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park, including Ortega Rock)[1]	0
Supplemental Open Space (Audubon Starr Ranch)	0
Subtotal for Subarea 1	***8***
Subarea 2	0
Subarea 3	0
Subarea 4	0
TOTAL	**8**

[1] The conservation analysis for the southwestern pond turtle reported in these tables focuses on documented breeding sites.

Effects of the Action

Direct Effects

The Plan will impact two pond turtle locations within the RMV Planning Areas (Table B), both in PA3 north of San Juan Creek, near CalMat Lake. One of the impacted locations is next to nursery lands in a tributary to San Juan Creek and is considered a "key" location; the other location is along the northern edge of the nursery and does not appear to be adjacent to suitable breeding or upland foraging and aestivating habitat, so is not considered a "key" location.

All of the Planning Areas along the creek (PA1 through PA5) will impact upland habitat that could contain aestivating, dispersing, or nesting pond turtles. Any pond turtles or pond turtle eggs within the RMV upland development footprint are anticipated to be crushed or buried during construction activities.

Table B for Southwestern Pond Turtle: Southwestern pond turtle locations permanently impacted by Covered Activities and the corresponding sites that will be conserved and adaptively managed.

Covered Activities and Conservation Areas	**Southwestern Pond Turtle Location Impacts**	**Southwestern Pond Turtle Locations in Habitat Reserve**	**Southwestern Pond Turtle Locations in SOS**
Proposed RMV (Planning Areas and infrastructure)	2	6	
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		0	
Subtotal of impacts and conservation by RMV and SMWD	**2**		
Prima Deshecha Landfill	0		0
Avenida La Pata	0		
Subtotal of impacts and conservation by the County of Orange	**0**		
Subtotal of impacts and assured conservation with adaptive management	**2**	**6**	
Subarea 3 Coto de Caza Parcels 1-17	0		
[1]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		**0**	
TOTAL	**2**	**6**	

[1]County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.

In addition to mortality of pond turtles within the impact area, the development of upland habitat adjacent to San Juan Creek will remove a substantial amount of upland nesting and aestivating habitat for the pond turtle. Pond turtle populations are dependent on the availability of upland nesting habitat for successful recruitment. The RMV development will remove most of the adjacent upland habitat along the north bank of San Juan Creek and portions of upland habitat along the south bank of San Juan Creek, but Chiquita Canyon and Gobernadora Canyon on the north side of the creek and much of the south side of the creek will remain undeveloped and available for use by nesting pond turtles.

Much of the upland habitat that will be removed along San Juan Creek consists of agricultural and nursery lands. Although pond turtles may occasionally be found on nursery lands, the nurseries provide no habitat value for pond turtle because they are so heavily used and compacted. Agricultural lands are likely attractive to nesting pond turtles because they are relatively flat with little vegetation and friable soil, but the agricultural lands in the RMV Planning Areas are heavily used, and therefore, any eggs laid in agricultural lands likely experience high mortality (*i.e.*, the baseline condition is not likely supporting successful recruitment).

Infrastructure Improvements

New or improved bridge crossings will be constructed for Cristianitos Road, Cow Camp Road, and Antonio Parkway. Installation of bridges over San Juan Creek for Cristianitos and Cow

Camp road will permanently impact 0.06 ac (0.02 ha) of streambed habitat and an undetermined amount of adjacent upland habitat for the southwestern pond turtle. Construction associated with the widening of Antonio Parkway over San Juan Creek and the Cow Camp Road Bridge over Gobernadora Creek is not anticipated to result in disturbance to the wetted channel, but it will impact a small amount of adjacent upland habitat for the pond turtle.

Sewer and water infrastructure is proposed along the south bank of San Juan Creek between PA 4 and PA 5, north bank of San Juan Creek between PA 1 and PA 3, and crossing San Juan Creek near the existing Cow Camp crossing and confluence with Trampas Canyon (Figure 188R). In addition, a total of 25 drainage outlets will be installed to allow discharge of water from development areas into San Juan and Gobernadora Creeks (Figure 190R). No permanent impacts to habitat for southwestern pond turtle are anticipated in conjunction with sewer and water infrastructure because the facilities will be buried and/or located outside of the wetted channel.

The construction of bridges and other infrastructure within and near San Juan Creek has the potential to crush individual southwestern pond turtles and their eggs. Habitat degradation associated with infrastructure improvements include alteration of streambed topography, removal of native vegetation, sedimentation, and a temporary reduction in water quality due to turbidity in the water column. Changes in streambed topography could result in less suitable habitat conditions for southwestern pond turtles. Removal of native vegetation will reduce available cover and increase the potential for bank erosion. Because pond turtles are dependent on a few deep ponds in San Juan Creek, such as CalMat Lake, effects to these ponds in particular could substantially alter the suitability of the habitat for southwestern pond turtles.

Other Covered Activities

Other Covered Activities that may impact southwestern pond turtles but will not result in a permanent or determined loss of potential habitat include cattle grazing, prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities such as pitfall trapping and removal of invasive species. Cattle grazing may result in disturbance of breeding pools and occasional trampling of southwestern pond turtles and eggs. Prescribed burns could result in the death of southwestern pond turtle in the burn area and the temporary degradation of breeding pools due to runoff of ash and sediment into the pools following the burn. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may very occasionally kill or injure southwestern pond turtle in the project area. Habitat management and species' monitoring activities may very occasionally kill or injure southwestern pond turtle that are within active restoration areas or that are trapped and handled during monitoring efforts.

Several Covered Activities will permanently impact relatively large areas but are not anticipated to impact southwestern pond turtles or their habitat, including Prima Deshecha landfill, Ortega Rock Quarry, Avenida La Pata extension, Coto de Caza Parcels 1-17, Upper Chiquita Reservoir, and Gobernadora Multi-Purpose Basin.

Indirect Effects

The southwestern pond turtle will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion. Of particular note is the southwestern pond turtle's susceptibility to changes in hydrology such as surface flow, erosion, and groundwater levels in areas surrounding southwestern pond turtle breeding and foraging pools, which are essential for persistence of pond turtle populations. Other potentially important indirect effects include the possibility that increased recreational use of the Habitat Reserve along San Juan Creek will facilitate the spread of non-native predators and competitors such as crayfish and non-native turtles, which people can transport and introduce to new locations. Increased access along San Juan Creek may increase the potential for collection. Also, because of their susceptibility to mortality and fragmentation due to roads, the southwestern pond turtle is likely to be vulnerable to indirect effects (*e.g.*, increased vehicle strikes) associated with roads.

Conservation Measures

Conservation and Restoration: The Habitat Reserve will contain six of the seven southwestern pond turtle "key" locations in the action area, including all three identified breeding locations. All pond turtle locations that will be incorporated in the Habitat Reserve are currently on RMV lands.

Reserve Design: Following implementation of the Plan, the known southwestern pond turtle locations will be in San Juan Creek, Jerome's Lake in upper Gabino Canyon, and a stock pond in upper Cristianitos Canyon. The Reserve design is anticipated to maintain these populations by conserving the breeding habitat, sufficient upland habitat for aestivating and nesting, and connectivity between the conserved populations.

Southwestern pond turtle observations in San Juan Creek are clustered at two locations: just east of PA1 and near CalMat Lake between PA3 and PA5. The locations associated with the San Juan Creek will be connected by the creek and surrounding upland habitat, identified as Linkage J in the Plan. The development of PA1 through PA5 will eliminate much of the upland habitat surrounding the creek, but a corridor at least 1,310 ft (400 m) wide (about 0.25 mi [0.40 km]) will be maintained along the length of the creek. Covered Activities include recreation trails and utilities on the banks of San Juan Creek within the corridor and the construction of two new bridges over San Juan Creek and improvement of an existing bridge, but the bridges will span most of the creek, and direct impacts will be primarily from the support columns and shading effects. Therefore, southwestern pond turtles should be able to disperse along the wide, sandy stream channel bottom and maintain connectivity between locations along the creek.

The proposed project will maintain connectivity between the pond turtles in San Juan Creek and upper Cristianitos Canyon as described in the "Environmental Baseline" section. PA4 will present a potential barrier to direct dispersal between San Juan Creek and Jerome's Lake, but the path of least resistance for turtles dispersing from Jerome's Lake would be to travel about 1.2 mi (1.9 km) to the northwest into Verdugo Canyon and then about 3.2 mi (5.2 km) through Verdugo Canyon and San Juan Creek to the location nearest location near CalMat Lake. PA4 will not

impact Verdugo Canyon, so some degree of connectivity between the populations in San Juan Creek and Jerome's Lake should be maintained.

Construction-Related Avoidance and Minimization Measures: As discussed in the Project Description, potential impacts to southwestern pond turtles associated with construction activities on RMV lands will be avoided and minimized through preparation of Biological Resources Construction Plans (BRCP), which will be developed in coordination with the CFWO to address potential impacts to Covered Species associated with a particular project. For example, projects with a high potential to impact southwestern pond turtles should include minimization measures for pond turtles, such as surveying for and relocating adults in the impact area. The project-specific Biological Resource Conservation Plans (BRCP - described in Appendix U of the Plan) provide the process for developing species-specific minimization measures, such as relocating pond turtles. Furthermore, potential degradation of aquatic habitats from pollution, sedimentation, and grading will be minimized through implementation of a variety of measures identified as MSAA Avoidance/Minimization Measures.

Management of Non-Native Aquatic Predators: The Invasive Species Control Plan (see Project Description) will result in removal of non-native plant species that degrade aquatic habitats and should increase the quality of pools that are used for breeding by southwestern pond turtle. The Invasive Species Control Plan also includes a bullfrog and crayfish control program within permanent and semi-permanent water bodies in San Juan Creek, identification of other bullfrog and crayfish breeding areas that may pose a risk to the pond turtle, and implementation of additional control programs where necessary. The removal of non-native aquatic predators will benefit the southwestern pond turtle by reducing predation pressure, particularly on small juvenile turtles. The Invasive Species Control Plan is anticipated to offset the possible spread of non-native species within the Habitat Reserve by new resident, increased edge effects, and ongoing human-caused disturbances.

Public Access Control and Education: General public access to the habitat reserve will largely be prohibited, except for special events, docent led tours and limited trails/bikeways. Public education of the future Ranch Plan residents about the sensitive habitats and species will also occur. It is anticipated that the combination of public education and public access control of public access will minimize the potential for the unregulated collection of specimens.

Hydrology: Through the Water Quality Management Plans summarized in the project description, flow duration (which influences channel morphology) and water quality will be maintained such that hydrologic conditions of concern such as erosion or sedimentation or pollutants of concern will be addressed. In particular, maintenance of conditions that create the deeper pools that support breeding pond populations will be important.

Monitoring: Monitoring will be conducted both at a species-specific level but also at a habitat landscape level. The detailed monitoring program for the southwestern pond turtle will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. HCP, Chapter 7, Table 7-17 provides a conceptual monitoring schedule for the southwestern pond turtle that proposes periodic monitoring of pond turtles on average every three years through year 2029. The implemented monitoring schedule will be subject to

adjustment by the Reserve Manager, with assistance by the Science Panel, as noted above. The monitoring is anticipated to identify potential threats and opportunities to enhance southwestern pond turtle populations and habitat and to guide management activities accordingly.

Analysis of Impacts and Conservation by Planning Area

A summary of Southwestern Pond Turtle locations that will be impacted and conserved is presented in Table C below.

Table C for Southwestern Pond Turtle. Southwestern Pond Turtle Permanently Impacted and Conserved/Managed as a Result of Covered Activities by Planning Area

Proposed RMV (Phased Dedication) and Associated Projects	**Southwestern Pond Turtle Locations Impacted (Cumulative Impacts)**	**Southwestern Pond Turtle Locations Conserved and Managed (Cumulative Conservation)**
PA1	0 (0)	0 (0)
PA2	0 (2)	2 (2)
PA3	2 (2)	2 (4)
PA4	0 (2)	0 (4)
PA5	0 (2)	0 (4)
PA6 & PA7	0 (2)	0 (4)
PA8	0 (2)	2 (6)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	0 (2)	
Ortega Rock	0 (2)	
Santa Margarita Water District Impacts	0 (2)	
Subtotal for Proposed RMV and Associated Projects	2	6
Prior RMV[1] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		0 (6)
TOTAL	**2**	**6**

[1] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA1 will not impact or conserve any known southwestern pond turtle locations. There are two "key" locations of pond turtles just upstream of PA1, and pond turtles may occasionally use the upland areas that will be impacted by PA1 for nesting and aestivating, but suitable upland habitat will remain further upstream. The PA1 conservation area includes a small stretch of San Juan Creek and a small amount of potential upland habitat, but most of the upland habitat conserved in association with PA1 is not adjacent to the creek and is, therefore less likely to be used as potential foraging and nesting habitat.

Build-out of PA2 will result in the conservation of two southwestern pond turtle "key" locations and will impact none. The PA2 conservation area includes potential breeding and foraging habitat in San Juan Creek and adjacent upland habitat that could be used for nesting. Cumulatively, build-out of PA1 and PA2 will result in the conservation of two locations of southwestern pond turtle locations and will impact none.

Build-out of PA3 will impact two known locations of southwestern pond turtle (one is a "key" location and one is not) and will conserve two "key" locations. The PA3 impact area includes agricultural and nursery lands, which are likely attractive to pond turtles as potential nesting sites because they are relatively flat and have little vegetative cover, but these areas provide little habitat value because they are actively farmed or heavily impacted by nursery activities. The PA3 conservation area includes potential breeding and dispersal habitat along most of San Juan Creek, including CalMat Lake. The upland habitat surrounding CalMat Lake will also be conserved in association with PA3 and could serve as potential nesting and aestivating habitat for pond turtles at this location. Finally, the PA3 conservation area includes large portions of the linkage between San Juan Creek and the stock pond in Upper Cristianitos Canyon and the linkage between San Juan Creek and Jerome's Lake. Cumulatively, build-out of PA1 through PA3 will conserve four of the six southwestern pond turtle locations in these Planning Areas.

Build-out of PA4 will not impact or conserve any known southwestern pond turtle locations. PA4 is located between San Juan Creek and the pond turtle population in Jerome's Lake, but the most likely dispersal route through Verdugo Canyon to the north is within the PA3 conservation area. Cumulatively, build-out of PA1 through PA4 will conserve four of the six southwestern pond turtle locations in these Planning Areas.

Build-out of PA5 will not impact or conserve any known southwestern pond turtle locations. The PA5 project footprint does not include areas that are likely to be frequently used as nesting and aestivating habitat and does not appear to represent a substantial barrier to the most likely pond turtle dispersal routes. The PA5 conservation area includes a strip of habitat between the development footprint and San Juan Creek that may occasionally be used for nesting or aestivating, but the conserved habitat near the creek is fairly steep and well-vegetated, so it is less likely to be used for nesting. Cumulatively, build-out of PA1 through PA5 will result in the conservation of four of the six southwestern pond turtle locations in these Planning Areas. If RMV voluntarily terminates their permit following the commencement of grading PA5, the large conservation area associated with PA8 (see below) will be conserved, which will further offset project-associated impacts.

The expansion of agricultural activities in PA6 and 7 will not impact or conserve any southwestern pond turtle locations. PA 6 contains a stock pond that serves as a breeding pool for southwestern pond turtle, but the pond will be avoided by future agricultural activities. The expansion of agricultural activities by 50 ac (20 ha) in PA6 and 7 is not anticipated to interfere with the dispersal of southwestern pond turtle in the San Mateo Creek watershed.

Build-out of PA8 will impact no known locations and will conserve two southwestern pond turtle "key" locations. In addition, the PA8 conservation area includes a large portion of the San Mateo Creek watershed on RMV property, which will provide connectivity to populations in San Juan Creek and outside the Plan Area to the south. Combined, build-out of PA1 through PA8 will result in the conservation of six of the eight southwestern pond turtle locations in the Plan Area.

In addition to the conservation identified by Planning Area, there will be conservation and management of the Covered Species on prior RMV lands from the date of permit issuance; however, there are no known southwestern pond turtle locations on prior RMV lands.

Lastly, the analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure in the Habitat Reserve. Anticipated impacts associated with infrastructure are described above in the paragraph entitled "Infrastructure Improvements." There are no known locations of southwestern pond turtle within the areas to be impacted by RMV's infrastructure, and the impacts associated with infrastructure represent a small fraction of the total impacts and will be spread throughout the life of the project. The management of prior RMV lands and conservation and management of the Habitat Reserve areas associated with PA1 through PA8 will help offset these impacts.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 or Alternative Order 1, 4, 3, 2, 5, and 8, (*i.e.*, implement PA3 before PA2 or implement PA4 and PA3 before PA2), the conservation will still offset the impacts in all phases of the development because PA3 is anticipated to provide a net benefit for southwestern pond turtle, and PA4 is not anticipated to substantially affect the pond turtle. PA3 will impact two pond turtle locations but will conserve two pond turtle locations and conserve and manage potential breeding, foraging, and dispersal habitat along most of San Juan Creek, including CalMat Lake. PA4 will neither impact nor conserve any known pond turtle locations.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the southwestern pond turtle. We base this conclusion on the following:

1. The southwestern pond turtle occurs from coastal areas south of San Francisco to northern Baja California, so the action area for this Plan represents only a small portion of the species' entire distribution.

2. Only two of the eight known southwestern pond turtle locations and associated upland habitat in the action area will be impacted, which represents 25 percent of the locations in the action area and a small portion of this species' population and habitat range-wide.

3. The Plan includes a process to develop project-specific minimization measures to address the loss of southwestern pond turtle individuals, in particular adult turtles that may be readily relocated out of harms way.

4. Six of the eight southwestern pond turtle locations (75 percent) will be permanently conserved and managed within the Habitat Reserve. The conserved locations include six of the seven "key" locations identified in the Plan. None of the pond turtle locations in

the future Habitat Reserve are currently conserved so Plan implementation will result in new conservation that would not occur otherwise.

5. All three known breeding sites (San Juan Creek, the cattle pond in Cristianitos Canyon, and Jerome's Lake) will be conserved. All of the upland habitat surrounding the cattle pond in Cristianitos Canyon and Jerome's Lake will be conserved. A substantial amount of upland habitat for southwestern pond turtle along San Juan Creek will be impacted, but the conservation and management of breeding habitat and remaining upland habitat in San Juan Creek is anticipated to maintain the southwestern pond turtle population at this location.

6. The design of the Habitat Reserve will help maintain habitat connectivity between southwestern pond turtle populations in the action area and surrounding areas.

7. We anticipate that permanent protection of southwestern pond turtle locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain southwestern pond turtle in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the Implementation Agreement is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for the southwestern pond turtle remains valid because the impacts and conservation will not change.

Unlisted Plants

California Scrub Oak

Status of the Species

Listing Status

California scrub oak (*Quercus berberidifolia*) is not listed under the Federal Endangered Species Act.

Species Description

California scrub oak is a member of the Fagaceae (Beech) family. It is an evergreen shrub that can reach heights of 12 ft (4 m) but is typically 3 to 9 ft (1 to 3 m) in height. The leaves are 0.4–1.2 in (1 – 3 cm) in length with rounded tips and spiny or toothed edges. The leaves are shiny green above and pale green below and have seven to eight rayed, flat, stellate trichomes on the underside of each leaf. Its bark is smooth and light green-gray to gray in color. The fruit (acorn) matures in a year and is typically 0.4-1.2 in (1 – 3 cm) in length (Tucker 1993).

There are three subgenera of oaks: white oaks (*Lepidobalanus*), black or red oaks (*Erythrobalanus*), and golden oaks (*Protobalanus*). *Quercus berberidifolia* is one of 11 species of white oaks and one of 20 species of *Quercus* that occurs in California. Within southern California there are five scrub oaks (*Q. cornelius-mulleri*, *Q. dumosa*, *Q. berberidifolia*, *Q. john-tuckeri*) plus two additional hybrid scrub oak taxa (*Quercus x acutidens*, *Quercus x alvordiana*) (Tucker 1993). The taxonomy of scrub oaks is complex because the taxa often hybridize. *Q. berberidifolia* has been known to hybridize with *Q. durata*, *Q. engelmannii*, *Q. cornelius-mulleri*, *Q. dumosa*, and *Q. lobata* (Roberts 1995). Although this species was named in 1854, until 1982 it was often referred to as *Q. dumosa* (Nuttall's scrub oak), a much rarer scrub oak found only in the coastal zone of southern California.

Habitat Affinities

Quercus berberidifolia typically occurs on dry slopes, hillsides, foothills, canyons, and mountains in chaparral, oak woodland, coastal sage scrub and yellow pine forest habitats (Roberts 1995).

Life History

Quercus berberidifolia is monoecious; each plant having both male and female flowers. Male flowers are minute and arranged in catkins or capitate clusters that bloom March through May, while the female flowers are small spikes in the leaf axils. The acorns of the white oaks characteristically mature in the fall of the same year the flowers bloomed (Griffin and Muick 1990). California white oak acorns do not require a period of dormancy and generally germinate in the fall or winter after dropping from the tree. Seedling oaks are susceptible to a variety of problems including drought, herbivory, and fire, and few survive and grow to the next stage of maturity, the short sapling stage. Oak trees pass out of the short sapling stage and into the tall sapling stage when they are greater than 4.5 ft (1.4 m) in height (Griffin and Muick 1990). Tree status can be considered the beginning of the reproductive stage of an oak's life. Longevity of *Q. berberidifolia* has not been reported in the literature.

Distribution

Quercus berberidifolia is common and widespread west of the deserts from Tehema and Nevada counties south along the Sierra Nevada foothills and Coast Ranges south to the western slopes of the Sierra Juarez, northwestern Baja California. Within southern California, it is common from the southern slopes of the Santa Ynez Mountains, east through Ventura County to the southwestern slopes of the San Gabriel Mountains, Verdugo Hills and Santa Monica Mountains; the Puente Hills and the southern slopes of the San Bernardino Mountains, south through Orange, Riverside and San Diego counties at least as far south as Punta Santo Tomas, Baja California. This species typically occurs from 900 to 5,000 ft (275-1,525 m) in elevation (Tucker 1993). In Orange and San Diego counties, it is absent from the immediate coast, where it is replaced by or hybridizes with the rare *Q. dumosa* (Nuttall's scrub oak).

Rangewide Trends and Current Threats

Quercus berberidifolia is a fairly common component of chaparral communities in much of western California and south into Baja California and has been referred to as the "default" scrub oak in California by (Nixon 2002). Regional population trends for this species are unknown. However, it is likely declining in areas where its habitat is being removed for urban development and agriculture.

Current threats to *Q. berberidifolia* include habitat destruction and fragmentation from urban development, fire suppression practices (including disking and plowing), and competition from exotic invasive plant species. Other threats may include cattle-related impacts (*e.g.*, overgrazing, trampling of saplings) and prolonged drought conditions.

Several large-scale habitat conservation plans have been implemented in southern California in recent years. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 1997, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. In 2004, the Service issued a permit for the Western Riverside County MSHCP. *Quercus berberidifolia* is not a Covered Species in any of these plans, and thus no mitigation specific to this species is required under these plans; however, the habitat reserves initiated through these plans include chaparral, coastal sage scrub, and oak woodland communities that likely provide conservation benefits to this species.

Conservation Needs

The conservation of *Q. berberidifolia* depends on the protection and management of California scrub oak dominated chaparral, coastal sage scrub, and oak woodland vegetation communities throughout its range. Within the Plan Area, fire management intended to maintain a natural diversity of age-stands of chaparral and coastal sage scrub would likely benefit this species. Other management actions might include control of exotic invasive species, especially in vulnerable areas such as existing and planned paved roads, dirt roads, and utility easements and site-specific habitat restoration in degraded areas triggered by natural or human-induced events.

Environmental Baseline

Within the action area, this species is associated with scrub oak chaparral and scrub oak-sagebrush habitats. The 3,002 acres (1216 ha) of California scrub oak habitat in the plan area consists of about 94 percent scrub oak chaparral and six percent scrub oak-sagebrush habitat.

The majority (93 percent) of the scrub oak chaparral habitat is located in Subarea 1, with the largest patches occurring on RMV lands in Verdugo Canyon and Lucas Canyon sub-basins, just north of the Lucas Canyon sub-basin, and in upper Bell Canyon. Additional sites in Subarea 1 with scrub oak chaparral include Caspers Wilderness Park, NAS Starr Ranch, Donna O'Neill Land Conservancy, O'Neill Regional Park and the Upper Chiquita Conservancy.

Most (96 percent) of the scrub oak-sagebrush also occurs in Subarea 1 in Caspers Wilderness Park, O'Neill Regional Park, and NAS Starr Ranch, with less than one acre on Rancho Mission Viejo. The combined amount of habitat supporting known occurrences of *Q. berberidifolia* (both scrub oak chaparral and scrub oak-sagebrush) is shown in Table A.

Table A for California Scrub Oak: California scrub oak habitat (scrub oak chaparral and scrub oak-sagebrush) in the action area

Action Area Components	**Total Amount of Scrub Oak Habitat (acres)**
Subarea 1	
Proposed RMV	1,284
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	48
Prima Deshecha Landfill	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	1,184
Supplemental Open Space (Audubon Starr Ranch)	266
Subtotal for Subarea 1	***2,782***
Subarea 2	196
Subarea 3	1
Subarea 4	23
TOTAL	**3,002**

Effects of the Action

Direct Effects

An estimated 284 ac (115 ha) of habitat, supporting known occurrences of *Q. berberidifolia* (hereafter referred to as *Q. berberidifolia* habitat), will be destroyed as a result of the proposed action (Table B). These impacts include development within the RMV Planning Areas and a small amount of loss due to infrastructure improvements, primarily roads and utilities. An additional 2 ac (0.8 ha) of *Q. berberidifolia* habitat within the Habitat Reserve and SOS will be impacted by infrastructure improvement activities and subsequently replanted/restored (see "Restoration of Temporary Impacts" below).

Other Covered Activities

Other Covered Activities that may impact *Q. berberidifolia* but will not result in a permanent or quantifiable loss of potential habitat include cattle grazing, prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities.

Table B for California scrub oak: The amount of California scrub oak habitat (scrub oak chaparral and scrub oak-sagebrush) permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed as scrub oak habitat in the action area.

Covered Activities and Conservation Areas	**Habitat Impact (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS[1] (acres)**	**Habitat with Status Unchanged (acres)**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	284	1,000		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		48		
Subtotal of impacts and conservation by RMV and SMWD	**284**	**1,048**		
Prima Deshecha Landfill	0		0	
Avenida La Pata on RMV Lands	0			
Avenida La Pata in Subarea 4	0			
Subtotal of impacts and conservation by the County of Orange	**0**	**0**	**0**	
Subtotal of impacts and assured conservation with adaptive management	**284**	**1,048**		
[2]Subarea 3 Coto de Caza Parcels 1-17	0			
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		1,184		
No Covered Activities				486
TOTAL	**284**	**2,232**	**0**	**486[4]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 266 ac in Audubon Starr Ranch SOS.

Cattle grazing results in herbivory and trampling of young oak saplings, and if the grazing pressure is heavy enough, can prevent recruitment and the development of oak woodlands. Prescribed burns can also result in the death of individual acorns, saplings, and trees, but if the appropriate fire frequency, intensity, and timing are used in combination with grassland and woodland restoration, the effects to the community could be beneficial. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may occasionally destroy or damage individual oaks, primarily acorns and saplings. Habitat management and species' monitoring activities may also occasionally destroy or damage individual oaks, primarily acorns and saplings.

Several Covered Activities will permanently impact substantial areas of natural habitat but are not anticipated to impact any mapped areas of *Q. berberidifolia*. These Covered Activities include Prima Deshecha landfill, Ortega Rock Quarry, Avenida La Pata extension, Coto de Caza Parcels 1-17, Upper Chiquita Reservoir, and Gobernadora Multi-Purpose Basin.

Indirect Effects

Q. berberidifolia will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion. Indirect effects associated with the proposed project include a potential increase in the distribution of non-native weedy species as a result of the influx of new residents and increased urban edge and new roads and other ground-disturbing activities. Another potential indirect effect is a possible change in the frequency and timing of fire, either as a result of increased fire suppression activities or as a result of increased human-caused ignition associated with the influx of new residents and increased access to the open space areas.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access and non-native species and to minimize the effects of construction activities, the following conservation measures specific to *Q. berberidifolia* will be implemented.

Conservation and Restoration: The Habitat Reserve will contain a total of 2,232 ac (904 ha) of *Q. berberidifolia* habitat (74 percent of the *Q. berberidifolia* habitat in the action area), including 1,048 ac (424 ha) on RMV lands and 1,184 ac (479 ha) within existing County Parks. There is no *Q. berberidifolia* habitat in the SOS at Prima Deshecha Landfill.

Reserve Design: Following implementation of the Plan, large areas of *Q. berberidifolia* will be conserved in the San Mateo Creek watershed north and east of PA8 and in the already-conserved Donna O'Neil Land Conservancy. In the San Juan Creek watershed, smaller patches of *Q. berberidifolia* will be conserved in the RMV portion of the Habitat Reserve between PA4 and PA5 and northeast of PA4. These smaller patches will be connected to larger areas of *Q. berberidifolia* in Caspers Regional Park and to areas outside the Reserve including NAS Starr Ranch and Cleveland National Forest. The Reserve design is anticipated to support these populations by conserving the habitat and maintaining connectivity between the identified areas, all of which will be connected by large areas of undeveloped open space.

Restoration of Temporary Impacts: All temporarily impacted upland areas in the Habitat Reserve will be restored to pre-construction elevations within one month following completion of work and to equivalent or better habitat conditions (Appendix U of the Plan). Revegetation should commence within three months after restoration of pre-construction elevations and be completed within one growing season. Because *Q. berberidifolia* takes a number of years to reach maturity, "temporary" impacts to *Q. berberidifolia* are more correctly viewed as permanent impacts followed by restoration and planting of oak saplings.

Monitoring: Monitoring will be conducted at a species-specific level and also at a habitat landscape level. The detailed monitoring program for *Q. berberidifolia* will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. HCP, Chapter 7, Table 7-17 provides a conceptual monitoring schedule for *Q. berberidifolia* that includes annual monitoring of sample vegetation plots between 2009 and 2031 to determine

smaller-scale changes in this habitat type and vegetation mapping conducted once every five years from 2007 to 2027 to determine larger-scale changes in the distribution of the habitat. The implemented monitoring schedule will be subject to adjustment by the Reserve Manager, with assistance by the Science Panel, as noted above. The monitoring is anticipated to identify potential threats and opportunities to enhance *Q. berberidifolia* communities and to guide management activities accordingly.

Analysis of Impacts and Conservation by Planning Area

A summary of *Q. berberidifolia* communities that will be impacted and conserved is presented in Table C below. In addition to the conservation identified by Planning Area, there will be conservation and management of the Covered Species on prior RMV lands from the date of permit issuance.

Table C for California Scrub Oak: California scrub oak habitat (scrub oak chaparral and scrub oak-sagebrush) Permanently Impacted and Conserved/Managed as a Result of Covered Activities by Planning Area

Proposed RMV (Phased Dedication) and Associated Projects	**Scrub Oak Habitat Impacted (Cumulative Impacts)**	**Scrub Oak Habitat Conserved and Managed (Cumulative Conservation)**
PA1	1 (1)	1 (1)
PA2	0 (1)	2 (3)
PA3	68 (69)	189 (192)
PA4	127 (196)	39 (231)
PA5	18 (214)	8 (239)
PA6 & PA7	0 (214)	0 (239)
PA8	67 (281)	764 (1,003)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	3 (284)	-3 (1,000)
Ortega Rock	0 (284)	
Santa Margarita Water District Impacts	0 (284)	
Subtotal for Proposed RMV and Associated Projects	284	1,000
Prior RMV[1] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		48 (1,048)
TOTAL	**284**	**1,048**

[1] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus are added to the mitigation for the Planning Areas.

Build-out of PA1 will impact one ac (0.4 ha) of *Q. berberidifolia* habitat and conserve 1 acre (0.40 ha). Neither the impacts to *Q. berberidifolia* habitat nor the conservation associated with PA1 are significant within the context of the Plan.

Build-out of PA2 will not impact *Q. berberidifolia* habitat but will conserve 2 ac (0.8 ha). Cumulatively, build-out of PA1 and PA2 will conserve 3 ac (1 ha) of *Q. berberidifolia* habitat and impact 1 ac (0.4 ha).

Build-out of PA3 will impact 68 ac (28 ha) of *Q. berberidifolia* habitat and conserve 189 ac (77 ha). The PA3 impact area includes scattered *Q. berberidifolia* mostly in the northern half of the Planning Area, while the conservation area includes larger areas of *Q. berberidifolia* on either side of San Juan Creek northeast of PA4. Cumulatively, build-out of PA1 through PA3 will conserve substantially more *Q. berberidifolia* habitat (192 ac (78 ha)) than will be impacted (69 ac (28 ha)).

Build-out of PA4 will impact up to 127 ac (51 ha) of *Q. berberidifolia* habitat and conserve 39 ac (16 ha). The PA4 development footprint includes a concentration of *Q. berberidifolia* in the eastern portion of PA4, and the conservation area includes smaller areas of oak woodland surrounding the development. Cumulatively, build-out of PA1 through PA4 will conserve 231 ac (94 ha) of *Q. berberidifolia* habitat and impact 196 ac (79 ha). Although almost half of the *Q. berberidifolia* in PA1 through PA4 will be impacted, most of the *Q. berberidifolia* in the Plan Area is either in the San Mateo Creek watershed or on existing conserved lands, including Caspers Regional Wilderness Park and NAS Starr Ranch. The cumulative conservation and management of 231 ac (94 ha) of *Q. berberidifolia* habitat combined with the management of 48 additional acres (19 ha) on prior RMV lands is anticipated to offset these impacts.

Build-out of PA5 will impact 18 ac (7 ha) of *Q. berberidifolia* habitat and conserve 8 ac (3 ha). The PA5 impact area includes an area of *Q. berberidifolia* near the northern edge of the Planning Area, and the conserved *Q. berberidifolia* is just north of the Planning Area. Cumulatively, the conservation associated with PA1 through PA5 (239 ac (97 ha)) will be greater than the cumulative impacts (214 acres), and importantly, if RMV voluntarily terminates its permit following the commencement of grading PA5, the large conservation area associated with PA8 (see below) will be conserved. The PA8 conservation area would greatly increase the conservation of *Q. berberidifolia* habitat associated with the RMV development, further helping to offset impacts associated with PA1 through PA5. In addition, the management of the large amount of existing conserved habitat on prior RMV lands will contribute substantially to the conservation of *Q. berberidifolia* in the Plan Area.

The expansion of agricultural activities in PA6 and 7 will not impact *Q. berberidifolia*, and no conservation is associated with the expansion of agricultural activities in PA6 and PA7.

Build-out of PA8 will impact an estimated 67 ac (27 ha) of *Q. berberidifolia* and will conserve 764 ac (309 ha). Combined, build-out of PA1 through PA8 will result in the conservation of 1,003 ac (406 ha) of *Q. berberidifolia* habitat while impacting only 281 acres (>3:1 ratio of conservation/impact). The PA8 conservation area will also maintain connectivity between *Q. berberidifolia* in the San Juan Creek and San Mateo Creek watersheds.

Lastly, impacts associated with RMV's infrastructure in the Habitat Reserve will permanently impact an estimated 3 ac (1 ha) of *Q. berberidifolia* habitat. Another 2 ac (0.8 ha) of *Q. berberidifolia* habitat will be temporarily impacted but subsequently replanted/restored. The impacts associated with infrastructure represent a very small portion of the total impacts and will be spread throughout the life of the project. The management of prior RMV lands and conservation and management of the Habitat Reserve areas associated with PA1 through PA8 will more than offset these impacts.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 or Alternative Order 1, 4, 3, 2, 5, and 8, new conservation of *Q. berberidifolia* habitat still exceeds the development impact by a ratio greater than 1:1 in all phases of development. Considering the widespread distribution of *Q. berberidifolia* and the management of 48 acres of *Q. berberidifolia* habitat on existing RMV lands, the conservation is anticipated to adequately offset the impacts for this species.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of *Quercus berberidifolia*. We base this conclusion on the following:

1. *Q. berberidifolia* is widespread west of the deserts from Tehema and Nevada counties south along the Sierra Nevada foothills and Coast Ranges south to the western slopes of the Sierra Juarez in northwestern Baja California, so the action area represents a small portion of the species' total distribution.

2. An estimated 284 ac (115 ha) of habitat supporting known occurrences of *Q. berberidifolia* will be destroyed, which represents only about 9 percent of the *Q. berberidifolia* habitat in the action area and a small portion of the habitat for this species across its range.

3. A total of 2,232 ac (904 ha) (74 percent) of *Q. berberidifolia* habitat in the action area will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 1,048 ac (424 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition 1,184 ac (479 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 266 ac (108 ha) is conserved at NAS Starr Ranch.

5. Combined, 2,498 ac (1,012 ha) or 83 percent of the *Q. berberidifolia* habitat in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[29]

6. The design of the Habitat Reserve will help maintain habitat connectivity between *Q. berberidifolia* in the action area and the surrounding environment.

[29] There is likely *Q. berberidifolia* habitat in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

7. We anticipate that permanent protection of known occurrences of *Q. berberidifolia* and its habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain *Q. berberidifolia* in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA is not invoked, and the Habitat Reserve is comprised of lands dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this important regional conservation effort, our no jeopardy conclusion for *Q. berberidifoli* remains valid for the following reasons:

10. An estimated 284 ac (115 ha) of habitat supporting known occurrences of *Q. berberidifoli* will be destroyed, which represents only about 9 percent of the *Q. berberidifolia* habitat in the action area and a small portion of the habitat for this species across its range.

11. The Habitat Reserve will include 1,000 ac (405 ha) of newly conserved *Q. berberidifoli* habitat and an additional 48 ac (19 ha) of *Q. berberidifoli* habitat on prior conserved RMV lands that will be adaptively managed for the species. At NAS Starr Ranch, 266 ac (108 ha) of *Q. berberidifoli* habitat are conserved, and 1,184 ac (480 ha) of *Q. berberidifoli* habitat occurs within County Park lands[30]; combined, at least 83 percent of the *Q. berberidifoli* habitat in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.

12. The mitigation to offset the impacts on RMV lands includes conservation and adaptive management of 79 percent of the *Q. berberidifoli* habitat on RMV lands. This represents a greater than 3:1 conservation to impact ratio and a significant conservation contribution within the Subregion.

13. Because the County Park lands will remain in open space, the design of the Habitat Reserve still functions to help maintain habitat connectivity between *Q. berberidifoli* occurrences in the action area and the surrounding environment.

14. Even in absence of cooperative management with the County, we anticipate that the permanent protection of known occurrences of *Q. berberidifoli* and its habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain *Q. berberidifoli* in the Southern Subregion and contribute to the range-wide conservation of this species.

[30] Cooperative management on County lands will not occur; thus, these lands will not be included in the Habitat Reserve and are now considered SOS by this analysis.

Chaparral Beargrass

Status of the Species

Listing Status

Chaparral beargrass is not listed under the Federal Endangered Species Act but is on the CNPS list of rare plants and ranked 1B (RED 3-2-3). According to the CNPS, a ranking of 1B means the species is rare or endangered in California and elsewhere. The RED 3-2-3 ranking means the species is distributed in one to several highly restricted occurrences or present in such small numbers that it is seldom reported, endangered in a portion of its range, and endemic to California (CNPS 2001).

Species Description

Chaparral beargrass is a member of the Liliaceae (lily) family. The nomenclature of this plant is unresolved in the Jepson Manual (Hickman 1993), and it is listed under *Nolina parryi* as an undescribed species. Based on a later examination of *Nolina parryi* specimens from desert and coastal areas, Hess and Dice (1995) determined that the desert and coastal specimens differed in certain morphological traits such as leaf number and width, stem length, panicle length and diameter, and bract size. Based on these differences, Hess and Dice (1995) felt this "unrecognized" species should be recognized as separate from *Nolina parryi* and proposed the name *Nolina cismontana* to reflect the species occurrence west of the mountain ranges. The California Native Plant Society and the California Natural Diversity Database have adopted this nomenclature.

Chaparral beargrass is a yucca-like perennial shrub whose leaves are silver-green and form a dense rosette at ground level. The inflorescence grows along a tall (3.3 ft (1.0 m) to 4.9 ft (1.5 m)), slender stalk that arises from the center of the rosette. The seeds are 0.1 to 0.2 in (0.25 to 0.5 cm) long and have a reddish brown color (Dice 1993).

Habitat Affinities

Chaparral beargrass occurs in the coastal foothills in xeric coastal sage scrub and chaparral habitats found on sandstone and/or gabbro soils (CNPS 2001). According to Dice (1993), it prefers dry slopes and ridges at elevations from 460 to 4,180 ft (140 to 1,274 m). In San Diego County, chaparral beargrass is associated with *Adenostoma fasciculatum*, *Erodictyon crassifolium, Rhamnus crocea*, *Quercus* species, *Rhus laurina*, *Ceanothus* species, and *Salvia* species (as summarized by CNDDB 2006). In Orange County, *Nolina cismontana* occurs with *Salvia melifera*, *Salvia apiana*, *Yucca whipplei,* and *Adenostoma fasciculatum*. In Ventura County, it is found in dense coastal sage scrub with *Adenostoma fasciculatum*, *Hemizonia minthornii* and *Erodictyon crassifolium*.

Life History

Chaparral beargrass is dioecious; a single plant being either male or female. Chaparral beargrass has flowers from April through June. Virtually nothing is known about chaparral beargrass beyond its botanical description, geographic distribution, and soil associations. Information for this species regarding ecology, natural history, demographics and genetic structure is absent from the scientific literature.

Distribution

Chaparral beargrass is found only in San Diego, Orange, and Ventura counties. The Inventory of Rare and Endangered Plants (CNPS 2001) has it occurring in Los Angeles County as well, but no exact location(s) were given. The CNDDB (2006) has no occurrences for Los Angeles or Riverside counties.

Rangewide Trends and Current Threats

As stated above, chaparral beargrass is considered endangered in a portion of its range (CNPS 2001). Although population trends for this species were not found in the literature, it is likely declining throughout its range due to habitat loss and degradation.

Chaparral beargrass occurs in seven areas in San Diego County (numbers of individuals not given): 1) northeast of Gregory Canyon on south-facing slopes above the San Luis Rey River, 2) along Highway 16 north of Pala, 3) upper Borrego Canyon, 4) Magee Truck Trail northeast of Mount Olympus, 5) west of Trujillo/southwest of Magee Truck Trail, 6) east of Ranchita, and 7) along the western slope of Viejas Mountain (Reiser 1996, as summarized by CNDDB 2006). In Orange County it occurs in six areas: 1) east of Live Oak Canyon Road, 2) south of Hamilton Truck Trail, 3) several locations along the western side of the Santa Ana Mountains, 4) Hot Springs Canyon/western San Juan Trail, 5) Claymine Canyon, and 6) south-facing slopes in Talega Canyon east of Northrop Grumman (as summarized by CNDDB 2006). In Riverside County it has been documented in the Cleveland National Forest near Corona and in Ventura County it occurs along Medea Creek southeast of Simi Peak and in the foothills of the Santa Ynez Mountains near the head of the Santa Ana Valley.

Current threats throughout its range include habitat loss due to urban development, agriculture, road construction, and recreational activities (CNPS 2001). Chaparral beargrass is slowly declining in the Pala region due to its habitat being cleared for orchards and extensive residential yards, and it is imperiled in the foothills of the Santa Ana Mountains by residential development (Reiser 1996). Populations in Orange and San Diego counties are threatened by habitat fragmentation due to urban development including road construction and an increase in fire frequency. Within the action area, the following threats have been identified: conversion of its habitat to agriculture, urban development, and overly frequent fires.

Conservation Needs

The conservation of chaparral beargrass depends on the protection and management of land where occurrences of this species can still be found. Another important step towards the recovery of this species would be research that focuses on the ecology, natural history, demographics, and genetic structure of the populations and the effects of fire on this species. To retain the proper soil components in areas supporting chaparral beargrass, soil disturbing activities such as cattle grazing, recreational hiking and biking, and/or horseback riding should also be monitored and controlled, where necessary.

Environmental Baseline

Within the action area, chaparral beargrass has been found in Subarea 1, 2, and 4. Subarea 2 and 4 had one individual each, but the current status of these individuals is unclear. All the recently documented occurrences are within Subarea 1. In Subarea 1, chaparral beargrass is found in the Talega sub-basin. In the Talega sub-basin, there are six individuals of chaparral beargrass, all in proposed RMV. One individual is located just east of the Northrop Grumman facility, while the eastern portion of the sub-basin and has five individuals. Because of the rarity of this species, the cluster of five individuals is considered an "important" population.

Effects of the Action

Direct Effects

Over the 75-year term of the permit, one individual of chaparral beargrass could be destroyed. Five individuals will be conserved in Habitat Reserve lands. The individual impacted occurs on RMV near the Northrop Grumman facilities. Since this individual occurs in PA8, it is possible that impacts will be avoided once the exact location for development is identified. Temporary impacts to chaparral beargrass are not expected. Cattle-related impacts are not expected due to the location of this species on steep slopes in sage scrub/chaparral habitat.

Indirect Effects

Chaparral beargrass will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion. Potential indirect effects include an increase in the distribution of non-native species as a result of new roads, urban areas, and other ground-disturbing activities. Also, the frequency and timing of wildfires may change as a result of increased human-caused ignitions associated with new urban areas (Stephenson and Calcarone 1999) and increased access to open space areas. Potential effects associated with an altered fire regime include changes to the vegetation community (Stephenson and Calcarone 1999) and effects due to increased wildfire suppression activities.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species and fire, the

following conservation measures specific to and/or of particular importance to chaparral beargrass will be implemented.

Conservation and Restoration: To offset impacts to chaparral beargrass in the action area, five individuals will be included in the Habitat Reserve. These lands will be maintained and managed in perpetuity for the benefit of Covered Species including chaparral beargrass. Management will primarily involve the monitoring and management of an appropriate fire regime for this species.

In addition to conservation and management of Habitat Reserve areas for chaparral beargrass, the permittee will implement minimization measures described in Appendix U of the Plan. For each construction project, the applicant will develop and implement a BRCP that provides for resource protection and establishes monitoring requirements. The BRCP will contain specific measures for the protection of chaparral beargrass during construction including dust control measures, grading techniques, construction area limits, identification and quantification of habitats to be removed, and protective fencing around conserved and construction staging areas.

Monitoring: Monitoring of chaparral beargrass will be focused on the eastern Talega sub-basin occurrence. Monitoring will document the status of the population and note general conditions of nearby vegetation communities such as species composition, native/non-native ratio, and observable disturbance. Photostations will be established at the site. This species is an evergreen shrub, so year-to-year variation is less likely. The primary stress factor that will be monitored and managed for is fire regime.

Analysis of Impacts and Conservation by Planning Area

Since impacts and conservation of chaparral beargrass will both occur upon build-out of PA8, the analysis by Planning Area is not relevant to this species.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of chaparral beargrass. We base this conclusion on the following:

1. Five individuals at the eastern Talega sub-basin will be permanently conserved within the Habitat Reserve. This cluster of five individuals is one of only two locations of chaparral beargrass known from RMV lands, and the only "important" population identified by the Plan. This location will be monitored and managed for the benefit of chaparral beargrass. Without the Plan, it is unlikely that this location would be identified for conservation.

2. Only one location of chaparral beargrass that includes only one individual plant is anticipated to be destroyed under the Plan, and there is even a possibility that this location will be avoided by project-specific planning.

3. We anticipate that permanent protection of chaparral beargrass at the eastern Talega sub-basin "important" population combined with long-term management and monitoring action within the Habitat Reserve will help sustain chaparral beargrass in the Southern Subregion and contribute to the range-wide conservation of the species.

Coast Live Oak

Status of the Species

Listing Status

Coast live oak *(Quercus agrifolia)* is not listed under the Federal Endangered Species Act.

Species Description

Coast live oak is a member of the Fagaceae (Beech) family. It is a drought-resistant, evergreen tree that grows up to 100 ft (31 m) in height. The leaves are 0.8-2.4 in (2-6 cm) in length, have a rounded base, a pointed tip, and are leathery, oblong, oval or elliptic in outline and strongly convex (rounded above). The upper surface of the leaf is shiny, deep green, and smooth (Roberts 1995). The bark is smooth, gray-brown when young, and with age becomes darker with broad, lighter gray ridges. The fruit (acorn) matures in a year and is typically 1.0-1.5 in (2.5-4 cm) in length (Tucker 1993).

There are three subgenera of oaks: white oaks (*Lepidobalanus*), black or red oaks (*Erythrobalanus*), and golden oaks (*Protobalanus*) (Roberts 1995). Coast live oak is 1 of 5 species of black oaks and 1 of 20 species of *Quercus* that occurs in California.

Habitat Affinities

Coast live oak occurs in canyons, foothills, valleys, and mesic slopes in southern oak woodland, sycamore woodland, and chaparral habitats (Roberts 1995) and occurs on sandstone and shale-derived soils (Sawyer and Keeler-Wolf 1995). Coast live oak typically occupies slopes with deep soils, alluvial terraces, and the recent alluvium of canyon bottoms (Griffin 1977; Brown 1982). In mesic areas, coast live oak forms a dense canopy and understory vegetation may be sparse or absent. In drier areas, exposed soils are usually shallower, and coast live oak is more scattered and forms an open woodland (Holland and Keil 1995). In the coast live oak woodland/grassland ecotone, the understory consists almost entirely of grassland species with a few shrubs. In other areas (usually on somewhat steeper slopes), there is a diversity of shrubs under and between the trees and a sparser herbaceous cover.

Life History

Coast live oak is monoecious; each plant having both male and female flowers. Male flowers are minute and clustered on catkins 2-4 in (5-10 cm) long and bloom April to May, while the female flowers are inconspicuous reddish green spikes in the leaf axils. The acorns mature in one year,

have no dormancy requirements and germinate in 15 to 50 days after falling (Matsuda and McBride 1989). Seedlings are slow growing and recruitment is best among germinants growing in shade, where herbivory protection and water availability are higher. Coast live oak stands are typically 40 to 110 years old, although individual trees may live over 250 years (Muick and Bartolome 1987).

Coast live oak is exceptionally fire resistant; adaptations to fire include evergreen leaves, thick bark, and sprouting ability (Plumb 1980). Coast live oak can sprout from the bole, branches, and/or root crown after fire damage. This species recovers rapidly from moderate-severity fires and even after severe burning can sprout from the main trunk and upper crown (Plumb and McDonald 1981). Coast live oak is more likely to be damaged by fall fire than spring/summer fires (Plumb and Gomez 1983). Acorns on the soil surface are killed by low-severity fire, while animal-buried acorns usually survive moderate-severity fire, sometimes allowing high rates of post-fire establishment (Lawson *et al*. 1997).

Distribution

In California, coast live oak occurs in southern Mendocino County south through the Coast Ranges, western Transverse Ranges, Peninsular Ranges and along the coast to the western slopes of the Sierra San Pedro Martir in northwestern Baja California (Roberts 1995). Limited inland populations also occur along watercourses in the Central Valley (Holstein 1984). In southern California, coast live oak is widespread in coastal areas and lower cismontane mountain slopes from Santa Barbara and Ventura counties east to the southern slope of the San Gabriel Mountains and the San Bernardino Mountains, south through Orange, western Riverside and coastal San Diego counties, to at least the vicinity of San Vicente in Baja California. It also occurs on Santa Rosa and Santa Cruz Islands (Roberts 1995). Elevations of coast live oak populations range from sea level to 3,000 ft (915 m) in central and northern California and from sea level to 5,000 ft (1,525 m) in southern California.

Rangewide Trends and Current Threats

Oak woodlands have the richest wildlife species abundance of any habitat in California, with over 330 species of birds, mammals, reptiles, and amphibians depending on them at some stage of their life cycle (CalPIF 2002). Oak woodland, however, is declining throughout much of its range, especially in southern California. Currently, only two-thirds of California's original oak woodlands remain, and of those, only four percent are formally protected (Thomas 1997).

Current threats to coast live oak and oak woodlands include habitat destruction and fragmentation from urban development, intensive agricultural practices such as vineyards, fire suppression practices (including disking and plowing), lack of natural regeneration, Sudden Oak Death, grazing, competition from exotic invasive plant species and prolonged drought conditions (CalPIF 2002; Holland and Keil 1995). The lack of natural regeneration in coast live oak has been linked to fire suppression practices and overgrazing, both of which contribute to invasion of non-native annual grasses and cause long-term changes in habitat structure. Annual grasses tend to out-compete native perennials and young oak seedlings for soil moisture, while herbivory by cattle can also impede oak sapling development (CalPIF 2002). The newest threat to

California's oak woodlands is Sudden Oak Death. This pathogen started attacking California oaks in 1985 and became a full-scale epidemic by 1999. Oaks of many species infected with this disease die quickly, and there are no known cures. Sudden Oak Death is present in more than 350 mi (564 km) of northern/central California coastal forests and will most likely continue to spread into other regions (CalPIF 2002).

Several large-scale habitat conservation plans have been implemented in southern California in recent years. In 1996, the Service issued a permit for the Central and Coastal Orange County NCCP/HCP. In 1997, the Multiple Species Conservation Plan was implemented in southwestern San Diego County, and in 2003, the Multiple Habitat Conservation Plan was implemented in northwestern San Diego County. In 2004, the Service issued a permit for the Western Riverside County MSHCP. Coast live oak is not a Covered Species in any of these plans, and thus no mitigation specific to this species is required under these plans; however, the habitat reserves initiated through these plans include chaparral, coastal sage scrub, and oak woodland communities that likely provide conservation benefits to this species.

Conservation Needs

The conservation of coast live oak depends on the protection and management of oak woodland vegetation communities throughout its range. Within the action area, fire management intended to maintain a natural diversity of age-stands of chaparral and coastal sage scrub would likely benefit this species. Other management actions might include eradicating exotic annual grasses, minimizing grazing intensity, surveying coast live oak dominated vegetation communities to determine if the natural regeneration process is occurring, and maintaining surface and subsurface hydrology to avoid both over-and under-watering.

Environmental Baseline

Coast live oak occurs in four vegetation communities in the action area as defined by Gray and Bramlet (1992):

1. oak savannah: annual or needlegrass grassland with widely scatter oaks such that oaks are less than 20 percent of the canopy cover;
2. oak woodland: a multi-layered vegetation community with 20-80 percent cover of oaks;
3. oak forest: a multi-layered vegetation community with 80 percent or more oak canopy cover; and
4. southern coast live oak riparian forest: a riparian community in drainages and streamcourses dominated by coast live oak, but mixed with other riparian species such as *Platanus racemosa* (sycamore) and *Salix* spp. (willow).

The 4,723 ac (1,911 ha) of coast live oak habitat in the action area (Table A) consists of about 55 percent coast live oak woodland, 44 percent live oak riparian, and less than one percent oak savannah. The oak savannah occurs primarily in Caspers Regional Park. The largest areas of coast live oak woodland are in the eastern portion of the action area in Caspers Wilderness Park and the hills west of Bell Canyon and in the northern portion of the action area in Live Oak Canyon and upper Arroyo Trabuco. Live oak forest primarily occurs on the Donna O'Neill Land

Conservancy, at the head of Cristianitos Creek, on the northern slopes of Blind Canyon, and in small patches in lower Chiquita Canyon and east of Canada Gobernadora.

Coast live oak riparian forest is the most common riparian community in the action area. It occurs throughout the action area, including Arroyo Trabuco, San Juan Creek, Canada Gobernadora, Cristianitos Creek and its tributaries, and the following canyons: Chiquita, Gabino, Verdugo, Bell, Crow, Trampas, Live Oak, Lion, Hot Spring, Hickey, and Rose.

Table A for Coast Live Oak: Coast live oak habitat (coast live oak savanna, woodland, forest and riparian forest) in the action area.

Action Area Components	**Total Amount of Coast Live Oak Habitat (acres)**
Subarea 1	
Proposed RMV[1]	1,767
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	291
Prima Deshecha Landfill	2
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	1,144
Supplemental Open Space (Audubon Starr Ranch)	516
Subtotal for Subarea 1	***3,720***
Subarea 2	585
Subarea 3	159
Subarea 4[2]	259
TOTAL	**4,723**

[1] Includes project footprint for RMV infrastructure in Subarea 4 (8 acres).
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (8 acres).

Effects of the Action

Direct Effects

An estimated 629 ac (255 ha) of habitat, supporting known occurrences of coast live oak (hereafter referred to as coast live oak habitat), will be destroyed as a result of the proposed action. Most of these impacts (628 ac (254 ha)) will be within the RMV Planning Areas or as a result of infrastructure improvements, primarily roads and utilities (Table B). Only 1 ac (0.4 ha) of impact is anticipated at the Prima Deshecha Landfill. An additional 32 ac (13 ha) of coast live oak habitat within the Habitat Reserve and SOS will be impacted by infrastructure improvement activities and subsequently re-planted with oak saplings and other native vegetation and maintained for three years.

Other Covered Activities

Other Covered Activities that may impact coast live oak habitat but will not result in a permanent or quantifiable loss of potential habitat include cattle grazing, prescribed burns, maintenance of existing infrastructure such as trails, roads, and utilities, and habitat and wildlife management and monitoring activities.

Table B for Coast Live Oak: The amount of coast live oak habitat (coast live oak savanna, woodland, forest and riparian forest) permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed as coast live oak habitat in the action area.

Covered Activities and Conservation Areas	**Habitat Impacts (acres)**	**Habitat in Reserve (acres)**	**Habitat in Prima SOS[1] (acres)**	**Habitat with Status Unchanged (acres)**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	628	1,139		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		291		
Subtotal of impacts and conservation by RMV and SMWD	**628**	**1,430**		
Prima Deshecha Landfill	1		1	
Avenida La Pata on RMV Lands	0			
Avenida La Pata in Subarea 4	0			
Subtotal of impacts and conservation by the County of Orange	**1**		**1**	
Subtotal of impacts and assured conservation with adaptive management	**629**			
[2]Subarea 3 Coto de Caza Parcels 1-17	0			
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		1,144		
No Covered Activities				1,519
TOTAL	**629**	**2,574**	**1**	**1,519[4]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 516 ac in Audubon Starr Ranch SOS.

Cattle grazing results in herbivory of young oak saplings, and if the grazing pressure is heavy enough, can prevent recruitment and the development of oak woodlands. The plan involves the re-introduction of grazing along the River Pasture, which consists of the eastern portion of San Juan Creek on RMV lands. This area contains substantial amounts of coast live oak habitat, is in the proposed Habitat Reserve, and has not been grazed since 1985. Therefore, if the grazing intensity is not carefully controlled, it could negatively affect occurrences of coast live oak at this location.

Prescribed burns can also destroy or damage individual acorns, saplings, and trees, but coast live oak is fire resistant, so if the correct fire frequency, intensity, and timing are used in combination with grassland and woodland restoration, the effects to the community could be beneficial. Maintenance of existing infrastructure such as trails, roads, and utilities will result in a relatively small but undetermined amount of habitat disturbance and may occasionally destroy or damage individual oaks, primarily acorns and saplings. Habitat management and species' monitoring activities may also occasionally destroy or damage individual oaks, primarily acorns and saplings.

Several Covered Activities will permanently impact substantial areas of upland and riparian habitat but are not anticipated to impact any mapped areas of coast live oak. These Covered Activities include Prima Deshecha landfill, Ortega Rock Quarry, Avenida La Pata extension, Coto de Caza Parcels 1-17, Upper Chiquita Reservoir, and Gobernadora Multi-Purpose Basin.

Indirect Effects

Coast live oak will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion. Of particular note are the potential effects of the plan on the water table and erosion within stream channels, which could indirectly affect the distribution of oak woodland by changing the availability of water and by eroding streambanks in coast live oak riparian habitat. Another potential indirect effect of concern is the effect of human activities on the spread of upland and riparian invasive plant species, which can inhibit the development of oak woodland communities.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access and non-native species, the following conservation measures specific to and/or of particular importance for coast live oak will be implemented.

Conservation and Restoration: The Habitat Reserve will contain a total of 2,574 ac (1,042 ha) of coast live oak habitat (55 percent of the coast live oak habitat in the action area), including 1,430 ac (579 ha) on RMV lands and 1,144 ac (463 ha) within existing County Parks. To help offset impacts at Prima Deshecha Landfill, one ac (0.4 ha) of suitable habitat within SOS at the Landfill will be conserved and adaptively managed by the County for Covered Species including coast live oak.

Reserve Design: Following implementation of the Plan, large areas of coast live oak will remain on RMV lands along San Juan Creek, in tributaries and upland areas between PA4 and PA5 and north east of PA4. In the San Mateo Creek watershed, coast live oak will be conserved along much of Cristianitos Canyon, Gabino Canyon, and La Paz Canyon. Smaller areas of coast live oak are scattered throughout the RMV Conservation Area. The conserved areas on RMV are connected to other large areas of coast live oak in the Habitat Reserve, including Donna O'Neal Regional Park and Caspers Regional Wilderness Park, and to areas outside the Reserve including NAS Starr Ranch and the Cleveland National Forest. The Reserve design is anticipated to maintain these populations by conserving habitat and maintaining connectivity between all of the identified areas.

Connectivity along San Juan Creek will be maintained by conservation of the creek and surrounding upland habitat, identified as Linkage J in the Plan. The large conserved corridors between PA5 and PA4 and east of PA4 will maintain connectivity between the habitat in the San Mateo Creek watershed and that in the San Juan Creek watershed.

Construction-Related Avoidance and Minimization Measures: As discussed in the Project Description, potential impacts to coast live oak associated with construction activities on RMV lands will be avoided and minimized through preparation of Biological Resources Construction Plans (BRCP), which will be developed in coordination with the CFWO to address potential impacts to Covered Species associated with a particular project. Furthermore, potential degradation of riparian coast live oak from pollution, sedimentation, and grading will be minimized through implementation of a variety of measures identified as MSAA Avoidance/Minimization Measures.

Restoration of Temporary Impacts: All temporarily impacted upland and wetland areas in the Habitat Reserve will be restored to pre-construction elevations within one month following completion of work and to equivalent or habitat conditions (Appendix U of the Plan). Revegetation should commence within three months after restoration of pre-construction elevations and be completed within one growing season. Because coast live oak takes many years to reach maturity, "temporary" impacts to coast live oak are more correctly viewed as permanent impacts followed by restoration and planting of oak saplings.

Hydrology: Through the Water Quality Management Plans summarized in the project description, flow duration (which influences channel morphology) and water quality will be maintained such that hydrologic conditions of concern such as erosion or sedimentation or pollutants of concern will be addressed. This should help maintain the riparian coast live oak habitat.

Monitoring: Monitoring will be conducted both at a species-specific level but also at a habitat landscape level. The detailed monitoring program for coast live oak will be developed by the Reserve Manager in consultation with the Science Panel and the Wildlife Agencies. The HCP, Chapter 7, Table 7-17 provides a conceptual monitoring schedule for coast live oak that includes annual monitoring of sample vegetation plots between 2009 and 2031 to determine smaller-scale changes in this habitat type and vegetation mapping conducted once every five years from 2007 to 2027 to determine larger-scale changes in the distribution of the habitat. The implemented monitoring schedule will be subject to adjustment by the Reserve Manager, with assistance by the Science Panel, as noted above. The monitoring is anticipated to identify potential threats and opportunities to enhance coast live oak communities and to guide management activities accordingly.

Analysis of Impacts and Conservation by Planning Area

A summary of coast live oak communities that will be impacted and conserved on RMV lands is presented in Table C for coast live oak below. In addition to the conservation identified by Planning Area, there will be conservation and adaptive management of the Covered Species on prior RMV lands from the date of permit issuance.

Table C for Coast Live Oak. Coast live oak habitat (coast live oak savanna, woodland, forest and riparian forest) permanently impacted and conserved/managed as a result of Covered Activities by Planning Area.

Proposed RMV (Phased Dedication) and Associated Projects	**Coast Live Oak Habitat Impacted (Cumulative Impacts)**	**Coast Live Oak Habitat Conserved and Managed (Cumulative Conservation)**
PA1	3 (3)	30 (30)
PA2	43 (46)	116 (146)
PA3	108 (154)	279 (425)
PA4	117 (271)	13 (438)
PA5	209 (480)	126 (564)
PA6 & PA7	1 (481)	0 (564)
PA8	118 (599)	597 (1,161)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	24[2] (623)	-16[2] (1,145)
Ortega Rock	0 (623)	
Santa Margarita Water District Impacts	5 (629)	-6 (1,139)
Subtotal for Proposed RMV and Associated Projects	629	
Prior RMV[1] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		291 (1,430)
TOTAL	**629**	**1,430**

[1] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus are added to the mitigation for the Planning Areas.
[2] 16 acres of infrastructure impact are in the Habitat Reserve and 8 acres are in SOS.

Build-out of PA1 will impact 3 ac (1 ha) of coast live oak habitat and conserve 30 ac (12 ha). The PA1 conservation area includes a small amount of oak woodland along San Juan Creek and more in the area between PA1 and PA5.

Build-out of PA2 will impact 43 ac (17 ha) of coast live oak habitat and conserve 116 ac (47 ha). The PA2 impact area includes oak woodlands north of San Juan Creek, and the conservation area includes a small amount of oak woodland along San Juan Creek and scattered pockets of oak woodland along Chiquita Canyon and Gobernadora Canyon. Cumulatively, build-out of PA1 and PA2 will conserve much more coast live oak (146 ac (59 ha)) habitat than will be impacted (46 ac (19 ha)).

Build-out of PA3 will impact 108 ac (44 ha) of coast live oak habitat and conserve 279 ac (113 ha). The PA3 impact area includes numerous smaller canyons north of San Juan Creek and east of Gobernadora Canyon, while the conservation area includes most of San Juan Creek on RMV including substantial areas of oak woodland south of San Juan Creek between PA4 and PA5 and northeast of PA4. Cumulatively, build-out of PA1 through PA3 will conserve substantially more coast live oak (425 ac (172 ha)) habitat than will be impacted (154 ac (62 ha)).

Build-out of PA4 will impact up to 117 ac (47 ha) of coast live oak habitat and conserve 13 ac (5 ha). The impacts associated with PA4 could be substantially less than estimated (see Table C above), but the precise acreage of impact is not known. The PA4 development footprint includes several substantial areas of coast live oak concentrated along the drainages, and the conservation area includes smaller areas of oak woodland surrounding the development. Although the impacts to coast live oak habitat associated with PA4 are much greater than the conservation, the

cumulative conservation of 438 ac (177 ha) of coast live oak habitat from build-out of PA1 through PA4 will still be substantially greater than the impacts to 271 ac (110 ha), and the conservation combined with the management of coast live oak habitat on prior RMV lands is anticipated to more than offset the impacts associated with PA1 through PA4.

Build-out of PA5 will impact 209 ac (85 ha) of coast live oak habitat and conserve 126 ac (51 ha). The PA5 impact area includes a large concentration of oak woodland south of San Juan Creek and on either side of Trampas Canyon. The conservation area includes concentrated areas of coast live oak along the northern and eastern border of PA5. Cumulatively, the conservation associated with PA1 through PA5 (564 ac (238 ha)) will be greater than the impacts (480 ac (194 ha)), and the conservation combined with management of coast live oak habitat on prior RMV lands is anticipated to offset the cumulative impacts from PA1 through PA5. Furthermore, if RMV voluntarily terminates its permit following the commencement of grading PA5, the large conservation area associated with PA8 (see below), containing over half of the coast live oak habitat on remaining RMV lands, will be conserved.

The expansion of agricultural activities in PA6 and PA7 will impact up to 1 ac (0.4 ha) of coast live oak. No conservation is associated with the expansion of agricultural activities in PA6 and PA7, but these activities will not add substantially to the total impacts to coast live oak.

Build-out of PA8 will impact an estimated 118 ac (48 ha) of coast live oak and will conserve 597 ac (242 ha). The impacts associated with PA8 will likely be substantially less than estimated (see Table C above), but the precise acreage is not known. Combined, build-out of PA1 through PA8 will result in the conservation of an estimated 1,161 ac (470 ha) of coast live oak habitat and will impact 599 ac (243 ha) (>2:1 ratio of conservation/impact). In addition, the PA8 conservation area will maintain connectivity between coast live oak populations in the San Mateo Creek watershed and the San Juan Creek watershed.

Lastly, the analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure in the Habitat Reserve. Anticipated impacts associated with infrastructure are described above in the paragraph entitled "Infrastructure Improvements" and include an estimated 29 ac (12 ha) of coast live oak habitat. The impacts associated with infrastructure represent a small fraction of the total impacts and will be spread throughout the life of the project. The management of prior RMV lands and conservation and management of the Habitat Reserve areas associated with PA1 through PA8 will more than offset these minor impacts.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8, new conservation of coast live oak habitat still exceeds the development impact by a ratio greater than 1:1 in all phases of development. If RMV chooses to phase development by Alternative Order 1, 4, 3, 2, 5, 8, new conservation lags behind the development impact by 77 ac (31 ha) following development of PA4; however, the management of 291 ac (118 ha) of coast live oak habitat on prior RMV lands offsets this loss and following development of PA3, the conservation again exceeds the development impact by a ratio greater than 1:1 in all remaining phases of development.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of coast live oak. We base this conclusion on the following:

1. Coast live oak occurs in southern Mendocino County south through the Coast Ranges, western Transverse Ranges, Peninsular Ranges and along the coast to the western slopes of the Sierra San Pedro Martir in northwestern Baja California (Roberts 1995). Limited inland populations also occur along watercourses in the Central Valley (Holstein 1984). Therefore, the action area represents a small portion of the species' total distribution.

2. An estimated 629 ac (255 ha) of habitat supporting known occurrences of coast live oak will be destroyed, which represents only about 13 percent of the coast live oak habitat in the action area and a small portion of the habitat for this species across its range.

3. A total of 2,574 ac (1,042 ha) (55 percent) of coast live oak habitat in the action area will be cooperatively managed within the Habitat Reserve. The Habitat Reserve will include 1,430 ac (579 ha) of habitat on RMV lands that will be adaptively managed for the species. In addition, 1,144 ac (463 ha) of habitat is within existing County Parks. While adaptive management of the County Park Lands is not assured, they will be managed in accordance with the overall conservation goals of the NCCP/MSAA/HCP.

4. An additional 1 ac (0.4 ha) of coast live oak habitat will be conserved and adaptively managed by the County within SOS at Prima Deshecha Landfill, and 516 ac (209 ha) is conserved at NAS Starr Ranch.

5. Combined, 3,091 ac (1,252 ha) or 65 percent of the coast live oak habitat in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.[31]

6. The design of the Habitat Reserve will help maintain habitat connectivity between coast live oak occurrences in the action area and the surrounding environment.

7. We anticipate that permanent protection of known occurrences of coast live oak and its habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain coast live oak in the Southern Subregion and contribute to the range-wide conservation of this species.

The above analysis assumes that the permit has not been withdrawn by the County or the severability clause in the IA is not invoked, and the Habitat Reserve is comprised of lands

[31] There is likely coast live oak habitat in conserved/open space lands in Subareas 2-4; however, the precise amount of suitable habitat was not available to us for this analysis.

dedicated to the overall conservation goals of the NCCP/MSAA/HCP by both the County and RMV. Should the County determine not to participate in this regional conservation effort, our no jeopardy conclusion for coast live oak remains valid for the following reasons:

1. An estimated 628 ac (254 ha) of habitat supporting known occurrences of coast live oak will be destroyed, which represents only about 13 percent of the coast live oak habitat in the action area and a small portion of the habitat for this species across its range.

2. The Habitat Reserve will include 1,139 ac (461 ha) of newly conserved coast live oak habitat and an additional 291 ac (118 ha) of coast live oak habitat on prior conserved RMV lands that will be adaptively managed for the species. At NAS Starr Ranch, 516 ac (209 ha) of coast live oak habitat are conserved, and 1,144 ac (463 ha) of coast live oak habitat occurs within County Park lands[32]; combined, at least 65 percent of the coast live oak habitat in the action area will be conserved or remain in existing dedicated open space following implementation of the Plan.

3. The mitigation to offset the impacts on RMV lands includes conservation and adaptive management of 69 percent of the coast live oak habitat on RMV lands. This represents a greater than 2:1 conservation to impact ratio and a significant conservation contribution within the Subregion.

4. Because the County Park lands will remain in open space, the design of the Habitat Reserve still functions to help maintain habitat connectivity between coast live oak occurrences in the action area and the surrounding environment.

5. Even in absence of cooperative management with the County, we anticipate that the permanent protection of known occurrences of coast live oak and its habitat combined with long-term management and monitoring actions within the Habitat Reserve will still help sustain coast live oak in the Southern Subregion and contribute to the range-wide conservation of this species.

Coulter's saltbush

Status of the Species

Listing Status

Coulter's saltbush is not listed under the Federal Endangered Species Act but is on the CNPS list of rare plants and ranked 1B (RED 2-2-2). According to the CNPS, a ranking of 1B means the species is rare or endangered in California and elsewhere. The RED 2-2-2 ranking means the species is distributed in a limited number of occurrences, endangered in a portion of its range, and rare outside of California (CNPS 2001).

[32] Cooperative management on County lands will not occur; thus, these lands will not be included in the Habitat Reserve and are now considered SOS by this analysis.

Species Description

Coulter's saltbush is a member of the Chenopodiaceae (Goosefoot) family. It is a perennial herb, although in some areas flowers as an annual. It is slightly woody at the base and can spread up to 3 ft (1m). The stems are frequently tinged with red, much branched, and sparsely scurfy, while the leaves are sometimes opposite, narrowly elliptic to ovate, gray and scaly and 0.3-0.8 in (0.8-2 cm) long (Taylor and Wilken 1993). The seeds are brown and 0.04 to 0.06 in (0.1-0.2 cm) long.

Habitat Affinities

Coulter's saltbush is typically a component of coastal bluff scrub, coastal dunes, coastal scrub, and clay or alkaline valley and foothill grassland (CNPS 2001). According to Taylor and Wilken (1993) it prefers alkaline or clay soils and open sites such as ridge tops. On Santa Catalina Island, Coulter's saltbush was associated with *Delphinum variegatum*, *Brodiaea kinkiensis* and *Sanicula arguta,* while on San Clemente Island it was found in clay soils with *Atriplex semibaccata*, *Bergerocactus emoryi*, and *Opuntia occidentalis*. On Santa Cruz Island, Coulter's saltbush was associated with other grassland species including *Bromus mollis*, *Hordeum leporinum*, *Lolium perenne*, *Atriplex semibaccata* and *Nassella pulchra* (as summarized by CNDDB 2006).

Life History

Coulter's saltbush is monoecious, each plant having both male and female flowers. The male flowers are imperfect and bloom March through May, while the female flowers are inconspicuous and form in the leaf axils. The main form of reproduction for this species is through seed dispersal; however, other species in the *Atriplex* genus exhibit asexual reproduction (*i.e.*, *Atriplex canescens*). Information for this species regarding pollinator species, seed dispersal, and other general life history traits is absent from the scientific literature.

Distribution

Coulter's saltbush occurs from Baja California, extending northward to Ventura County and also on the Channel Islands. Almost all of the viable locations on the mainland for this species occur in Orange County including RMV, San Clemente State Park, Whispering Hills in San Juan Capistrano, Dana Point Headlands, Bommer Canyon, San Joaquin Freshwater Marsh, Laguna Beach, MacArthur Boulevard and Pacific Coast Highway, behind Newport Beach Public Library, Pelican Hill and the east slope above Los Trancos Canyon. Although Reiser (1996) believed this species was extirpated from San Diego County, one population remains at San Onofre State Park while another may still be extant at the Silver Strand State Beach on Coronado (as summarized by CNDDB 2006). In Los Angeles County, it occurred on coastal bluffs near Point Dume as recently as 1996. This population, however, may no longer be extant. Occurrences of Coulter's saltbush have also been documented on San Clemente Island, Santa Catalina Island, Santa Rosa Island, Santa Cruz Island, and San Miguel Island. This species typically occurs from sea level to 165 ft (50 m) in elevation (Taylor and Wilken 1993).

Rangewide Trends and Current Threats

As stated above, Coulter's saltbush is considered rare or threatened throughout its range. Recent declines can be attributed to development of its coast bluff habitat and possibly feral herbivores (CNPS 2001). Habitat degradation and competition from exotic plant species and cattle grazing may also be contributing to the decline of this species. The following potential threats have been identified in the action area: competition with non-native plants (*Brassica* species, *Raphanus sativus*, and *Atriplex semibaccata*), alteration of soil/water relations, destruction of cryptogammic soils and cattle-related impacts.

Conservation Needs

The conservation of Coulter's saltbush depends on the protection and management of land where remaining populations of this species still occur. Another important step towards the recovery of this species would be research that focuses on basic life history information including pollinators, seed dispersal, etc. Based on the threats identified in the action area, exotic species control and cattle exclusion programs should be considered in areas where Coulter's saltbush currently exists. To retain the proper soil components in these areas, other soil disturbing activities such as recreational hiking, biking, and/or horseback riding should also be monitored and controlled, where necessary.

Environmental Baseline

Within the southern subregion, this species is known from three general areas: Chiquita Canyon, upper Cristianitos Canyon, and upper Gabino Canyon. These three areas are located within Proposed RMV (Subarea 1).[33] Because this species is relatively rare within its range, all populations on RMV constitute "major" or "important" populations. The Chiquita Canyon group is further divided into one "major" population and two "important" populations. Thus, Subarea 1 supports one "major" population and four "important" populations as follows:

- Upper Gabino Canyon supports 4 locations and 100 individuals that are considered an "important" population.
- Upper Cristianitos Creek supports two small occurrences of 3 and 12 individuals that together form an "important" population.
- Lower Chiquita Canyon supports two locations of 200 and 400 individuals that together form an "important" population.
- Middle Chiquita/Narrows supports 19 locations ranging from 10s to 600 individuals. The location with 600 individuals is east and adjacent to the creek while locations with 150, 150, and 200 individuals are west of the creek. These four locations combined are considered a "major" population in a "key" location. The total number of individuals in this population is about 1671 individuals.

[33] A fourth location in the City of San Juan Capistrano was impacted by the Whispering Hills subdivision development where about 60 individuals were proposed to be relocated to an open space area (David Evans and Associates, Inc. 2001). Since the success of this relocation effort is unknown at this time, this population is not considered a part of the environmental baseline for the purposes of this biological opinion.

- Middle Chiquita northwest of the Treatment Plant supports 4 locations and about 349 individuals east and west of the creek, and this group is considered a "important" population in a "key" location. Approximately 336 individuals wholly or partially mapped within existing orchards are excluded from this group because they are likely already impacted.

There are 2 additional occurrences of Coulter's saltbush in Subarea 1 not given special designations that are located in a major side canyon southeast of the Narrows and contain 6 and 10 individuals, respectively. Thus, for the purposes of the effects analysis below, we are considering the environmental baseline to include 33 locations and 2,751 individuals of Coulter's saltbush.

Effects of the Action

Direct Effects

Areas impacted versus conserved for Coulter's saltbush were determined using the following criteria:

- Locations with fewer than 100 individuals must have at least 75 percent of the individuals in the Habitat Reserve or Supplemental Open Space to be considered conserved;
- If more than 25 percent of individuals are impacted in locations supporting less than 100 individuals, the entire location and all individuals at the location are considered impacted (*i.e.*, the entire location is considered non-viable over the long term);
- For locations with more than 100 individuals, any location with at least 75 individuals in the Habitat Reserve would be considered conserved; and
- For the purpose of reporting all impacts on proposed Covered Species, for locations that are considered conserved, but for which some proportion of the location is impacted, the number of impacted individuals is still reported even though overall the location is considered conserved.

Over the 75-year term of the permit, a total of 4 locations (12 percent) and 277 individuals (10 percent) of Coulter's saltbush in the action area will be permanently impacted by urban development, including infrastructure construction. All 4 locations and 277 individuals impacted are located on RMV lands. Twenty-nine locations (88 percent) and 2,474 individuals (90 percent) are conserved in the action area, all in proposed RMV Habitat Reserve lands. Eighteen of the 19 locations and 1,419 individuals (85 percent) in the Middle Chiquita Canyon/Narrows population, 4 locations and all 349 individuals in the Middle Chiquita Canyon North of Treatment Plant population, both locations and 600 individuals in the Lower Chiquita Canyon population, and all 4 locations and 100 individuals in the Upper Gabino population will be in the Habitat Reserve. Both locations in the Upper Cristianitos "important" population, consisting of 3 and 12 individuals respectively, could be destroyed under the Plan, depending on the final locations of the Covered Activities in PA6 and PA7.

In addition to the permanent impacts associated with urban development, the construction and maintenance of bridges, trails, water storage tanks, drainage culverts, and water and sewer lines will temporarily impact four locations and 111 individuals, two locations and 92 individuals within RMV lands and two locations and 19 individuals within the SMWD area. All temporary impacts will be restored to equivalent or better conditions compared to the existing condition at the time of impact (Appendix U of the Plan).

In addition to the impacts due to development projects, grazing is a potential stressor to this species. The general effects of grazing on plants are described in the General Effects of the Action section above. General effects potentially include the introduction or augmentation of non-native plant competitors and direct consumption of plants prior to setting seed. Monitoring will occur as described below to insure the maintenance of Coulter's saltbush on Habitat Reserve lands, including monitoring for appropriate pH levels and for disturbance of cryptogammic crusts by cattle. If necessary to protect Coulter's saltbush, exclusion fencing will be used to protect this species from cattle. Other Covered Activities that may impact Coulter's saltbush but will not result in a permanent loss of locations or individuals include vegetation/fuels management and habitat and wildlife management and monitoring activities.

Indirect Effects

Coulter's saltbush will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion. Potential indirect effects include an increase in the distribution of non-native species as a result of new roads, urban areas, and other ground-disturbing activities. Also, the frequency and timing of wildfires may change as a result of increased human-caused ignitions associated with new urban areas (Stephenson and Calcarone 1999) and increased access to the open space areas. Potential effects associated with an altered fire regime include changes to the vegetation community (Stephenson and Calcarone 1999) and effects due to increased wildfire suppression activities.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, fire, and grazing, the following conservation measures specific to and/or of particular importance to Coulter's saltbush will be implemented.

<u>Conservation and Restoration</u>: To offset impacts to Coulter's saltbush in the action area, a total of 29 locations (88 percent) and 2,474 individuals (90 percent) would be included in the Habitat Reserve. These lands will be maintained and managed in perpetuity for the benefit of Covered Species including Coulter's saltbush. Management actions for Coulter's saltbush within the Habitat Reserve will include the control of invasive species through implementation of the Invasive Species Control Plan described in the "Project Description" section. Artichoke thistle control occurs on RMV and is expected to continue into the future. Other control methods may also be implemented including prescribed burning, mowing, manual removal, and herbicide treatment. The potential for cattle-related impacts will be monitored and if necessary protection

of populations and associated cryptogrammic soils will be implemented. Public access will also be controlled as described in the "Project Description" section.

In addition to the management of Coulter's saltbush populations in the Habitat Reserve, translocation and propagation of Coulter's saltbush will be conducted to the extent feasible and appropriate to mitigate impacts. The Translocation, Propagation, and Management Plan for Special-Status Plants (Appendix I of the Plan) describes the various methods for restoration of Coulter's saltbush, including seed collection, receptor site selection and preparation, greenhouse propagation, translocation, introduction, direct seeding, and long-term maintenance. Appendix I of the Plan also provides success criteria to evaluate the effectiveness of the restoration of Coulter's saltbush in areas of temporary impacts.

In addition to conservation and management of Habitat Reserve areas for Coulter's saltbush and restoration of temporarily impacted areas, the permittee will implement minimization measures described in Appendix U of the Plan. For each construction project, the applicant will develop and implement a BRCP that provides for resource protection and establishes monitoring requirements. The BRCP will contain specific measures for the protection of Coulter's saltbush during construction including erosion and siltation control measures, dust control measures, grading techniques, construction area limits, identification and quantification of habitats to be removed, and protective fencing around conserved and construction staging areas.

Monitoring: Monitoring will use direct counts of observed individuals and include collection of data on native/non-native ratio and any evidence of disturbance of cryptogammic soils. Because of this species affinity for alkalinity, soil samples should be taken during surveys to measure pH. Annual monitoring will occur every year for the first five years following initiation of monitoring once occupied areas are dedicated to the Habitat Reserve and thereafter in intervals as determined by the Reserve Manager and Science Panel.

Analysis of Impacts and Conservation by Planning Area

A summary of Coulter's saltbush individuals that will be impacted and conserved is presented in Table C below.

Build-out of PA1 will not impact Coulter's saltbush. Build-out of PA2 will impact 219 individuals and result in the conservation and management of 2,417 individuals (>11:1 ratio conservation/impact). Both areas impacted and conserved are in Middle Chiquita Canyon, a site supporting a "major" population. Build-out of PA3, PA4, PA5, PA6 and PA7 will not impact Coulter's saltbush. Build-out of PA8 will impact 15 individuals and result in the conservation of 100 individuals in Gabino Canyon, an "important" population.

The majority of impacts and conservation will occur upon build-out of PA2. Upon build-out of PA2, 2,417 of the 2,474 Coulter's saltbush individuals (98 percent) proposed for conservation will be included in the Habitat Reserve. The only other Planning Area with impacts or conservation is PA8, which includes a small proportion of the impacts and conservation under the Plan. Thus, if RMV voluntarily terminates their permit following the grading of PA2 or

subsequent Planning Areas, most of the conservation area for Coulter's saltbush will already be permanently conserved.

Table C for Coulter's Saltbush: Coulter's saltbush individuals permanently impacted and conserved/managed as a result of Covered Activities by Planning Area

Proposed RMV (Phased Dedication) and Associated Projects	**Coulter's Saltbush Individuals Impacted (Cumulative Impacts)**	**Coulter's Saltbush Individuals Conserved and Managed (Cumulative Conservation)**
PA1	0 (0)	0 (0)
PA2[1]	219 (219)	2,417 (2,417)
PA3	0 (219)	0 (2,417)
PA4	0 (219)	0 (2,417)
PA5	0 (219)	0 (2,417)
PA6 & PA7	0 (219)	0 (2,417)
PA8	15 (234)	100 (2,517)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	43 (277)	-43 (2,474)
Santa Margarita Water District Impacts in Gobernadora Multipurpose Basin	0 (277)	
Subtotal for Proposed RMV and Associated Projects	277	
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		0 (2,474)
TOTAL	**277**	**2,474**

[1] The estimated impact and conservation in PA2 is based on the Conservation Analysis method for plants described in Chapter 13 of the NCCP/MSAA/HCP on p. 13-179.
[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

The analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure construction in the Habitat Reserve and SOS. The total impact resulting from such infrastructure is anticipated to affect only 43 of the 2,751 (< 2 percent) Coulter's saltbush individuals documented in the action area and will be spread throughout the life of the project.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 or Alternative Order 1, 4, 3, 2, 5, and 8, the above analysis remains valid since no impacts or conservation to Coulter's saltbush are associated with development of PA1, PA3, or PA4.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of the Coulter's saltbush. We base this conclusion on the following:

1. Twenty-nine locations (about 88 percent) and 2,474 individuals (about 90 percent) of Coulter's saltbush individuals in the action area will be permanently conserved within the Habitat Reserve. These locations will be monitored and actively managed for the benefit of Coulter's saltbush. Without the Plan, it is unlikely that any of these locations would be identified for conservation.

2. Only four locations (12 percent) and 277 individuals (10 percent) of Coulter's saltbush will be impacted in the action area. Most of the Coulter's saltbush individuals that will be impacted are in the Middle Chiquita/Narrows population, which is the largest occurrence of Coulter's saltbush in the action area and considered a major population in a key location. This population should be able to sustain the loss of the anticipated 252 individuals without being compromised since the population would retain about 1,419 individuals (85 percent). While the Upper Cristianitos Creek "important" population could be impacted, it includes only 15 individuals.

3. All locations and individuals of the Middle Chiquita Canyon North of the Treatment Plant, Lower Chiquita Canyon, and Upper Gabino Canyon populations, which are all considered "important" populations, will be within the Habitat Reserve.

4. Monitoring and management associated with the Plan should help address the threat of competition with non-native species, cattle-related impacts, and impacts resulting from public access.

5. This species ranges from Baja California to Ventura County, including the Channel Islands; thus, the impacts associated with Plan implementation will occur over a small portion of this species' range.

6. We anticipate that permanent protection of Coulter's saltbush locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain Coulter's saltbush in the Southern Subregion and contribute to the range-wide conservation of this species.

Many-stemmed Dudleya

Status of the Species

Listing Status

Many-stemmed dudleya is not listed under the Federal Endangered Species Act, but it is on the California Native Plant Society's (CNPS) list of rare plants and ranked 1B (RED 1-2-3). According to the CNPS, a ranking of 1B means the species is rare or endangered in California and elsewhere. The RED 1-2-3 ranking means the species is rare but found in sufficient numbers and distributed widely enough that the potential for extinction is currently low, endangered in a portion of its range and endemic to California (CNPS 2001).

Species Description

Many-stemmed dudleya is a member of the Crassulaceae (Stonecrop) family. It is a succulent, short-lived perennial herb with a corm-like stem that is 0.6-2.0 in (1.5-5 cm) long, 0.1-0.8 in (2-20 mm) wide, and oblong. The leaves are 1.5-6.0 in (4-15 cm) long, round and narrow with pointy tips that flatten out at the base. The inflorescence contains 3-15 flowers. The sepals are triangular with bottom corners rounded, and the petals are yellow and almond to spear-shaped with pointy tips. The fruit is a follicle (dry, many-seeded fruit), which spreads out. The mean number of seeds per fruit is 26 (Alejandro *et al*. 1998). Due to its vernal nature, it is not readily identifiable except during the late spring and early summer when the succulent leaves and flowers are present (Reiser 1996).

Many-stemmed dudleya is one of 45 species in the genus *Dudleya*. Moran (1951) revised the genus and recognized 55 taxa grouped into two subgenera: *Veradudleya* and *Hasseanthus*. Many-stemmed dudleya is a member of the subgenus *Hasseanthus*, which consist of four or five small short-lived perennial species that all grow from a subsurface corm (Bartel 1993). Many-stemmed dudleya is most closely related to *Dudleya variegata*, another yellow-flowered species with fewer, shorter and more flattened leaves.

Habitat Affinities

Many-stemmed dudleya occurs in openings in coastal sage scrub, chaparral, and valley and foothill grassland habitats (CNPS 2001). It is endemic to the coastal plains of southern California and is usually found growing on rocky outcrops (Dice 1990). It is often found in heavy soils with a strong clay component (Bartel 1993). Many-stemmed dudleya is often associated with coastal sage scrub and valley grassland species including *Allium fimbriatum*, *Artemisia californica*, *Calochortus* species, *Eriogonum fasciculatum*, *Nassella pulchra*, and *Selaginella bigelovii*.

Life History

The following life history information was taken from Alejandro *et al*. (1998), unless otherwise noted. Many-stemmed dudleya is adapted to arid environments and remains dormant during the dry months (June-November) as an underground corm. Dormant plants of the related *Dudleya blochmaniae* have been known to survive at least three years without water (Dodero 1995). Rainfall, coupled with cold nights, triggers the start of plant growth. Depending on the timing and amount of rainfall, plants may emerge in mid-November or as late as mid-January. The inflorescence usually appears in March and flowers through June. A plant may have two to several inflorescences, each bearing at least three flowers. The small seeds are primarily gravity-dispersed, traveling no more than 10 in (25 cm). Reifner and Bowler (1995) suggested that on sheer rock outcroppings, lichens from the genus *Niebla* serve as a nutrient-rich seed trap for the propagation of *Dudleya* species. A species of sweat bee (*Dialictus* species) has been observed successfully pollinating many-stemmed dudleya, while Dodero (1995) noted that coastal species of *Hasseanthus* appear to be pollinated by honey bees (*Apis mellifera*), bumble bees (*Bombus* species), digger bees (Anthophoridae), benbicine wasps (*Stenolia duplicata* and *Bembix occidentalis*), metallic sweat bees (Halictidae), bee flies (Bombyliidae), bee mimic flower flies

(Syrphidae), and soft-winged flower beetles (*Dasytes* species). This species can self-pollinate although it is unknown if the resulting progeny have lower fitness than progeny propagated from cross-pollinating plants.

To determine the number of *Dudleya* individuals in a given population, only the number of standing flower stalks are counted. However, because more plants flower in wet years than dry years, flowering plants likely represent only a portion of the total population of plants present at any given site. In addition to the annual fluctuation in number of flowering plants, flower counts do not include immature and non-flowering adults whose leaves have dried-up by the time of flowering. Therefore, in any given year only a portion of a *Dudleya* population will be detected during a flower count survey.

Distribution

Many-stemmed dudleya is endemic to southwestern California and is only known from extreme southwestern San Bernardino County, western Riverside County, Los Angeles County, Orange County, and in the northernmost portion of San Diego County (Bartel 1993; as summarized in CNDDB 2006). The upper elevation limit for this species varies depending on the source. According to CNPS (2001), this species is found between 50-3,000 ft (15-915 m) in elevation, while Bartel (1993) has it occurring below 2,000 ft (610 m).

Rangewide Trends and Current Threats

Many-stemmed dudleya is considered rare and endangered in a portion of its range (CNPS 2001), while its distribution appears to be constricting throughout its entire range. Approximately 30 percent of the populations known from Orange County in 1981 were extirpated by 1988 and up to 50 percent may now be extinct (Alejandro *et al*. 1998). Population trends for this species in other portions of its range are unknown; however, it is likely declining as its habitat continues to be removed for urban development.

The largest many-stemmed dudleya populations are concentrated in five areas, three in Orange County, one in San Diego County and one in western Riverside County. The three areas in Orange County include the San Joaquin Hills, the northern Lomas de Santiago including the Santiago Hills north to Gypsum and Blind Canyons, and on RMV lands. Orange County supports the majority of the extant known populations of this species, perhaps as much as 80 percent of remaining individuals. The largest population of known many-stemmed dudleya individuals in San Diego County occurs in Talega Canyon on MCB Camp Pendleton in the northern portion of San Diego County (as summarized in CNDDB 2006), while the largest population in western Riverside County is found in the Gavilan Hills. Smaller occurrences of this species can also be found near Prado Dam in San Bernardino County, in the Cleveland National Forest near Corona in Riverside County, Cleveland National Forest lands located in Orange and San Diego counties, San Dimas/San Jose Hills in Los Angeles County, and Chino Hills in Orange County.

Permits for two large-scale habitat conservation plans have been issued in southern California that included many-stemmed dudleya as a Covered Species (Appendix 2). The Service issued a

permit to San Diego Gas and Electric in 1995. The effects of this plan on many-stemmed dudleya are very small, and the plan minimizes and mitigates the impacts to the species' habitat. The Service also issued a permit for the Western Riverside County MSHCP in 2004. Approximately 311,155 ac (126,009 ha) of modeled habitat for many-stemmed dudleya was addressed by this Plan, with 55 percent of this habitat anticipated to be impacted and 45 percent anticipated to be conserved. However, within this modeled habitat, 53 percent of the known occurrences will be protected or remain within the identified MSHCP Conservation Area. Moreover, because this species is considered a narrow endemic plant under this Plan, surveys and additional conservation measures, including monitoring and management, are included to reduce impacts to "important" populations and provide for the long-term conservation of this species (USFWS 2004).

The following threats to many-stemmed dudleya were taken from CNDDB (2006). In San Diego County, the main threat to many-stemmed dudleya is the possible expansion of fire breaks, while threats to this species in the other four counties include grazing, exotic annual grasses and artichoke thistle, road expansions, disking for fire control along roads, transportation corridors, urban development, trampling by humans, mountain biking, hiking, powerline corridors, and sand/gravel and clay mining. The following potential threats to many-stemmed dudleya have been identified in the action area: Non-native plants (*Brassica* species, *Lolium multiflorum, Cynara cardunculus*, *Avena* species, *Bromus* species, *Hypochaeris glabra*, and *Hedypnois cretica*), cattle-related impacts, and recreational activities such as hiking, mountain biking, and horse-back riding.

A more subtle threat to this species is the loss of gene flow between colonies (Alejandro *et al*. 1998). Alejandro *et al*. (1998) determined that there was little gene flow among populations across the range of the species, that there was a high level of intrapopulation genetic variation, and that there was significant genetic differentiation among populations. In general, low gene flow among populations may produce functionally unique populations that are evolving under different selection pressures. Since many-stemmed dudleya is characterized by geographically isolated populations across its entire range, each population of this species may foster unique genotypic characteristics that could have evolved and adapted to microhabitats. Moreover, when a species is characterized by small, fragmented populations, genetic drift will eliminate population genetic structure and presumably increase a population's vulnerability to extinction.

Conservation Needs

The conservation of many-stemmed dudleya depends on the protection and management of lands where remaining populations of this species still occurs. Management must include the protection of pollinators and their habitat from indirect impacts such as more frequent fires, siltation, and exotic weedy annuals. Another important step towards the recovery of this species is research that focuses on the ecology, natural history, demographics and genetic structure of its remaining occurrences (Alejandro *et al*. 1998). A conservation or management plan that is based on all of this information can increase the probability of success for restoration and re-introduction to extirpated sites, or even seed-banking strategies.

Environmental Baseline

There are approximately 65,120 many-stemmed dudleya individuals in the action area (Table A), including about 50,268 individuals in proposed RMV lands and 13,795 individuals in prior RMV lands. In addition, there are 1,056 individuals in Subarea 4. This species is known from five main locations in the action area: 1) Chiquita Ridge (420 individuals); 2) Chiquadora Ridge (8,623 individuals); 3) Gobernadora/central San Juan Creek (5,678 individuals); 4) Trampas Canyon/Cristianitos Canyon extending south to the Talega development in the San Clemente watershed (34,137 individuals); and 5) upper Gabino and La Paz canyons (4,100 individuals). A smaller cluster occurs east of Northrop Grumman facilities on the mesa. There is also a single record for the Bell Canyon area on Starr Ranch. As described above in the "Status of the Species" section, this likely underestimates the true number of individuals present in the action area.

Table A for Many Stemmed Dudleya: Many-stemmed Dudleya Individuals in the Action Area

Action Area Components	**Total Many-stemmed Dudleya Individuals in NCCP Dataset**
Subarea 1	
Proposed RMV[1]	50,268
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	13,795
Prima Deshecha Landfill	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	0
Supplemental Open Space (Audubon Starr Ranch)	1
Subtotal for Subarea 1	***64,064***
Subarea 2	0
Subarea 3	0
Subarea 4	1,056
TOTAL	**65,120**

[1] Includes project footprint for RMV infrastructure in Subarea 4 (430 locations).
[2] Does not include project footprint for RMV infrastructure in Subarea 4 (430 locations).

The following describes the "major" and "important" populations of many-stemmed dudleya in the action area (acreages of each site not given):

- Upper Gabino/Middle Gabino and La Paz Canyon: 4,100 individuals, considered a "major" population.
- Trampas Canyon/Cristianitos Canyon extending south to the Talega development in the San Clemente watershed: 34,137 individuals, considered a "major" population and accounts for 52 percent of many-stemmed dudleya in the action area; RMV land supports 18,796 individuals; Donna O'Neill Conservancy land supports 14,250 individuals; and Talega Open Space land supports 1,091 individuals.
- Northrop Grumman: 292 individuals, considered an "important" population.
- Chiquadora Ridge: 8,623 individuals, considered an "important" population.

- Chiquita Ridge: 1,349 individuals, considered an "important" population.
- Lower Chiquita Canyon: 6,686 individuals, considered an "important" population.
- Central Canada Gobernadora: 5,678 individuals, considered a "major" population.
- Middle Chiquita Canyon: a few scattered locations (number of individuals not given).
- Upper Gobernadora sub-basin: 1,622 individuals, considered an "important" population.

Effects of the Action

Direct Effects

In the action area over the 75-year term of the permit, 20,039 many-stemmed dudleya individuals (31 percent) will be destroyed and 44,024 individuals (68 percent) will be conserved (Table B) in Subarea 1; one individual is conserved at NAS Starr Ranch, and the remaining 1,486 individuals (2 percent) are in Subarea 4 and will not be affected by the Plan. Development would impact 5,441 of 5,678 individuals (96 percent) in the Gobernadora "major" population. In addition, development would impact 6,635 of the 6,637 individuals (near 100 percent) in the Lower

Table B for Many-stemmed Dudleya: Many-stemmed dudleya individuals permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed in the Action Area.

Covered Activities and Conservation Areas	**Individuals Impacted**	**Individuals in Habitat Reserve (acres)**	**Individuals in Prima SOS[1] (acres)**	**Individuals with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	20,039	30,229		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		13,795		
Subtotal of impacts and conservation by RMV and SMWD	**20,039**	**44,024**		
Prima Deshecha Landfill	0		0	
Avenida La Pata on RMV Lands	0			
Avenida La Pata in Subarea 4	0			
Subtotal of impacts and conservation by the County of Orange	**0**		**0**	
Subtotal of impacts and assured conservation with adaptive management	**20,039**	**44,024**		
[2]Subarea 3 Coto de Caza Parcels 1-17	0			
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)				
No Covered Activities				1,057
TOTAL	**20,039**	**44,024**	**0**	**1,057[4]**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum possible impacts are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.
[4] Includes 1 individual in Audubon Starr Ranch SOS.

Chiquita "important" population. Impacts to other populations are less, ranging from no impacts to the East Talega population to 21 percent of individuals in the Chiquadora Ridge "important" population.

In addition to the permanent impacts associated with urban development, the construction and maintenance of bridges, trails, water storage tanks, drainage culverts, and water and sewer lines will temporarily impact 1,360 individuals. All temporary impacts will be restored to equivalent or better conditions compared to the existing condition at the time of impact (Appendix U of the Plan).

In addition to the impacts due to development projects, grazing is a potential stressor to this species. The general effects of grazing on plants are described in the General Effects of the Action section above. General potential effects include the introduction or augmentation of non-native plant competitors and direct consumption of plants prior to setting seed. Cattle are a potential stressor on the Cristianitos Canyon and Gabino Canyon populations since grazing coincides with the dudelya growing season. However, many-stemmed dudleya tends to grow in areas where annual grasses are less prevalent, some grazing has the potential to reduce the impacts of invasive species, the species has persisted with grazing, and monitoring will occur as described below to insure the maintenance of many-stemmed dudleya on Habitat Reserve lands. Grazing may also occur in the Donna O'Neill Conservancy for fuel load reduction or to aid Covered Species. A report including before and after photographs of a set of fixed points will be submitted to the Habitat Reserve Manager within three months of ending the fuel modification or grazing management measures conducted to benefit Covered Species. The Habitat Reserve Manager will include this information in the next applicable report.

Indirect Effects

Many-stemmed dudleya will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion. Potential indirect effects include an increase in the distribution of non-native species as a result of new roads, urban areas, and other ground-disturbing activities. Also, the frequency and timing of wildfires may change as a result of increased human-caused ignitions associated with new urban areas (Stephenson and Calcarone 1999) and increased access to the open space areas. Potential effects associated with an altered fire regime include changes to the vegetation community (Stephenson and Calcarone 1999) and effects due to increased wildfire suppression activities.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, fire, and grazing, the following conservation measures specific to and/or of particular importance to many-stemmed dudleya will be implemented.

<u>Conservation and Restoration:</u>. To offset impacts to many-stemmed dudleya in the action area, a total of 44,024 individuals will be included in the Habitat Reserve. This represents 68 percent of

the many-stemmed dudleya individuals known from the action area and 69 percent of the many-stemmed dudleya found on RMV lands. This conservation will include most of the "major" and "important" populations of many-stemmed dudleya with Subarea 1. The lands within the Habitat Reserve will be maintained and managed in perpetuity for the benefit of Covered Species, including many-stemmed dudleya. Management actions for many-stemmed dudleya within the Habitat Reserve will include the control of invasive species. Artichoke thistle control occurs on RMV and is expected to continue into the future. Other control methods may also be implemented including prescribed burning, mowing, manual removal, and herbicide treatment.

In addition to the management of many-stemmed dudleya populations in the Habitat Reserve, translocation and propagation of many-stemmed dudleya will be conducted to the extent feasible and appropriate to mitigate impacts. Potential restoration areas will focus on areas targeted for coastal sage scrub and coastal sage scrub/valley needlegrass grassland restoration, including Chiquita Ridge and Chiquadora Ridge. The Translocation, Propagation and Management Plan for Special-Status Plants (Appendix I of the Plan) describes the various methods for restoration of many-stemmed dudleya, including seed collection, receptor site selection and preparation, greenhouse propagation, translocation, introduction, direct seeding, and long-term maintenance. Appendix I of the Plan also provides success criteria to evaluate the effectiveness of the restoration of many-stemmed dudleya in areas of temporary impacts.

In addition to conservation and management of Habitat Reserve areas for many-stemmed dudleya and restoration of temporarily impacted areas, the permittee will implement minimization measures described in Appendix U of the Plan. For each construction project, the applicant will develop and implement a BRCP that provides for resource protection and establishes monitoring requirements. The BRCP will contain specific measures for the protection of many-stemmed dudleya during construction including erosion and siltation control measures, dust control measures, grading techniques, construction area limits, identification and quantification of habitats to be removed and protective fencing around conserved and construction staging areas.

Monitoring: Monitoring of many-stemmed dudleya will be focused on the Chiquadora Ridge, Cristianitos Canyon, upper and middle Gabino Canyon, Chiquita Ridge, upper Gobernadora and east Talega populations. Monitoring will use direct counts of observed individuals or estimates to the nearest 100 individuals as the index of population size. Representative sample plots will be selected within the monitoring areas that reflect the general size, distribution, and vegetation communities within the population. An emphasis will be to select sample plots where potential stressors such as exotic species, cattle, and human activities exist and on control areas for these stressors. Annual monitoring will occur every year for the first five years and thereafter in intervals as determined by the Reserve Manager and Science Panel.

Analysis of Impacts and Conservation by Planning Area

A summary of many-stemmed dudleya individuals that will be impacted and conserved is presented in Table C below. In addition to the conservation identified by Planning Area, there will be conservation and management of the Covered Species, including 13,795 individuals of many-stemmed dudleya on the prior RMV lands from the date of permit issuance.

Table C for Many-stemmed Dudley: Many-stemmed Dudleya Individuals Permanently Impacted and Conserved/Managed as a Result of Covered Activities by Planning Area

Proposed RMV (Phased Dedication) and Associated Projects	**Many-Stemmed Dudleya Individuals Impacted (Cumulative Impacts)**	**Many-Stemmed Dudleya Individuals Conserved and Managed (Cumulative Conservation)**
PA1	0 (0)	0 (0)
PA2	7,499 (7,499)	9,442 (9,442)
PA3	6,331 (13,830)	5,371 (14,813)
PA4	0 (13,830)	0 (14,813)
PA5	0 (13,830)	1 (14,814)
PA6 & PA7	3,221[1] (17,051)	0 (14,814)
PA8[2]	483 (17,534)	17,490 (32,304)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	2,069[2] (19,603)	-1,639[2] (30,665)
Santa Margarita Water District Impacts in Gobernadora Multipurpose Basin	436 (20,039)	-436 (30,229)
Subtotal for Proposed RMV and Associated Projects	20,039	30,229
Prior RMV[3] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		13,795
TOTAL	**20,039**	**44,024**

[1] Assumes avoidance of 4,216 individuals in siting of orchards.
[2] 1,639 individuals impacted by infrastructure are in the Habitat Reserve, and 430 individuals are in SOS.
[3] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus is added to the mitigation for the Planning Areas.

Build-out of PA6 and PA7 can occur at any time during the 75-year timeframe of Plan implementation. Since the build-out of PA6 and PA7 involve impacts to many-stemmed dudleya and no conservation, we assume for the purposes of this analysis that these impacts could happen prior to PA1 as a worst-case scenario. Build-out of PA6 and PA7 would impact 3,221 individuals of many-stemmed dudleya. The loss of 3,221 individuals upon build-out of PA6 and PA7 will leave about 61,899 individuals in the action area, although not in a Habitat Reserve. The loss of the 3,221 individuals associated with PA6 and PA7 will be offset by the monitoring and management of the 13,795 individuals associated with Prior RMV lands within 6 months of upon permit issuance.

Build-out of PA1 will not impact many-stemmed dudleya. Build-out of PA2 will impact 7,499 individuals and result in new conservation and management of 9,442 individuals. Build-out of PA2 will result in impacts to the Lower Chiquita "important" population, but these impacts will be offset by conservation of portions of the Chiquadora Ridge and Chiquita populations.

Build-out of PA3 will impact 6,331 individuals and result in new conservation and management of 5,371 individuals. Build-out of PA3 will result in the impacts described above to the Gobernadora population, but these impacts will be offset by conservation of portions of the Chiquadora Ridge population. Cumulatively, build-out of PA3 will impact 13,830 individuals and conserve 14,813 individuals.

Build-out of PA4 and PA5 will not impact many-stemmed dudleya. Build-out of PA5 will result in new conservation and management of one location and one individual. Build-out of PA8 will impact 483 many-stemmed dudleya and result in new conservation and management of 17,490 individuals. Build-out of PA8 will result in the protection of the East Talega and Upper and Middle Gabino/La Paz Canyon populations. Cumulatively, the build-out of PA8 will impact 17,534 and conserve 32,304 many-stemmed dudleya individuals.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8 or Alternative Order 1, 4, 3, 2, 5, and 8, new conservation lags behind the development impact by 960 individuals following development of PA3 under both scenarios. However, because RMV has committed prior open space lands for inclusion within the Habitat Reserve within 6 months of issuance of the permit, 13,795 additional many-stemmed dudleya individuals will also be managed within the Habitat Reserve by this time, which maintains a conservation to impact ratio greater than 2:1. Following buildout of PA 2 under both of the Alternative, the new conservation again exceeds the impact by a greater than 1:1 ratio in all remaining phases of development.

The analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure construction in the Habitat Reserve and SOS or impacts by SMWD. The total impacts resulting from these activities will affect 2,505 of the 65,120 (4 percent) many-stemmed dudleya individuals documented in the action area and will be spread throughout the life of the project. Cumulatively, the Covered Activities will impact 20,039 many-stemmed dudleya individuals and conserve 30,229 individuals. In addition, 13,795 individuals will be included in the Habitat Reserve and adaptively managed for the benefit of the species. Thus, the overall conservation to impact ratio is greater than 2:1.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/MSAA/HCP is not likely to jeopardize the continued existence of many-stemmed dudleya. We base this conclusion on the following:

1. In total, 44,024 individuals (68 percent) of the many-stemmed dudleya individuals in the action area will be permanently conserved within the Habitat Reserve. These locations will be monitored and actively managed for the benefit of many-stemmed dudleya. Without the Plan, it is unlikely that any of these locations would be identified for conservation.

2. Most of the Gobernadora "major" population and all of the Chiquita "important" population will be developed under the Plan; however, all locations and individuals of the Middle Chiquita Canyon North of the Treatment Plant, Lower Chiquita Canyon, and Upper Gabino Canyon populations, which are all considered "important" populations, will be conserved within the Habitat Reserve and receive monitoring and management.

3. Monitoring and management associated with the Plan should help address the threat of competition with non-native species, cattle-related impacts, and impacts resulting from public access.

4. We anticipate that permanent protection of many-stemmed dudleya locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain many-stemmed dudleya in the Southern Subregion and contribute to the range-wide conservation of this species.

Southern tarplant

Status of the Species

Listing Status

Southern tarplant is not listed under the Federal Endangered Species Act but is on the CNPS list of rare plants and ranked 1B (RED 3-3-2). According to the CNPS, a ranking of 1B means the species is rare or endangered in California and elsewhere. The RED 3-3-2 ranking means the species is distributed in one to several highly restricted occurrences, endangered throughout its range, and rare outside of California (CNPS 2001).

Species Description

Southern tarplant is a member of the Asteraceae (Sunflower) family. It is an annual herb that can reach heights of up to 2.5 ft (0.8 m). The stems are stiff, bristly and simple or branched, while the lower leaves vary in size from 2-8 in (5-20 cm), are linear-lanceolate, and deeply divided. The upper leaves are linear and spine-tipped. The inflorescence can vary from open to dense. The ray flowers number from 9 to more than 30 and the ligule (a flattened, strap-shaped part of the ray corolla) is 0.08-0.25 in (0.2-0.6 cm) long, two-lobed, and yellow (sometimes becoming red). The species is characterized by many disk flowers with yellow petals and brown or black anthers.

Habitat Affinities

Southern tarplant occurs in vernal pools, alkali playas, alkali grasslands, valley and foothill grasslands, marshes, swamps, and disturbed areas (CNPS 2001). According to Keil (1993), it prefers seasonally wet (often saline or alkaline) grassland near the coast below 650 ft (198 m) in elevation. In San Diego County, southern tarplant is often associated with non-native annual grasses or at the edge of riparian woodlands. In Orange County, it is found in alkaline floodplains, weedy alkali fields and alkali flats. Southern tarplant is also found in non-native grassland in association with *Brassica geniculata*, *Frankenia grandifolia* and *Salsola kali* and in upper salt marsh with *Distichlis spicata*. In Los Angeles County, it is found in salt marsh habitats with *Salicornia virginica* and *Spartina foliosa* and in annual grassland dominated by *Bromus* species, *Lolium* species, and *Avena* species (as summarized by CNDDB 2006).

Life History

Southern tarplant typically flowers from May until November. Like other annual species, the number of southern tarplant individuals can vary significantly from one year to the next depending on a number of environmental factors including amount and timing of rainfall and temperature. Although little is known regarding the ecology/natural history of this species, it appears to be able to exist in disturbed areas (based on its abundance in cultivated and grazed areas of Chiquita Canyon, Orange County).

Distribution

Southern tarplant once occurred from Santa Barbara County south through San Diego County and into Baja California, Mexico. It may also occur on Santa Catalina Island, although confirmation is needed (CNPS 2001). The CNDDB (2006) has records for this species in Santa Barbara, Los Angeles, Orange, and San Diego counties.

Rangewide Trends and Current Threats

Historically, southern tarplant was known from 47 locations; however, 35 to 40 percent of these occurrences have been extirpated. Orange County contains the majority of currently extant populations, including the following: RMV (145,600 individuals), Newport Back Bay (160,000 individuals), Talbert Park (8,000 individuals), Banning Ranch (2,000+ individuals), Hellman Ranch (3,300 individuals), and Bolsa Chica (2,000+ individuals). Another large population occurs at Madrona Marsh (1,000 to 5,000 individuals) in Los Angeles County. Reiser (1996) describes this species at two locales in San Diego County: Del Mar and Ramona. In Del Mar, a small colony occurs immediately east of Interstate 5 and south of Via de La Valle on the periphery of salt marsh habitat. In Ramona, this species is associated with vernal pools in the vicinity of the Ramona Airport and west of Rangeland Road. According to the CNDDB (2006), these two locations are still considered extant.

Many occurrences of southern tarplant are on protected lands including approximately 160,000 individuals at the Newport Ecological Reserve, Hellman Ranch (3,307 individuals), Bolsa Chica Mesa (2,000 individuals), Talbert Park (8,000+ individuals), Madrona Marsh and Banning Ranch. In addition, on RMV the Chiquita Tesoro Mitigation Site has 11,000+ individuals and the Ladera portion of the GERA mitigation area has 10,000+ individuals.

Southern tarplant is considered endangered throughout its range according to CNPS. Recent declines can be attributed to urbanization, vehicles, and foot traffic (CNPS 2001). Habitat degradation and competition from exotic plant species may also be contributing to the decline of this species. In San Diego County, threats to this species include grazing, exotic annual grasses, and flood control activities. In Orange County, southern tarplant occurrences have been trampled by joggers, mountain bikers, dirt-bikers, and hikers. Other populations in the county are threatened by major transportation corridors. In Los Angeles County, southern tarplant is threatened by planned trails, urban development, and trampling from hikers (CNDDB 2006). The following potential threats to southern tarplant have been identified in the action area: non-

native plants (*Brassica* species, *Raphanus sativus*, and *Lolium multiflorum*), alteration of soil/water relations, and habitat fragmentation.

Conservation Needs

The conservation of southern tarplant depends on the protection and management of remaining populations of this species. Also, important to the recovery of this species is research that focuses on the ecology, natural history, demographics and genetic structure of its remaining occurrences. Exotic species control programs should be implemented in areas where southern tarplant currently exists.

Environmental Baseline

There are approximately 142,571 southern tarplant individuals within the action area (Table A). Southern tarplant has been further sub-divided into the following "major" and "important" populations:

- Middle Chiquita/Narrows: 119,006 individuals, considered a "major" population
- Middle Chiquita Northwest of the Treatment Plant: 635 individuals, considered an "important" population
- Tesoro Mitigation Site: 11,000 individuals, considered a "major" population
- GERA: 10,000 individuals, considered a "major" population
- Lower Chiquita Canyon: 400 individuals, considered a "major" population

Table A for Southern Tarplant: Southern Tarplant habitat and locations in the action area

Action Area Components	**Southern Tarplant Individuals in NCCP Dataset[1]**
Subarea 1	
Proposed RMV	142,571
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement for Arroyo Trabuco Golf Course)	0
Prima Deshecha Landfill	0
County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)	0
Supplemental Open Space (Audubon Starr Ranch)	0
Other	0
Subtotal for Subarea 1	***142,571***
Subarea 2	0
Subarea 3	0
Subarea 4	0
TOTAL	**142,571**

[1] Southern tarplant populations can vary dramatically from year to year, so the population numbers reported here are presented for the purpose of analysis rather than an accurate assessment of the population size.

In addition to these populations, there are 1,530 individuals at various locations. A population that occurs at a wetland seep between Gobernadora and Chiquita with a few hundred individuals is considered an "important" population. The other locations are not considered "major" or "important" populations. All populations of southern tarplant within the action area are within Subarea 1 and on proposed RMV lands.

Effects of the Action

Direct Effects

Over the 75-year term of the permit, a total of 12,587 individuals (9 percent) of southern tarplant in the action area will be permanently impacted by urban development, including infrastructure construction, all in Subarea 1 (Table B). All 12,587 individuals impacted are located on RMV lands.

With regard to impacts to "major" or "important" populations, 11,405 individuals of the Middle Chiquita/Narrows "major" population will be impacted. Impacts to the other approximately 1,180 individuals will occur outside the "major" or "important" populations.

Table B for Southern Tarplant: Southern tarplant individuals permanently impacted by Covered Activities and the corresponding mitigation areas that will be conserved and adaptively managed in the action area.

Covered Activities and Conservation Areas	**Individuals Impacted**	**Individuals in Habitat Reserve**	**Individuals in Prima SOS[1]**	**Individuals with Status Unchanged**
Proposed RMV (infrastructure, the SMWD reservoir in Upper Chiquita Conservation Area, and Ortega Rock)	12,587	129,984		
Prior RMV (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)	0	0		
Subtotal of impacts and conservation by RMV and SMWD		**129,984**		
Prima Deshecha Landfill	0		0	
Avenida La Pata	0			
Subtotal of impacts and conservation by the County of Orange	**0**		**0**	
Subtotal of impacts and assured conservation with adaptive management	**12,587**	**129,984**	**0**	
[2]Subarea 3 Coto de Caza Parcels 1-17				
[3]County Parks (Caspers, Thomas Riley Wilderness Parks, and O'Neill Regional Park)		0		
No Covered Activities				0
TOTAL	**12,587**	**129,984**	**0**	**0**

[1] SOS lands on Prima will be newly conserved and managed consistent with the Prima Deshecha Landfill SOS Management Plan.
[2] For the purposes of this analysis, the maximum impacts to habitat are assumed for Subarea 3 under the "Opt-In-Program."
[3] County Parks may receive adaptive management of Covered Species by RMV and through funding provided by the Coto de Caza "Opt-In-Program" and grants, but adaptive management is not assured. Thus, County Parks are included separately from the action area components that are assured of adaptive management.

In addition to the permanent impacts associated with urban development, the construction and maintenance of bridges, trails, water storage tanks, drainage culverts, and water and sewer lines will temporarily impact 16 locations and 4,539 individuals. Twelve locations and 4,159 individuals are within RMV lands and four locations and 380 individuals are within the SMWD area. All temporary impacts will be restored to equivalent or better conditions compared to the existing condition at the time of impact (Appendix U of the Plan).

In addition to the impacts due to development projects, grazing is a potential stressor to this species. The general effects of grazing on plants are described in the "General Effects of the Action" section above. General effects potentially include the introduction or augmentation of non-native plant competitors and direct consumption of plants prior to setting seed. Monitoring will occur as described below to insure the maintenance of southern tarplant on Habitat Reserve lands, including monitoring for appropriate pH levels. Other Covered Activities that may impact southern tarplant, but are not expected to result in a permanent loss of locations or individuals, include vegetation/fuels management and habitat and wildlife management and monitoring activities.

Indirect Effects

Southern tarplant will be subject to indirect effects from Covered Activities described in the "General Effects of the Action" section of this biological opinion. Potential indirect effects include an increase in the distribution of non-native species as a result of new roads, urban areas, and other ground-disturbing activities. Also, the frequency and timing of wildfires may change as a result of increased human-caused ignitions associated with new urban areas (Stephenson and Calcarone 1999) and increased access to the open space areas. Potential effects associated with an altered fire regime include changes to the vegetation community (Stephenson and Calcarone 1999) and effects due to increased wildfire suppression activities.

Conservation Measures

In addition to the Conservation Measures identified in the "Project Description" section of this biological opinion to address management of recreation/access, non-native species, fire, and grazing, the following conservation measures specific to and/or of particular importance to southern tarplant will be implemented.

<u>Conservation and Restoration</u>: To offset impacts to southern tarplant in the action area, a total of 129,984 individuals (91 percent) will be included in the Habitat Reserve. The Plan will conserve 107,601 individuals (90 percent) in the Middle Chiquita/Narrows "major" population. Almost all individuals in the Middle Chiquita Canyon Northwest of Treatment Plant "important" population will be conserved in the Habitat Reserve, with only a few individuals being impacted. All of the Lower Chiquita Canyon "major" population, Tesoro Mitigation Site "major" population, GERA "major" population, and wetland seep between Gobernadora and Chiquita "important" population will be within the Habitat Reserve.

These lands will be maintained and managed in perpetuity for the benefit of Covered Species, including southern tarplant. Management actions for southern tarplant within the Habitat Reserve would include the control of invasive species through implementation of the Invasive Species Control Plan described in the "Project Description" section. Artichoke thistle control occurs on RMV lands and is expected to continue into the future. Other control methods may also be implemented including prescribed burning, mowing, manual removal, and herbicide treatment. Public access will also be controlled as described in the "Project Description" section.

In addition to the management of southern tarplant populations in the Habitat Reserve, translocation and propagation of southern tarplant would be conducted to the extent feasible and appropriate to mitigate impacts. The Translocation, Propagation and Management Plan for Special-Status Plants (Appendix I of the Plan) describes the various methods for restoration of southern tarplant, including seed collection, receptor site selection and preparation, greenhouse propagation, translocation, introduction, direct seeding, and long-term maintenance. Appendix I of the Plan also provides success criteria to evaluate the effectiveness of the restoration of southern tarplant in areas of temporary impacts.

In addition to conservation and management of Habitat Reserve areas for southern tarplant and restoration of temporarily impacted areas, the permittee will implement minimization measures described in Appendix U of the Plan. For each construction project, the applicant will develop and implement a BRCP which provides for resource protection and establishes monitoring requirements. The BRCP will contain specific measures for the protection of southern tarplant during construction including erosion and siltation control measures, dust control measures, grading techniques, construction area limits, identification and quantification of habitats to be removed, and protective fencing around conserved and construction staging areas.

Grazing Management: Several factors should minimize the potential effects of grazing on southern tarplant. Cattle have been rotated between pastures based on water and forage availability and a desire to maintain an average of 25 percent residual dry matter for natural pastures. The maintenance of a limit on grazing intensity should minimize the potential for effects to native grasslands. Also, appropriately timed grazing can increase the vigor of native grasslands, by removal of thatch and litter, recycling of nutrients, stimulation of tillering (sprouting of new stalks), and removal and control of alien species. Further, southern tarplant occurs with non-native species in some of areas as described in the "Status of the Species" section above. Finally, grazing is an existing use that has occurred over many years and existing practices have been compatible with maintaining southern tarplant occurrences.

Monitoring: Monitoring will use direct counts of observed individuals or estimates to the nearest 1,000 individuals as the index of population size. Because of this species affinity for alkalinity, soil samples should be taken during surveys to measure pH. In addition, photographs will be taken. Annual monitoring will occur every year for the first five years and thereafter in intervals as determined by the Reserve Manager and Science Panel.

Analysis of Impacts and Conservation by Planning Area

A summary of southern tarplant individuals that will be impacted and conserved is presented in Table C below.

Table C for Southern Tarplant: Southern tarplant individuals permanently impacted and conserved/managed as a result of Covered Activities by Planning Area

Proposed RMV (Phased Dedication) and Associated Projects	**Individuals Impacted (Cumulative Impacts)[1]**	**Individuals Conserved and Managed (Cumulative Conservation)[1]**
PA1	0 (0)	0 (0)
PA2	9,281 (9,281)	123,290 (123,290)
PA3	0 (9,281)	10,000 (133,290)
PA4	0 (9,281)	0 (133,290)
PA5	0 (9,281)	0 (133,290)
PA6 & PA7	0 (9,281)	0 (133,290)
PA8	0 (9,281)	0 (133,290)
Permanent Infrastructure Impacts by RMV in Habitat Reserve and SOS	3,306 (12,587)	-3,306 (129,984)
Santa Margarita Water District Impacts in Gobernadora Multipurpose Basin	0 (12,587)	0 (129,984)
Subtotal for Proposed RMV and Associated Projects	12,587	129,984
Prior RMV[2] (Upper Chiquita Conservation Area, Donna O'Neill Conservancy, Ladera Ranch, Arroyo Trabuco Open Space, CDFG Conservation Easement)		0 (129,984)
TOTAL	**12,587**	**129,984**

[1] Assumes 100% avoidance of major populations/key locations on Chiquadora Ridge and Crisitiantios/Lower Gabino Canyon.
[2] The Prior RMV lands are already conserved but will be managed for the benefit of the Covered Species when the Plan is implemented and thus are added to the mitigation for the Planning Areas.

Build-out of PA1 will not impact southern tarplant. Build-out of PA2 will impact 9,821 individuals and result in the conservation and management of 123,290 individuals. Build-out of PA3 will not impact southern tarplant and result in the conservation of 10,000 individuals at Gobernadora Creek. Build-out of PA4, PA5, PA6, PA 7, and PA8 will have no impacts to or conservation for southern tarplant.

The majority of impacts and conservation will occur upon build-out of PA2. Upon build-out of PA2, 123,290 of the 129,984 individuals (95 pecent) to be conserved under the Plan will be conserved. The only other Planning Area with impacts or conservation is PA3, which includes conservation only. Thus, if RMV voluntarily terminates their permit following the grading of PA2 or subsequent Planning Areas, most southern tarplant in the action area will already be permanently conserved.

If RMV chooses to phase development by Alternative Order 1, 3, 2, 4, 5, and 8, southern tarplant could be conserved without associated impacts if development were halted after PA3. Thus, this order could only be an improvement from the order analyzed above. Likewise, if RMV chooses

to phase development by Alternative Order 1, 4, 3, 2, 5, and 8, this order also could only be an improvement since conservation would occur in PA3 before the impacts in PA2.

The analysis by Planning Area provided above does not include impacts associated with RMV's infrastructure construction in the Habitat Reserve. The total impact resulting from such infrastructure is anticipated to affect 3,306 of the 142,587 southern tarplant individuals documented in the action area (Table C) and will be spread throughout the life of the project.

Conclusion

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conference opinion that issuance of an incidental take permit for the proposed Covered Activities as described in the Orange County Southern Subregion NCCP/HCP is not likely to jeopardize the continued existence of the southern tarplant. We base this conclusion on the following:

1. About 129,984 individuals or 91 percent of southern tarplant individuals in the action area will be permanently conserved within the Habitat Reserve. Conserved occurrences will be monitored and actively managed for the benefit of southern tarplant. Without the Plan, it is unlikely that these individuals would be identified for conservation.

2. About 12,587 individuals of southern tarplant will be destroyed, which represents only 9 percent of southern tarplant individuals in the action area. Most of the southern tarplant individuals that will be destroyed are in the Middle Chiquita/Narrows "major" population, which is the largest occurrence of southern tarplant in the action area. This population should be able to sustain the loss of the anticipated 11,405 individuals without being compromised since the population would retain about 107,601 individuals (90 percent).

3. All locations and individuals of the Lower Chiquita Canyon "major" population, Tesoro Mitigation Site "major" population, GERA "major" population, and wetland seep between the Gobernadora and Chiquita "important" population will be within the Habitat Reserve. Almost all individuals in the Middle Chiquita Canyon Northwest of Treatment Plant "important" population will be conserved in the Habitat Reserve, with only a few individuals being impacted.

4. We anticipate that permanent protection of southern tarplant locations and associated habitat combined with long-term management and monitoring actions within the Habitat Reserve will help sustain southern tarplant in the Southern Subregion and contribute to the range-wide conservation of this species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulations issued pursuant to section 4(d) of the Act, prohibit take of endangered and threatened species without a special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), such incidental taking is not considered to be a prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement. Sections 7(b)(4) and 7(o)(2) of the Act do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law. Thread-leaved brodiaea is listed as endangered under both the Federal Endangered Species Act and the California Endangered Species Act. This biological and conference opinion does not relieve the need for the Permittees' compliance with any other Federal, State or local permitting requirement.

The proposed Southern NCCP/HCP and its associated documents identify anticipated impacts to the affected species likely to result from the proposed taking and the measures that are necessary and appropriate to minimize those impacts. All conservation measures described in the proposed Southern NCCP/HCP specific to the HCP Conservation Strategy, together with the terms and conditions described in the associated Implementation Agreement, and any section 10(a)(1)(B) permit or permits issued with respect to the proposed HCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR 402.14(i). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and 7(o)(2) to apply. If the Permittee(s) fail to adhere to these terms and conditions, protective coverage of the section 10(a)(1)(B) and 7(o)(2) may lapse. The amount or extent of incidental take anticipated under the proposed HCP, the HCP's associated reporting requirements, and provision for disposition of dead or injured animals are described in the Southern NCCP/HCP and its accompanying section 10(a)(1)(B) permit.

The action area for the Southern NCCP/HCP is known to be occupied by all of the Covered Animal Species. The amount of take (killing, harming, wounding), described below, for many species is anticipated to be low due to the effectiveness of the avoidance and minimization measures. For example, the bird species are highly mobile and are not expected to be killed or wounded due to breeding season restrictions on clearing and grubbing activities. Moreover, the riparian birds (*e.g.*, least Bell's vireo, southwestern willow flycatcher, yellow warbler, yellow-breasted chat) are only seasonally present in the action area, and very little of their habitat will be

negatively impacted over the term of the permits. The long-eared owl is rare in the action area, and similarly, while wintering burrowing owls have been documented, there are no recent (last 20 years) records for nesting burrowing owls in the action area. Incidental take for the listed fairy shrimp is also expected to be low because all occupied fairy shrimp pools are within the Habitat Reserve and effects from Covered Activities are primarily beneficial. The impacts to arroyo chub and threespine stickleback habitat will be very minor, and measures will be implemented to survey and relocate most fish out of harms way.

The section 10(a) incidental take permit would also constitute a Special Purpose permit under 50 CFR 21.27 for the take of any Covered Animal Species which may be listed as threatened or endangered under the ESA during the permit term and which are also protected by the Migratory Bird Treaty Act (MBTA), in the amount and/or number and subject to the terms and conditions specified in the 10(a) permit. The MBTA Special Purpose permit would be come effective upon the listing of the species under the ESA. Any such take shall not be in violation of the MBTA of 1918, as amended (16 U.S.C. 703-712). The Special Purpose permit shall be valid for a period of three years from the effective date, provided the section 10(a) permit remains in effect for such period. The Special Purpose permit shall be renewed, provided the Permittees remain in compliance with the terms of the 10(a) permit and the Implementation Agreement. Each such renewal shall be valid for the maximum period of time allowed by 50 CFR 21.27 or its successor at the time of renewal. White-tailed kite is listed as a fully protected species under the State of California's Fish and Game Code. This biological opinion does not relieve the need for the Permittees' compliance with any other Federal, State or local permitting requirement.

The measures described below are non-discretionary, and must be undertaken by the Service so that they become binding conditions of any grant or permit issued to RMV, SMWD, and the County of Orange, as appropriate, for the exemption in section 7(o)(2) to apply. The Service has a continuing duty to regulate the activity covered by the Incidental Take Statement. If the Service (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Service must track the progress of the action and its impact on the species as specified in the Incidental Take Statement. [50 CFR §402.14(i)(3)]

AMOUNT OR EXTENT OF TAKE

RMV, SMWD, and the County of Orange propose to permanently convert a maximum of 8,168 ac (3,306 ha) in accordance with the requirements, guidelines, measures, and processes described in the Southern NCCP/HCP, specific to the HCP and Implementation Agreement. In addition, RMV and SMWD propose to temporarily impact a maximum of 432 ac (175 ha). The County of Orange may also temporarily impact habitat within the 530.7-acre SOS on Prima Deshecha Landfill for general maintenance activities including landslide remediation. RMV will use its best efforts to cause 4,332 ac (1,753 ha) of Prior RMV conservancy lands to be transferred, conveyed, or otherwise assigned to the Independent Reserve Land Easement Holder within 6 months of permit issuance to be adaptively managed under the HCP. These Prior RMV lands, combined with the proposed conservation areas associated with the Phased Dedication Program, will be included in the Habitat Reserve. The disturbance and conversion of land is expected to

result in incidental take of the Covered Animal Species; take incidental to management of the Habitat Reserve is also expected. Incidental take that will result from RMV, SMWD, and the County of Orange habitat conversion and restoration and management of the Habitat Reserve will be authorized through the section 10(a)(1)(B) permits for the HCP. Take will be in the form of harm, kill, and injury. It is expected that individuals of the Covered Animal Species will or may be taken during development, as well as other Covered Activities addressed above and fully described in the Southern NCCP/HCP.

The Service expects that incidental take of various Covered Animal Species will be difficult to detect or quantify for the following reasons: (1) the aquatic nature of certain of the organisms or the relatively small body size makes the finding of a dead specimen unlikely; (2) the secretive nature of certain of the species makes detection or quantification difficult; (3) species abundance may be masked by seasonal fluctuations in numbers or other causes; (4) species occur in habitats that make them difficult to detect; (5) the species use of the habitat is intermittent.

Therefore, as a result of issuing the proposed Incidental Take permits to RMV, SMWD, and the County of Orange, the Service estimates that take of Covered Animal Species will occur with the loss of up to 8,600 ac (3,480 ha) of habitat from development and infrastructure; take will also occur on an additional approximately 33,000 ac (13,351 ha) of Covered Animal Species' habitat associated with perpetual management under the Adaptive Management Program, and habitat restoration/enhancement in the Habitat Reserve and SOS on Prima Deshecha Landfill. Habitat restoration and invasive species eradication in Subarea 3 with monies generated by Coto de Caza mitigation fees are included in the County of Orange's individual take statements for Covered Animal Species. Table 5 provides maximum authorized impacts and net conservation by Permittee.

Table 5: Impacts and Conservation by Permittee.

Permittee	**Permanent Impacts (acres)**	**Temporary Impacts (acres)**	**Permanent and Temporary Impacts Combined (acres)**	**Net Conservation (acres)**
RMV	6,687	271	6,958	20,543
SMWD	73	161	234	Not Applicable
County of Orange	1,408	*	1,408	12,481
Total	**8,168**	**432**	**8,600**	**33,024**

*The County of Orange may need to temporarily impact habitat within the 530.7-acre SOS on Prima Deshecha Landfill for general maintenance activities including landslide remediation.

Since withdrawal of RMV from the HCP will result in the termination of SMWD's permit, incidental take of the 32 Covered Species is not authorized for SMWD independent of participation by RMV in the HCP. In addition, if RMV withdraws from the HCP or invokes the severability clause in the Implementation Agreement, the take levels are authorized to the County of Orange only for arroyo toad, coastal California gnatcatcher, least Bells' vireo, yellow

warbler, yellow-breasted chat, and northern red-diamond rattlesnake. Lastly, each Permittee is not authorized to impact more of each habitat type than is shown in Table 6, and in accordance with the overall acreage impacts shown in Table 5.

Table 6: Acres of Maximum Permanent Impact by Vegetation Type and Permittee.

Vegetation Community	**Permittee**		
	RMV[1]	**County of Orange[2]**	**SMWD**
Sage Scrub	2,226	232	23
Chaparral	1,118	45	0
Grassland	1,918	749	14
Riparian	157	33	3
Freshwater Marsh	2	0	0
Alkali Meadow	3	0	0
Open Water	64	0	0
Streamcourses	0	0	0
Woodland & Forest	561	1	0
Cliff & Rock	5	0	0
Agriculture	1,497	0	32
Disturbed	345	305	0
Developed	385	43	1
Total	**8,283**	**1,408**	**73**

[1] The impact acreage is an overstatement that assumes 100 percent disturbance in PA 4 and PA8 and potential orchards in PA6 and PA7 because the areas of the specific impact have not been determined. Ultimately, impacts will be reduced by about 1,632 acres and the Habitat Reserve will be increased by the same amount. Permanent impacts for RMV include Ortega Rock, the construction of new residential/commercial, potential orchards in PAs, and new infrastructure (roads, trails, sewer, water, etc.) and operation and maintenance/repair of existing infrastructure in the Habitat Reserve and SOS.
[2] The impact acreage includes impacts for Avenida La Pata, Prima Deshecha Landfill, and Coto de Caza.

The numbers used to generate the take estimates for the individual animal species below are based on the information in Table B and C for each individual species included in the effects analysis of this biological and conference opinion. The numbers in Table B and C for individual species differ slightly from estimates provided in the Southern NCCP/HCP because of the way we addressed proposed impacts in PA6-PA8 on RMV lands. PA 6 and PA7 combined are 453 ac (183 ha) in size, of which only 50 ac (20 ha) will be developed. Thus, for species that had greater than 50 ac (20 ha) of suitable habitat in PA6 and PA7, we capped the maximum impact at 50 ac (20 ha) and added the remaining habitat acreage to the Habitat Reserve. Similarly, P8 is 1,349 ac (546 ha) of which only 500 ac (203 ha) can be developed. Thus, for species that had greater than 500 ac (203 ha) of suitable habitat in PA8, we capped the maximum impact acreage at 500 ac (203 ha) and added the remaining habitat acreage to the Habitat Reserve. Below we further quantify the expected take by species and by Permittee.

Lastly, per draft Permit Condition #14 for draft Permit Number TE144140-0 (RMV), grazing in Ladera Open Space may be proposed but only as an adaptive management tool for Covered Species that are known to occur here. The Service has final approval authority for allowing grazing activities to occur in Ladera Open Space through the minor amendment process, thus we expect that impacts to Covered Species would be low and minimized and mitigated.

Listed Amphibians

Arroyo Toad

The proposed action is anticipated to result in the permanent loss of 442 ac (179 ha) and temporary impacts to 36 ac (15 ha) of suitable upland habitat for the arroyo toad. Minimization measures may relocate some toads out of harms way prior to grading and grubbing activities. However, any remaining toads in impact areas will likely be killed. Grazing, maintenance of infrastructure, habitat management and restoration activities, monitoring, and implementation of BRCPs may also impact individual arroyo toads. Due to the difficulty in quantifying the number of arroyo toad individuals occupying the areas impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows:

RMV

- All arroyo toads within up to 442 ac (179 ha) of suitable arroyo toad habitat permanently impacted by RMV Covered Activities in the action area. In addition, the impacted habitat will no longer be available for use by arroyo toads adjacent to the impact area. Therefore, take will be in the form of harm, death, and injury.
- All arroyo toads within up to 4 ac (2 ha) temporarily impacted by RMV Covered Activities in the action area. Because temporarily impacted habitat will be restored and available for use by arroyo toads adjacent to the impact area soon after project completion, take will only be in the form of death and injury.
- A few arroyo toads within areas affected by maintenance of infrastructure, habitat restoration, and adaptive management activities within the Habitat Reserve. Take will be in the form of death or injury.
- A small, but undetermined, acreage of arroyo toad upland habitat within the Habitat Reserve may become unsuitable for arroyo toads due to habitat restoration and adaptive management activities. Take will be in the form of harm due to loss of suitable habitat.
- Trapping and handling of arroyo toad individuals associated with monitoring activities in the Habitat Reserve and implementation of project-specific BRCPs is authorized. Death or injury of arroyo toad individuals during monitoring activities and implementation of BRCPs is anticipated over the 75-year permit term. If one (1) arroyo toad is killed or four (4) arroyo toads are injured from any one monitoring session or BRCP-related action, then the take threshold will be reached and the permittee will cease the monitoring and contact the Service to discuss methods to avoid further death/injury.
- Death or injury of arroyo toads from trampling and/or temporary increases in turbidity and sedimentation associated with cattle grazing is anticipated over the 75-year permit term. Take will be in the form of death or injury. If death or injury of one (1) adult

arroyo toad, four (4) metamorphs, or one (1) egg mass is documented during a particular year, then the take threshold will be reached and the permittee will contact the Service to discuss methods to avoid further death or injury.

SMWD

- All arroyo toads within up to 32 ac (13 ha) of suitable arroyo toad habitat temporarily impacted by SMWD Covered Activities in the action area. Because temporarily impacted habitat will be restored and available for use by arroyo toads adjacent to the impact area soon after project completion, take will only be in the form of death or injury.

County of Orange

- A few arroyo toads within the 24-ac (10-ha) restoration area in Caspers Wilderness Park. Take will be in the form of death or injury.

<u>Listed Birds</u>

Coastal California Gnatcatcher

Grading and grubbing activities conducted outside the breeding season that result in the permanent loss of up to 2,479 ac (1,004 ha) of coastal California gnatcatcher breeding and foraging habitat (coastal sage scrub), supporting at least 98 known locations for the gnatcatcher, and the temporary loss of up to 71 ac (29 ha) of habitat, supporting at least 3 locations, are not likely to result in the direct mortality of adult, juvenile, or nestling birds or their eggs. Likewise, habitat management and restoration activities and maintenance of infrastructure within the Habitat Reserve and the Prima Deshecha Landfill SOS are not expected to kill or injure adult, juvenile, or nestling birds or their eggs. However, for some adult individuals, reproduction may be impaired or life expectancy shortened. Due to the difficulty in quantifying the number of gnatcatchers that may occupy the impacted habitat over the 75-year permit term, we are quantifying the take as follows:

RMV

- Any adult coastal California gnatcatchers supported by up to 2,248 ac (910 ha) of coastal sage scrub permanently impacted by RMV Covered Activities as generally distributed in Table C for coastal California gnatcatcher and currently supporting 79 gnatcatcher locations. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult gnatcatchers supported by up to 49 ac (20 ha) of coastal sage scrub temporarily impacted by RMV Covered Activities within the action area. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of gnatcatcher habitat within the Habitat Reserve may become temporarily unsuitable for gnatcatcher due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

SMWD

- Any adult coastal California gnatcatchers supported by up to 23 ac (9 ha) of coastal sage scrub permanently impacted by SMWD Covered Activities as generally distributed in Table C for coastal California gnatcatcher and currently supporting 4 gnatcatcher locations. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult gnatcatchers supported by up to 22 ac (9 ha) of coastal sage scrub temporarily impacted by SMWD Covered Activities within the action area and currently supporting at least 3 gnatcatcher locations. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.

County of Orange

- Any adult gnatcatchers supported by up to 231 ac (93 ha) of coastal sage scrub permanently impacted by County of Orange Covered Activities within the action area at Coto de Caza (57 ac (23 ha)), which currently supports 8 gnatcatcher locations; Prima Deshecha Landfill (122 ac (49)), which currently supports an additional 8 locations, and various Avenida La Pata impact areas (52 ac (21 ha)), which support 3 locations. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- A small, but undetermined, acreage of gnatcatcher habitat within the 530.7-ac (215-ha) Prima Deshecha Landfill SOS may become temporarily unsuitable for gnatcatcher due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of gnatcatcher habitat within County Parks and SOS in Subarea 3 may become temporarily unsuitable for gnatcatcher due to habitat restoration and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

Least Bell's Vireo

Grading and grubbing activities outside the breeding season that result in the permanent loss of up to 75 ac (30 ha) of least Bell's vireo nesting and foraging habitat (southern willow scrub, arroyo willow riparian forest, and black willow riparian forest), supporting at least 7 known locations for the vireo, and the temporary loss of up to 36 ac (15 ha) of habitat, supporting at least 2 locations, are not likely to result in the direct mortality of adult, juvenile, or nestling birds or their eggs. Likewise, habitat management and restoration activities and maintenance of infrastructure within the Habitat Reserve and the Prima Deshecha Landfill SOS are not expected to kill or injure adult, juvenile, or nestling birds or their eggs. However, for some adult individuals, reproduction may be impaired or life expectancy shortened. Due to the difficulty in quantifying the number of vireos that may occupy the impacted habitat over the 75-year permit term, we are quantifying the take as follows:

RMV

- Any adult vireos supported by up to 54 ac (22 ha) of suitable vireo habitat permanently impacted by RMV Covered Activities as generally distributed in Table C for least Bell's

vireo and currently supporting at least one vireo location. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.

- Any adult vireos supported by up to 34 ac (14 ha) of vireo habitat temporarily impacted by RMV Covered Activities within the action area and currently supporting at least 2 vireo locations. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of vireo habitat within the Habitat Reserve may become temporarily unsuitable for vireo due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

SMWD

- Any adult vireos supported by up to 3 ac (1 ha) of vireo habitat permanently impacted by SMWD Covered Activities as generally distributed in Table C for least Bell's vireo. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult vireos supported by up to 11 ac (4 ha) of vireo habitat temporarily impacted by SMWD Covered Activities within the action area. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.

County of Orange

- Any adult vireos supported by up to 18 ac (7 ha) of vireo habitat permanently impacted by County of Orange Covered Activities within the action area at Coto de Caza (3 ac (1 ha)); various Avenida La Pata impact areas (9 ac (4 ha)); and Prima Deshecha Landfill (6 ac (2 ha)), which currently supports at least 6 vireo locations. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- A small, but undetermined, acreage of vireo habitat within the 530.7-ac (215-ha) Prima Deshecha Landfill SOS may become temporarily unsuitable for vireo due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of vireo habitat within County Parks and SOS in Subarea 3 may become temporarily unsuitable for vireo due to habitat restoration and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

Southwestern Willow Flycatcher

Grading and grubbing activities outside the breeding season that result in the permanent loss of up to 75 ac (30 ha) and the temporary loss of up to 36 ac (15 ha) of southwestern willow flycatcher nesting and foraging habitat are not likely to result in the direct mortality of adult, juvenile, or nestling birds or their eggs. Likewise, habitat management and restoration activities and maintenance of infrastructure within the Habitat Reserve and the Prima Deshecha Landfill SOS are not expected to kill or injure adult, juvenile, or nestling birds or their eggs. However, for some adult individuals, reproduction may be impaired or life expectancy shortened. There are no known locations of southwestern willow flycatchers currently in the impact areas. Due to

the difficulty in quantifying the number of flycatchers that may occupy the impacted habitat over the 75-year permit term, we are quantifying the take as follows:

RMV

- Any adult flycatchers supported by up to 54 ac (22 ha) of southern willow scrub, arroyo willow riparian forest, and black willow riparian forest (flycatcher habitat) permanently impacted by RMV Covered Activities as generally distributed in Table C for southwestern willow flycatcher. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult flycatchers supported by up to 34 ac (14 ha) of flycatcher habitat temporarily impacted by RMV Covered Activities within the action area. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of flycatcher habitat within the Habitat Reserve may become temporarily unsuitable for flycatcher due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

SMWD

- Any adult flycatchers supported by up to 3 ac (1 ha) of flycatcher habitat permanently impacted by SMWD Covered Activities as generally distributed in Table C for southwestern willow flycatcher. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult flycatchers supported by up to 11 ac (4 ha) of flycatcher habitat temporarily impacted by SMWD Covered Activities within the action area. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.

County of Orange

- Any adult flycatchers supported by up to 18 ac (7 ha) of flycatcher habitat permanently impacted by County of Orange Covered Activities within the action area at Coto de Caza (3 ac (1 ha)); various Avenida La Pata impact areas (9 ac (4 ha)); and Prima Deshecha Landfill (6 ac (2 ha)). Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- A small, but undetermined, acreage of flycatcher habitat within the 530.7-ac (215-ha) Prima Deshecha Landfill SOS may become temporarily unsuitable for flycatcher due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of flycatcher habitat within County Parks and SOS in Subarea 3 may become temporarily unsuitable for flycatcher due to habitat restoration and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

<u>Listed Invertebrates</u>

Riverside Fairy Shrimp

Due to the difficulty in quantifying the number of Riverside fairy shrimp individuals and cysts that may be impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows: We anticipate an undetermined, but low, number of Riverside fairy shrimp adults and/or cysts will be collected, killed, injured and/or harmed in conjunction with the following activities by RMV:

RMV

- Project-related Habitat Reserve management activities including exotic species removal and regular monitoring efforts;
- Livestock grazing due to trampling and/or temporary eutrophication; and
- Prescribed burns in the watersheds of the Radio Tower Road Pools due to temporary changes in water quality.

County of Orange

- General maintenance, land remediation activities, and habitat management and restoration activities at Prima Deshecha Landfill, including the 530.7-ac (215-ha) Prima Deshecha Landfill SOS, in accordance with any approved minor amendment.

San Diego Fairy Shrimp

Due to the difficulty in quantifying the number of San Diego fairy shrimp individuals and cysts that may be impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows: We anticipate an undetermined, but low, number of San Diego fairy shrimp adults and/or cysts will be collected, killed, injured and/or harmed in conjunction with the following activities by RMV:

RMV

- Project-related Habitat Reserve management activities including exotic species removal and regular monitoring efforts;
- Livestock grazing due to trampling and/or temporary eutrophication; and
- Prescribed burns in the watersheds of the Radio Tower Road Pools due to temporary changes in water quality.

County of Orange

- General maintenance, land remediation activities, and habitat management and restoration activities at Prima Deshecha Landfill, including the 530.7-ac (215-ha) Prima Deshecha Landfill SOS, in accordance with any approved minor amendment.

<u>Unlisted Amphibians</u>

Western spadefoot toad

The proposed action is anticipated to result in the permanent loss of four known western spadefoot toad locations and an undetermined amount of suitable upland habitat. Minimization measures may relocate some toads out of harms way prior to grading and grubbing activities. However, any remaining toads in impact areas will likely be killed. Grazing, maintenance of infrastructure, habitat management and restoration activities, monitoring, and implementation of BRCPs may also impact individual western spadefoot toads. Due to the difficulty in quantifying the number of western spadefoot toad individuals occupying the areas impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows:

RMV

- All western spadefoot toads, including two known locations, within the maximum 6,687 ac (2,706 ha) area permanently impacted by RMV Covered Activities in the action area. In addition, the impacted habitat will no longer be available for use by western spadefoot toads adjacent to the impact area. Therefore, take will be in the form of harm, death, and injury.
- All western spadefoot toads within the maximum 271 ac (110 ha) area temporarily impacted by RMV Covered Activities in the action area. Because temporarily impacted habitat will be restored and available for use by western spadefoot toads adjacent to the impact area soon after project completion, take will only be in the form of death and injury.
- A few western spadefoot toads within areas affected by maintenance of infrastructure, habitat restoration, and adaptive management activities within the Habitat Reserve. Take will be in the form of death or injury.
- A small, but undetermined, acreage of western spadefoot toad upland habitat within the Habitat Reserve may become unsuitable for western spadefoot toads due to habitat restoration and adaptive management activities. Take will be in the form of harm due to loss of suitable habitat.
- Trapping and handling of western spadefoot toad individuals associated with monitoring activities in the Habitat Reserve and implementation of project-specific BRCPs is authorized. Death or injury of western spadefoot toad individuals during monitoring activities and implementation of BRCPs is anticipated over the 75-year permit term. If four (4) western spadefoot toads are found killed or injured from any one monitoring session or BRCP-related action, then the take threshold will be reached and the permittee will cease the monitoring and contact the Service to discuss methods to avoid further death/injury.
- Death or injury of western spadefoot toads from trampling and/or temporary increases in turbidity and sedimentation associated with cattle grazing is anticipated over the 75-year permit term. Take will be in the form of death or injury. These effects are anticipated to be reduced through the measures described in the Grazing Management Plan.

SMWD

- All western spadefoot toads within the maximum 73-ac (30 ha) area permanently impacted by SMWD Covered Activities in the action area. In addition, the impacted habitat will no longer be available for use by western spadefoot toads adjacent to the impact area. Therefore, take will be in the form of harm, death, and injury.
- All western spadefoot toads within the maximum 161-ac (65 ha) area temporarily impacted by SMWD Covered Activities in the action area. Because temporarily impacted habitat will be restored and available for use by western spadefoot toads adjacent to the impact area soon after project completion, take will only be in the form of death and injury.

County of Orange

- All western spadefoot toads within up to 1,025 ac (385 ha) of suitable habitat permanently impacted by County of Orange Covered Activities in the action area at Prima Deshecha (649 ac (263 ha)), Avenida La Pata (302 ac (122 ha)), and Coto de Caza (74 ac (30 ha)) as generally depicted in Table B. Take will be in the form of death and injury.
- Western spadefoot toads within a small, but undetermined, area affected by maintenance of infrastructure, habitat restoration, and adaptive management activities in the 530.7-ac (215-ha) Prima Deshecha Landfill SOS. Take of western spadefoot toads will be in the form of death or injury.
- Western spadefoot toads within a small, but undetermined, area affected by habitat restoration and adaptive management activities in County Parks and SOS in Subarea 3. Take of western spadefoot toads will be in the form of death or injury.

Unlisted Birds

Burrowing Owl

Grading and grubbing activities outside the breeding season that result in the permanent loss of up to 3,769 ac (1,525 ha) and temporary loss of up to 212 ac (86 ha) of burrowing owl nesting and foraging habitat are not likely to result in the direct mortality of adult, juvenile, or nestling birds or their eggs. Likewise, habitat management and restoration activities and maintenance of infrastructure within the Habitat Reserve and the Prima Deshecha Landfill SOS are not expected to kill or injure adult, juvenile, or nestling birds or their eggs. However, for some adult individuals, reproduction may be impaired or life expectancy shortened. There are no known locations of burrowing owl nest sites currently in the impact areas. Due to the difficulty in quantifying the number of burrowing owls that may occupy the impacted habitat over the 75-year permit term, we are quantifying the take as follows:

RMV

- Any adult burrowing owls supported by up to 2,974 ac (1,204 ha) of grassland, alkali meadow, and agriculture (burrowing owl habitat) permanently impacted by RMV Covered Activities as generally distributed in Table C for the burrowing owl. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult burrowing owls supported by up to 121 ac (49 ha) of burrowing owl habitat temporarily impacted by RMV Covered Activities within the action area. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of burrowing owl habitat within the Habitat Reserve may become temporarily unsuitable for burrowing owl due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

SMWD

- Any adult burrowing owls supported by up to 46 ac (19 ha) of burrowing owl habitat permanently impacted by SMWD Covered Activities as generally distributed in Table C for the burrowing owl. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult burrowing owls supported by up to 91 ac (37 ha) of burrowing owl habitat temporarily impacted by SMWD Covered Activities within the action area. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.

County of Orange

- Any adult burrowing owls supported by up to 749 ac (303 ha) of burrowing owl habitat permanently impacted by County of Orange Covered Activities within the action area at Coto de Caza (15 ac (6 ha)), Prima Deshecha Landfill (484 ac (196 ha)); and various Avenida La Pata impact areas (250 ac (101 ha)). Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- A small, but undetermined, acreage of burrowing owl habitat within the 530.7-ac (215-ha) Prima Deshecha Landfill SOS may become temporarily unsuitable for burrowing owl due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of burrowing owl habitat within County Parks and SOS in Subarea 3 may become temporarily unsuitable for burrowing owl due to habitat restoration and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

Coastal Cactus Wren

Grading and grubbing activities outside the breeding season that result in the permanent loss of up to 2,479 ac (1,003 ha) of cactus wren nesting and foraging habitat (coastal sage scrub), supporting at least 223 known locations for the cactus wren, and temporary loss of up to 71 ac (29 ha) of habitat, supporting at least 8 locations, are not likely to result in the direct mortality of adult, juvenile, or nestling birds or their eggs. Likewise, habitat management and restoration

activities and maintenance of infrastructure within the Habitat Reserve and the Prima Deshecha Landfill SOS are not expected to kill or injure adult, juvenile, or nestling birds or their eggs. However, for some adult individuals, reproduction may be impaired or life expectancy shortened. Due to the difficulty in quantifying the number of cactus wrens that may be using the impacted habitat over the 75-year permit term, we are quantifying the take as follows:

RMV

- Any adult cactus wrens supported by up to 2,225 ac (901 ha) of coastal sage scrub permanently impacted by RMV Covered Activities as generally distributed in Table C for coastal cactus wren and currently supporting 207 cactus wren locations. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult cactus wrens supported by up to 49 ac (20 ha) of coastal sage scrub temporarily impacted by RMV Covered Activities within the action area and currently supporting at least 5 cactus wren locations. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of cactus wren habitat within the Habitat Reserve may become temporarily unsuitable for cactus wren due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

SMWD

- Any adult cactus wrens supported by up to 23 ac (9 ha) of coastal sage scrub permanently impacted by SMWD Covered Activities as generally distributed in Table C for coastal cactus wren and currently supporting one cactus wren location.
- Any adult cactus wrens within up to 22 ac (9 ha) of coastal sage scrub temporarily impacted by SMWD Covered Activities within the action area and currently supporting at least 3 cactus wren locations. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.

County of Orange

- Any adult cactus wrens within up to 231 ac (93 ha) of coastal sage scrub permanently impacted by County of Orange Covered Activities within the action area at Coto de Caza (57 ac (23 ha)), which currently supports 7 cactus wren locations; Prima Deshecha Landfill (122 ac (49 ha)), which currently supports an additional 7 locations of cactus wren; and various Avenida La Pata (52 ac (21 ha)) impact areas, which currently support 1 cactus wren location. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- A small, but undetermined, acreage of cactus wren habitat within the 530.7-ac (215-ha) Prima Deshecha Landfill SOS may become temporarily unsuitable for cactus wren due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of cactus wren habitat within County Parks and SOS in Subarea 3 may become temporarily unsuitable for cactus wren due to habitat restoration and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

Cooper's Hawk

Grading and grubbing activities outside the breeding season that result in the permanent loss of up to 756 ac (306 ha) of Cooper's hawk habitat, supporting at least 6 historic nest sites, and the temporary loss of up to 85 ac (ha) of habitat are not likely to result in the direct mortality of adult, juvenile, or nestling birds or their eggs. Likewise, habitat management and restoration activities and maintenance of infrastructure within the Habitat Reserve and the Prima Deshecha Landfill SOS are not expected to kill or injure adult, juvenile, or nestling birds or their eggs. However, for some adult individuals, reproduction may be impaired or life expectancy shortened. Due to the difficulty in quantifying the number of Cooper's hawks that may occupy the impacted habitat over the 75-year permit term, we are quantifying the take as follows:

RMV

- Any adult Cooper's hawks supported by up to 724 ac (293 ha) of riparian, woodland and forest (Cooper's hawk habitat) permanently impacted by RMV Covered Activities as generally distributed in Table C for the Cooper's hawk and currently supporting at least 6 historic nest sites for Cooper's hawk. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult Cooper's hawks supported within up to 57 ac (23 ha) of Cooper's hawk habitat temporarily impacted by RMV Covered Activities within the action area. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of Cooper's hawk habitat within the Habitat Reserve may become temporarily unsuitable for Cooper's hawk due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

SMWD

- Any adult Cooper's hawks supported by up to 3 ac (1 ha) of Cooper's hawk habitat permanently impacted by SMWD Covered Activities generally distributed in Table C for Cooper's hawk. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult Cooper's hawks supported by up to 28 ac (11 ha) of Cooper's hawk habitat temporarily impacted by SMWD Covered Activities in the action area. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.

County of Orange

- Any adult Cooper's hawks supported by up to 29 ac (12 ha) of Cooper's hawk habitat permanently impacted by County of Orange Covered Activities within the action area at Coto de Caza (3 ac (1 ha)), Prima Deshecha Landfill (17 ac (7 ha)), and various Avenida La Pata impact areas (9 ac (4 ha)). Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- A small, but undetermined, acreage of Cooper's hawk habitat within the 530.7-ac (215-ha) Prima Deshecha Landfill SOS may become temporarily unsuitable for Cooper's hawk due to maintenance of infrastructure, habitat restoration, and adaptive management

activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

- A small, but undetermined, acreage of Cooper's hawk habitat within County Parks and SOS in Subarea 3 may become temporarily unsuitable for Cooper's hawk due to habitat restoration and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

Grasshopper Sparrow

Grading and grubbing activities outside the breeding season that results in the permanent loss of up to 3,769 ac (1,525 ha) of grasshopper sparrow nesting and foraging habitat, supporting at least 267 known locations for grasshopper sparrow, and the temporary loss of up to 212 ac (86 ha) of habitat, supporting 15 locations, are not likely to result in the direct mortality of adult, juvenile, or nestling birds or their eggs. Likewise, habitat management and restoration activities and maintenance of infrastructure within the Habitat Reserve and the Prima Deshecha Landfill SOS are not expected to kill or injure adult, juvenile, or nestling birds or their eggs. However, for some adult individuals, reproduction may be impaired or life expectancy shortened. Grazing in the pastures on RMV lands during the grasshopper sparrow breeding season may result in some loss of eggs or nestlings. Due to the difficulty in quantifying the number of grasshopper sparrows that may occupy the impacted habitat over the 75-year permit term, we are quantifying the take as follows:

RMV

- Any adult grasshopper sparrows supported by up to 2,974 ac (1,204 ha) of grassland, alkali meadow, and agriculture (grasshopper sparrow habitat) permanently impacted by RMV Covered Activities as generally distributed in Table C for the grasshopper sparrow and currently supporting at least 219 locations of grasshopper sparrow. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult grasshopper sparrows supported by up to 121 ac (49 ha) of grasshopper sparrow habitat temporarily impacted by RMV Covered Activities within the action area and currently supporting at least 6 locations of grasshopper sparrow. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of grasshopper sparrow habitat within the Habitat Reserve may become temporarily unsuitable for grasshopper sparrow due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.
- Death or injury of grasshopper sparrow eggs and nestling birds from livestock grazing in the RMV pastures due to trampling of nests is anticipated over the 75-year permit term. If 5 trampled nests are incidentally documented in a given year, during the routine annual monitoring activities as proposed in the NCCP/MSAA/HCP, then the take threshold will be reached and the permittee will contact the Service to discuss whether further conservation measures to reduce this take are needed. It is not anticipated that grazing operations in any active pastures, and in particular the pasture(s) where the take threshold was met, would need to cease during these discussions.

SMWD

- Any adult grasshopper sparrows supported within up to 46 ac (19 ha) of grasshopper sparrow habitat permanently impacted by SMWD Covered Activities as generally distributed in Table C for grasshopper sparrow and currently supporting one location for grasshopper sparrow. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult grasshopper sparrows supported within up to 91 ac (37 ha) of grasshopper sparrow habitat temporarily impacted by SMWD Covered Activities in the action area and currently supporting at least nine locations of grasshopper sparrow. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.

County of Orange

- Any adult grasshopper sparrows supported within up to 749 ac (303 ha) of grasshopper sparrow habitat permanently impacted by County of Orange Covered Activities within the action area at Coto de Caza (15 ac (6 ha)), Prima Deshecha Landfill (484 ac (196 ha)), which currently supports 17 locations of grasshopper sparrow; and various Avenida La Pata impact areas (250 ac (101 ha)), which support locations. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- A small, but undetermined, acreage of grasshopper sparrow habitat within the 530.7-ac (215-ha) Prima Deshecha Landfill SOS may become temporarily unsuitable for grasshopper sparrow due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of grasshopper sparrow habitat within County Parks and SOS in Subarea 3 may become temporarily unsuitable for grasshopper sparrow due to habitat restoration and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

Long-eared owl

Grading and grubbing activities outside the breeding season will result in the loss of suitable nesting and foraging habitat for the long-eared owl within the maximum 8,168-ac (3,305-ha) area of permanent impacts and the maximum 432-ac (175-ha) area of temporary impacts authorized under the Plan. These activities are not likely to result in the direct mortality of adult, juvenile, or nestling birds or their eggs. Likewise, habitat management and restoration activities and maintenance of infrastructure within the Habitat Reserve and the Prima Deshecha Landfill SOS are not expected to kill or injure adult, juvenile, or nestling birds or their eggs. However, for some adult individuals, reproduction may be impaired or life expectancy shortened. Due to the difficulty in quantifying the number of long-eared owls that may occupy the impacted habitat over the 75-year permit term, we are quantifying the take as follows:

RMV

- Any adult long-eared owls supported by the maximum 6,687-ac (2,706-ha) area permanently impacted by RMV Covered Activities in the action area. Take will be in the form of harm due to the permanent loss of nesting habitat.
- Any adult long-eared owls supported by the maximum 271-ac (110-ha) area temporarily impacted by RMV Covered Activities within the action area. Take will be in the form of harm due to the temporary loss of nesting habitat.
- A small, but undetermined, acreage of long-eared owl nesting habitat within the Habitat Reserve may become temporarily unsuitable for long-eared owl due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of nesting habitat.

SMWD

- Any adult long-eared owls supported by the maximum 73-ac (30-ha) area permanently impacted by SMWD Covered Activities. Take will be in the form of harm due to the permanent loss of nesting habitat.
- Any adult long-eared owls supported by the maximum 161-ac (65-ha) area temporarily impacted by SMWD Covered Activities in the action area. Take will be in the form of harm due to the temporary loss of nesting habitat.

County of Orange

- Any adult long-eared owls supported by the maximum 1,408-ac (570 ha) area permanently impacted by County of Orange Covered Activities within the action area at Coto de Caza (77 ac (31 ha)), Prima Deshecha Landfill (999 ac (404 ha)), and various Avenida La Pata impact areas (331 ac (134 ha)). Take will be in the form of harm due to the permanent loss of nesting habitat.
- A small, but undetermined, acreage of long-eared owl nesting habitat within the 530.7-ac (215-ha) Prima Deshecha Landfill SOS may become temporarily unsuitable for long-eared owl due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of nesting habitat.
- A small, but undetermined, acreage of long-eared owl nesting habitat within County Parks and SOS in Subarea 3 may become temporarily unsuitable for long-eared owl due to habitat restoration and adaptive management activities. Take will be in the form of harm due to temporary loss of nesting habitat.

Tricolored Blackbird

Grading and grubbing activities outside the breeding season that result in the permanent loss of up to 3,769 ac (1,525 ha) of tricolored blackbird nesting and foraging habitat, including 1 historic breeding site, are not likely to result in the direct mortality of adult, juvenile, or nestling birds or their eggs. Likewise, habitat management and restoration activities and maintenance of infrastructure within the Habitat Reserve and the Prima Deshecha Landfill SOS are not expected to kill or injure adult, juvenile, or nestling birds or their eggs. However, for some adult individuals, reproduction may be impaired or life expectancy shortened. Due to the difficulty in

quantifying the number of tricolored blackbirds that may occupy the impacted habitat over the 75-year permit term, we are quantifying the take as follows:

RMV

- Any adult tricolored blackbirds supported by up to 2,974 ac (1,204 ha) of grassland, alkali meadow, and agriculture (tricolored blackbird habitat) permanently impacted by RMV Covered Activities as generally distributed in Table C for the tricolored blackbird and currently supporting one historic breeding site. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult tricolored blackbirds supported by up to 121 ac (49 ha) of tricolored blackbird habitat temporarily impacted by RMV Covered Activities within the action area. Take will be in the form of harm due to the temporary loss of foraging habitat.
- A small, but undetermined, acreage of tricolored blackbird habitat within the Habitat Reserve on RMV lands may become temporarily unsuitable for tricolored blackbird due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of foraging habitat.

SMWD

- Any adult tricolored blackbirds supported by up to 46 ac (19 ha) of tricolored blackbird habitat permanently impacted by SMWD Covered Activities generally distributed in Table C for tricolored blackbird. Take will be in the form of harm due to the permanent loss of foraging habitat.
- Any adult tricolored blackbirds supported by up to 91 ac (37 ha) of tricolored blackbird habitat temporarily impacted by SMWD Covered Activities in the action area. Take will be in the form of harm due to the temporary loss of foraging habitat.

County of Orange

- Any adult tricolored blackbirds supported by up to 749 ac (303 ha) of tricolored blackbird habitat permanently impacted by County of Orange Covered Activities within the action area at Coto de Caza (15 ac (6 ha)), Prima Deshecha Landfill (484 ac (196 ha)), and various Avenida La Pata impact areas (250 ac (101 ha)). Take will be in the form of harm due to the permanent loss of foraging habitat.
- A small, but undetermined, acreage of tricolored blackbird habitat within the 530.7-ac (215-ha) Prima Deshecha Landfill SOS may become temporarily unsuitable for tricolored blackbird due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of foraging habitat.
- A small, but undetermined, acreage of tricolored blackbird habitat within County Parks and SOS in Subarea 3 may become temporarily unsuitable for tricolored blackbird due to habitat restoration and adaptive management activities. Take will be in the form of harm due to temporary loss of foraging habitat.

White-tailed Kite

Grading and grubbing activities outside the breeding season that result in the permanent loss of up to 756 ac (306 ha) of white-tailed kite nesting habitat, supporting at least two historic nest sites, and the temporary loss of up to 85 ac (34 ha) of habitat, are not likely to result in the direct mortality of adult, juvenile, or nestling birds or their eggs. Likewise, habitat management and restoration activities and maintenance of infrastructure within the Habitat Reserve and the Prima Deshecha Landfill SOS are not expected to kill or injure adult, juvenile, or nestling birds or their eggs. However, for some adult individuals, reproduction may be impaired or life expectancy shortened. Due to the difficulty in quantifying the number of white-tailed kites that may occupy the impacted habitat over the 75-year permit term, we are quantifying the take as follows:

RMV

- Any adult white-tailed kites supported by up to 724 ac (293 ha) of riparian, woodland and forest (white-tailed kite nesting habitat) permanently impacted by RMV Covered Activities as generally distributed in Table C for the white-tailed kite and currently supporting at least two historic nest sites for white-tailed kite. Take will be in the form of harm due to the permanent loss of nesting habitat.
- Any adult white-tailed kites supported within up to 57 ac (23 ha) of white-tailed kite nesting habitat temporarily impacted by RMV Covered Activities within the action area. Take will be in the form of harm due to the temporary loss of nesting habitat.
- A small, but undetermined, acreage of white-tailed kite nesting habitat within the Habitat Reserve may become temporarily unsuitable for white-tailed kite due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of nesting habitat.

SMWD

- Any adult white-tailed kites supported by up to 3 ac (1 ha) of white-tailed kite nesting habitat permanently impacted by SMWD Covered Activities generally distributed in Table C for white-tailed kite. Take will be in the form of harm due to the permanent loss of nesting habitat.
- Any adult white-tailed kites supported by up to 28 ac (11 ha) of white-tailed kite nesting habitat temporarily impacted by SMWD Covered Activities in the action area. Take will be in the form of harm due to the temporary loss of nesting habitat.

County of Orange

- Any adult white-tailed kites supported by up to 29 ac (12 ha) of white-tailed kite nesting habitat permanently impacted by County of Orange Covered Activities within the action area at Coto de Caza (3 ac (1 ha)), Prima Deshecha Landfill (17 ac (7 ha)), and various Avenida La Pata impact areas (9 ac (4 ha)). Take will be in the form of harm due to the permanent loss of nesting habitat.
- A small, but undetermined, acreage of white-tailed kite nesting habitat within the 530.7-ac (215-ha) Prima Deshecha Landfill SOS may become temporarily unsuitable for white-tailed kite due to maintenance of infrastructure, habitat restoration, and adaptive

management activities. Take will be in the form of harm due to temporary loss of nesting habitat.

- A small, but undetermined, acreage of white-tailed kite nesting habitat within County Parks and SOS in Subarea 3 may become temporarily unsuitable for white-tailed kite due to habitat restoration and adaptive management activities. Take will be in the form of harm due to temporary loss of nesting habitat.

Yellow-breasted Chat

Grading and grubbing activities outside the breeding season that result in the permanent loss of 189 ac (76 ha) of yellow-breasted chat nesting and foraging habitat (mulefat scrub, arroyo willow riparian forest, southern willow scrub, southern coast live oak riparian woodland, southern sycamore riparian woodland, freshwater marsh, and intermittent and perennial rivers and streams), supporting at least 14 known chat locations, and the temporary loss of 66 ac (27 ha) of habitat, supporting 3 locations, are not likely to result in the direct mortality of adult, juvenile, or nestling birds or their eggs. Likewise, habitat management and restoration activities and maintenance of infrastructure within the Habitat Reserve and the Prima Deshecha Landfill SOS are not expected to kill or injure adult, juvenile, or nestling birds or their eggs. However, for some adult individuals, reproduction may be impaired or life expectancy shortened. Due to the difficulty in quantifying the number of chats that may be using the impacted habitat over the 75-year permit term, we are quantifying the take as follows:

RMV

- Any adult chats supported by up to 158 ac (64 ha) of chat habitat permanently impacted by RMV Covered Activities as generally distributed in Table C for yellow-breasted chat and currently supporting 11 chat locations. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult chats supported by up to 45 ac (18 ha) of chat habitat temporarily impacted by RMV Covered Activities within the action area and currently supporting at least 3 chat locations. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of chat habitat within the Habitat Reserve may become temporarily unsuitable for chat due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

SMWD

- Any adult chats within up to 3 ac (1 ha) of chat habitat permanently impacted by SMWD Covered Activities as generally distributed in Table C for yellow-breasted chat. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult chats within up to 21 ac (8 ha) of chat habitat temporarily impacted by SMWD Covered Activities within the action area. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.

County of Orange

- Any adult chats within up to 28 ac (11 ha) of chat habitat permanently impacted by County of Orange Covered Activities within the action area at Coto de Caza (3 ac (1 ha)); Prima Deshecha Landfill (16 ac (6 ha), which currently supports two chat locations; and various Avenida La Pata impact areas (9 ac (4ha)), which support 1 chat location. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat
- A small, but undetermined, acreage of chat habitat within the 530.7-ac (215-ha) Prima Deshecha Landfill SOS may become temporarily unsuitable for chat due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of chat habitat within County Parks and SOS in Subarea 3 may become temporarily unsuitable for chat due to habitat restoration and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

Yellow Warbler

Grading and grubbing activities outside the breeding season that result in the permanent loss of 189 ac (76 ha) of yellow warbler nesting and foraging habitat (mulefat scrub, arroyo willow riparian forest, southern willow scrub, southern coast live oak riparian woodland, southern sycamore riparian woodland, freshwater marsh, and intermittent and perennial rivers and streams), and the temporary loss of 66 ac (27 ha) of habitat, supporting at least 1 known yellow warbler location, are not likely to result in the direct mortality of adult, juvenile, or nestling birds or their eggs. Likewise, habitat management and restoration activities and maintenance of infrastructure within the Habitat Reserve and the Prima Deshecha Landfill SOS are not expected to kill or injure adult, juvenile, or nestling birds or their eggs. However, for some adult individuals, reproduction may be impaired or life expectancy shortened. Due to the difficulty in quantifying the number of yellow warblers that may be using the impacted habitat over the 75-year permit term, we are quantifying the take as follows:

RMV

- Any adult warblers supported by up to 158 ac (64 ha) of yellow warbler habitat permanently impacted by RMV Covered Activities as generally distributed in Table C for yellow warbler. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult warblers supported by up to 45 ac (18 ha) of yellow warbler habitat temporarily impacted by RMV Covered Activities within the action area and currently supporting at least 1 known location of yellow warbler. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of yellow warbler habitat within the Habitat Reserve may become temporarily unsuitable for yellow warbler due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.

SMWD

- Any adult warblers within up to 3 ac (1 ha) of yellow warbler habitat permanently impacted by SMWD Covered Activities as generally distributed in Table C for yellow warbler. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- Any adult warblers within up to 21 ac (8 ha) of yellow warbler habitat temporarily impacted by SMWD Covered Activities within the action area. Take will be in the form of harm due to the temporary loss of breeding and foraging habitat.

County of Orange

- Any adult yellow warblers within up to 28 ac (11 ha) of yellow warbler habitat permanently impacted by County of Orange Covered Activities within the action area at Coto de Caza (3 ac (1 ha)), Prima Deshecha Landfill (16 ac (6 ha), and various Avenida La Pata impact areas (9 ac (4ha)) in the Habitat Reserve. Take will be in the form of harm due to the permanent loss of breeding and foraging habitat.
- A small, but undetermined, acreage of yellow warbler habitat within the 530.7-ac (215-ha) Prima Deshecha Landfill SOS may become temporarily unsuitable for yellow warbler due to maintenance of infrastructure, habitat restoration, and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.
- A small, but undetermined, acreage of yellow warbler habitat within County Parks and SOS in Subarea 3 may become temporarily unsuitable for yellow warbler due to habitat restoration and adaptive management activities. Take will be in the form of harm due to temporary loss of breeding and foraging habitat.

Unlisted Fish

Arroyo Chub

Due to the difficulty in quantifying the number of arroyo chub individuals and eggs that may be impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows: We anticipate an undetermined, but low, number of individuals and/or eggs will be collected, killed, injured and/or harmed in conjunction with:

RMV

- Construction and maintenance of infrastructure within the wetted channel due to: 1) removal and relocation of individuals from the construction area out of harms way; 2) crushing and smothering remaining individuals in the construction area that were not removed and relocated; and 3) temporary degradation of habitat.
- Adaptive management activities including exotic species removal, habitat restoration, and monitoring.
- Seasonal livestock grazing in the River, Vineyard and Lower Gobernadora Pastures, due to trampling and/or habitat degradation.

SMWD

- Construction and maintenance of infrastructure within the wetted channel due to: 1) removal and relocation of individuals from the construction area out of harms way; 2) crushing and smothering remaining individuals in the construction area that were not removed and relocated; and 3) temporary degradation of habitat.

County of Orange

- Adaptive management activities within County Parklands in the Habitat Reserve including exotic species removal and habitat restoration.

Threespine Stickleback

Due to the difficulty in quantifying the number of threespine stickleback individuals and eggs that may be impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows: We anticipate an undetermined, but low, number of individuals and/or eggs will be collected, killed, injured and/or harmed in conjunction with:

RMV

- Construction and maintenance of infrastructure within the wetted channel due to: 1) removal and relocation of individuals from the construction area out of harms way; 2) crushing and smothering remaining individuals in the construction area that were not removed and relocated; and 3) temporary degradation of habitat.
- Adaptive management activities including exotic species removal, habitat restoration, and monitoring.
- Seasonal livestock grazing in the River, Vineyard and Lower Gobernadora Pastures, due to trampling and/or habitat degradation.

SMWD

- Construction and maintenance of infrastructure within the wetted channel due to: 1) removal and relocation of individuals from the construction area out of harms way; 2) crushing and smothering remaining individuals in the construction area that were not removed and relocated; and 3) temporary degradation of habitat.

County of Orange

- Adaptive management activities within County Parklands in the Habitat Reserve, including exotic species removal and habitat restoration.

<u>Unlisted Reptiles</u>

Belding's Orange-throated whiptail

The proposed action is anticipated to result in the permanent loss of up to 4,092 ac (1,657 ha) of suitable orange-throated whiptail habitat (coastal sage scrub, chaparral, woodland and forest), including 48 known locations of orange-throated whiptail, and the temporary loss of up to 101 ac (41 ha) of suitable habitat, including 8 known locations. Minimization measures may relocate

some orange-throated whiptails out of harms way prior to grading and grubbing activities. However, any remaining individuals in impact areas will likely be killed. Grazing, maintenance of infrastructure, habitat management and restoration activities, monitoring, and implementation of BRCPs may also impact individual orange-throated whiptails. Due to the difficulty in quantifying the number of orange-throated whiptails occupying the areas impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows:

RMV

- All orange-throated whiptails, including 48 known locations, within up to 3,792 ac (1,535 ha) of suitable orange-throated whiptail habitat permanently impacted by RMV Covered Activities as generally depicted in Table C for orange-throated whiptail. Take will be in the form of death and injury.
- All orange-throated whiptails, including 6 known locations, within up to 69 ac (28 ha) of suitable orange-throated whiptail habitat temporarily impacted by RMV Covered Activities in the action area. Take will be in the form of death and injury.
- Death or injury of a few orange-throated whiptails within areas affected by maintenance of infrastructure, habitat restoration, and adaptive management activities within the Habitat Reserve is anticipated. Take will be in the form of death or injury.
- A small, but undetermined, acreage of orange-throated whiptail habitat within the Habitat Reserve may become unsuitable for orange-throated whiptails due to restoration and adaptive management activities. Take will be in the form of harm due to loss of suitable habitat.
- Trapping and handling of orange-throated whiptail individuals associated with monitoring activities in the Habitat Reserve and implementation of project-specific BRCPs is authorized. Death or injury of orange-throated whiptail individuals during monitoring activities and implementation of BRCPs is anticipated over the 75-year permit term. If four (4) orange-throated whiptails are found killed or injured from any one monitoring session or BRCP-related action, then the take threshold will be reached and the permittee will cease the monitoring and contact the Service to discuss methods to avoid further death/injury.

SMWD

- All orange-throated whiptails within up to 23 ac (9 ha) of suitable habitat permanently impacted by SMWD Covered Activities as generally depicted in Table C for orange-throated whiptail. Take will be in the form of death and injury.
- All orange-throated whiptails, including 2 known locations, within up to 32 ac (13 ha) of suitable habitat temporarily impacted by SMWD Covered Activities in the action area. Take will be in the form of death and injury.

County of Orange

- We anticipate the loss of all orange-throated whiptails within up to 277 ac (112 ha) of suitable habitat permanently impacted by County of Orange Covered Activities within the action area at Prima Deshecha (166 ac (67 ha)), Avenida La Pata (52 ac (21 ha)), and Coto de Caza (59 ac (24 ha)) as generally depicted in Table B. Take will be in the form of death and injury.
- Orange-throated whiptails within a small, but undetermined, area affected by maintenance of infrastructure, habitat restoration, and adaptive management activities in the 530.7-ac (215-ha) Prima Deshecha Landfill SOS. Take of orange-throated whiptails will be in the form of death or injury.
- Orange-throated whiptails within a small, but undetermined, area affected by habitat restoration and adaptive management activities in County Parks and SOS in Subarea 3. Take of orange-throated whiptails will be in the form of death or injury.

California Glossy Snake

The proposed action is anticipated to result in the permanent loss of up to 4,421 ac (1,789 ha) and the temporary loss of up to 288 ac (117 ha) of suitable habitat (sandy and loamy soils and rock outcroppings in coastal sage scrub, chaparral, grassland, riparian, stream courses, and woodlands and forest) for the California glossy snake. Minimization measures may relocate some snakes out of harms way prior to grading and grubbing activities. However, any remaining snakes in impact areas will likely be killed. Grazing, maintenance of infrastructure, habitat management and restoration activities, monitoring, and implementation of BRCPs may also impact individual California glossy snakes. Due to the difficulty in quantifying the number of California glossy snake individuals occupying the areas impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows:

RMV

- We anticipate the loss of all California glossy snakes within up to 4,251 ac (1,740 ha) of suitable habitat anticipated to be permanently impacted by RMV Covered Activities as generally depicted in Table C. Take will be in the form of death and injury.
- We anticipate the loss of any California glossy snakes within up to 194 ac (79 ha) of suitable California glossy snake habitat temporarily impacted by RMV Covered Activities in the action area. Take will be in the form of death and injury.
- Death or injury of a few California glossy snakes within areas affected by maintenance of infrastructure, habitat restoration, and land management activities within the Habitat Reserve on RMV and County lands is anticipated. Take will be in the form of death or injury.
- A small, but undetermined, acreage of California glossy snake habitat within the Habitat Reserve on RMV lands may become unsuitable for California glossy snakes due to habitat restoration and adaptive management activities. Take will be in the form of harm due to loss of suitable habitat.
- Trapping and handling of California glossy snake individuals associated with monitoring activities in the Habitat Reserve on RMV and County Lands and implementation of project-specific BRCPs is authorized. Death or injury of California glossy snake

individuals during monitoring activities and implementation of BRCPs is anticipated over the 75-year permit term. If two California glossy snakes are found killed or injured from any one monitoring session or BRCP, then the take threshold will be reached and the permittee will cease the monitoring and contact the Service to discuss methods to avoid further death/injury.

SMWD

- We anticipate the loss of all California glossy snakes within up to 39 ac (16 ha) of suitable habitat anticipated to be permanently impacted by SMWD Covered Activities as generally depicted in Table C. Take will be in the form of death and injury.
- We anticipate the loss of any California glossy snakes within up to 94 ac (38 ha) of suitable habitat temporarily impacted by SMWD Covered Activities in the action area. Take will be in the form of death and injury.

County of Orange

- We anticipate the loss of all California glossy snakes within up to 131 ac (53 ha) of suitable habitat permanently impacted by County of Orange Covered Activities within the action area at Prima Deshecha (21 ac (9 ha)), Avenida La Pata (33 ac (13 ha)), and Coto de Caza (77 ac (30 ha)) as generally depicted in Table B. Take will be in the form of death and injury.
- California glossy snakes within a small, but undetermined, area affected by maintenance of infrastructure, habitat restoration, and adaptive management activities in the 530.7-ac (215-ha) Prima Deshecha Landfill SOS. Take of California glossy snakes will be in the form of death or injury.
- California glossy snakes within a small, but undetermined, area affected by habitat restoration and adaptive management activities in County Parks and SOS in Subarea 3. Take of California glossy snakes will be in the form of death or injury.

Coast patch-nosed snake

The proposed action is anticipated to result in the permanent loss of up to 5,324 ac (2,156 ha) of suitable habitat (coastal sage scrub, chaparral, grassland, and alkali meadow) and one known location of coast patch-nosed snake and will result in the temporary loss of up to 205 ac (83 ha) of suitable habitat. Minimization measures may relocate some snakes out of harms way prior to grading and grubbing activities. However, any remaining snakes in impact areas will likely be killed. Grazing, maintenance of infrastructure, habitat management and restoration activities, monitoring, and implementation of BRCPs may also impact individual coast patch-nosed snakes. Due to the difficulty in quantifying the number of coast patch-nosed snake individuals occupying the areas impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows:

RMV

- We anticipate the loss of all coast patch-nosed snakes, including one known location, within up to 4,262 ac (1,725 ha) of suitable habitat anticipated to be permanently

impacted by RMV Covered Activities as generally depicted in Table C. Take will be in the form of death and injury.

- We anticipate the loss of any coast patch-nosed snakes within up to 139 ac (56 ha) of suitable coast patch-nosed snake habitat temporarily impacted by RMV Covered Activities in the action area. Take will be in the form of death and injury.
- Death or injury of a few coast patch-nosed snakes within areas affected by maintenance of infrastructure, habitat restoration, and adaptive management activities within the Habitat Reserve on RMV and County lands is anticipated. Take will be in the form of death or injury.
- A small, but undetermined, acreage of coast patch-nosed snake habitat within the Habitat Reserve on RMV lands may become unsuitable for coast patch-nosed snakes due to habitat restoration and adaptive management activities. Take will be in the form of harm due to loss of suitable habitat.
- Trapping and handling of coast patch-nosed snake individuals associated with monitoring activities in the Habitat Reserve on RMV and County Lands and implementation of project-specific BRCPs is authorized. Death or injury of coast patch-nosed snake individuals during monitoring activities and implementation of BRCPs is anticipated over the 75-year permit term. If two (2) coast patch-nosed snakes are found killed or injured from any one monitoring session or BRCP, then the take threshold will be reached and the permittee will cease the monitoring and contact the Service to discuss methods to avoid further death/injury.

SMWD

- We anticipate the loss of all coast patch-nosed snakes within up to 37 ac (15 ha) of suitable habitat anticipated to be permanently impacted by SMWD Covered Activities as generally depicted in Table C. Take will be in the form of death and injury.
- We anticipate the loss of any coast patch-nosed snakes within up to 66 ac (27 ha) of suitable habitat temporarily impacted by SMWD Covered Activities in the action area. Take will be in the form of death and injury.

County of Orange

- We anticipate the loss of all coast patch-nosed snakes within up to 1,025 ac (415 ha) of suitable habitat permanently impacted by County of Orange Covered Activities within the action area at Prima Deshecha (649 ac (263 ha)), Avenida La Pata (302 ac (122 ha)), and Coto de Caza (74 ac (30 ha)) as generally depicted in Table C. Take will be in the form of death and injury.
- Coast patch-nosed snakes within a small, but undetermined, area affected by maintenance of infrastructure, habitat restoration, and adaptive management activities in the 530.7-ac (215-ha) Prima Deshecha Landfill SOS. Take of coast patch-nosed snakes will be in the form of death or injury.
- Coast patch-nosed snakes within a small, but undetermined, area affected by habitat restoration and adaptive management activities in County Parks and SOS in Subarea 3. Take of coast patch-nosed snakes will be in the form of death or injury.

Northern Red-diamond Rattlesnake

The proposed action is anticipated to result in the permanent loss of up to 5,324 ac (2,156 ha) of suitable northern red-diamond rattlesnake habitat (coastal sage scrub, chaparral, grassland, and alkali meadow), including six known locations of northern red-diamond rattlesnake, and the temporary loss of up to 205 ac (83 ha) of suitable habitat, including two locations. Minimization measures may relocate some snakes out of harms way prior to grading and grubbing activities. However, any remaining snakes in impact areas will likely be killed. Grazing, maintenance of infrastructure, habitat management and restoration activities, monitoring, and implementation of BRCPs may also impact individual northern red-diamond rattlesnakes. Due to the difficulty in quantifying the number of northern red-diamond rattlesnake individuals occupying the areas impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows:

RMV

- All northern red-diamond rattlesnakes, including six known location, within up to 4,262 ac (1,725 ha) of suitable rattlesnake habitat permanently impacted by RMV Covered Activities as generally depicted in Table C for red-diamond rattlesnake. Take will be in the form of death and injury.
- All northern red-diamond rattlesnakes, including one known location, within up to 139 ac (56 ha) of suitable rattlesnake habitat temporarily impacted by RMV Covered Activities in the action area. Take will be in the form of death and injury.
- Death or injury of a few northern red-diamond rattlesnakes within areas affected by maintenance of infrastructure, habitat restoration, and adaptive management activities within the Habitat Reserve is anticipated. Take will be in the form of death or injury.
- A small, but undetermined, acreage of northern red-diamond rattlesnake habitat within the Habitat Reserve may become unsuitable for rattlesnakes due to restoration and adaptive management activities. Take will be in the form of harm due to loss of suitable habitat.
- Trapping and handling of northern red-diamond rattlesnake individuals associated with monitoring activities in the Habitat Reserve and implementation of project-specific BRCPs is authorized. Death or injury of northern red-diamond rattlesnake individuals during monitoring activities and implementation of BRCPs is anticipated over the 75-year permit term. If two (2) northern red-diamond rattlesnakes are found killed or injured from any one monitoring session or BRCP-related action, then the take threshold will be reached and the permittee will cease the monitoring and contact the Service to discuss methods to avoid further death/injury.

SMWD

- All northern red-diamond rattlesnakes within up to 37 ac (15 ha) of suitable habitat permanently impacted by SMWD Covered Activities as generally depicted in Table C for northern red-diamond rattlesnake. Take will be in the form of death and injury.
- All northern red-diamond rattlesnakes, including one known location, within up to 66 ac (27 ha) of suitable habitat temporarily impacted by SMWD Covered Activities in the action area. Take will be in the form of death and injury.

County of Orange

- All northern red-diamond rattlesnakes within up to 1,025 ac (415 ha) of suitable habitat permanently impacted by County of Orange Covered Activities within the action area at Prima Deshecha (649 ac (263 ha)), Avenida La Pata (302 ac (122 ha)), and Coto de Caza (74 ac (30 ha)) as generally depicted in Table C. Take will be in the form of death and injury.
- Northern red-diamond rattlesnakes within a small, but undetermined, area affected by maintenance of infrastructure, habitat restoration, and adaptive management activities in the 530.7-ac (215-ha) Prima Deshecha Landfill SOS. Take of northern red-diamond rattlesnakes will be in the form of death or injury.
- Northern red-diamond rattlesnakes within a small, but undetermined, area affected by habitat restoration and adaptive management activities in County Parks and SOS in Subarea 3. Take of northern red-diamond rattlesnakes will be in the form of death or injury.

Red Coachwhip

The proposed action is anticipated to result in the permanent loss of up to 5,324 ac (2,156 ha) of suitable red coachwhip habitat (coastal sage scrub, chaparral, grassland, and alkali meadow), including one known red coachwhip location, and the temporary loss of up to 205 ac (83 ha) of suitable habitat. Minimization measures may relocate some snakes out of harms way prior to grading and grubbing activities. However, any remaining snakes in impact areas will likely be killed. Grazing, maintenance of infrastructure, habitat management and restoration activities, monitoring, and implementation of BRCPs may also impact individual red coachwhips. Due to the difficulty in quantifying the number of red coachwhip individuals occupying the areas impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows:

RMV

- All red coachwhips, including one known location, within up to 4,262 ac (1,725 ha) of suitable habitat anticipated to be permanently impacted by RMV Covered Activities as generally depicted in Table C for red coachwhip. Take will be in the form of death and injury.
- All red coachwhips within up to 139 ac (56 ha) of suitable coachwhip habitat temporarily impacted by RMV Covered Activities in the action area. Take will be in the form of death and injury.
- Death or injury of a few red coachwhips within areas affected by maintenance of infrastructure, habitat restoration, and adaptive management activities within the Habitat Reserve on RMV and County lands is anticipated. Take will be in the form of death or injury.
- A small, but undetermined, acreage of red coachwhip habitat within the Habitat Reserve may become unsuitable for coachwhips due to habitat restoration and adaptive management activities. Take will be in the form of harm due to loss of suitable habitat.

- Trapping and handling of red coachwhip individuals associated with monitoring activities in the Habitat Reserve on RMV and County Lands and implementation of project-specific BRCPs is authorized. Death or injury of red coachwhip individuals during monitoring activities and implementation of BRCPs is anticipated over the 75-year permit term. If two (2) red coachwhips are found killed or injured from any one monitoring session or BRCP, then the take threshold will be reached and the permittee will cease the monitoring and contact the Service to discuss methods to avoid further death/injury.

SMWD

- All red coachwhips within up to 37 ac (15 ha) of suitable habitat anticipated to be permanently impacted by SMWD Covered Activities as generally depicted in Table C for red coachwhip. Take will be in the form of death and injury.
- All red coachwhips within up to 66 ac (27 ha) of suitable habitat temporarily impacted by SMWD Covered Activities in the action area. Take will be in the form of death and injury.

County of Orange

- All red coachwhips within up to 1,025 ac (415 ha) of suitable habitat permanently impacted by County of Orange Covered Activities within the action area at Prima Deshecha (649 ac (263 ha)), La Pata Avenue (302 (122 ha)), and Coto de Caza (74 ac (30 ha)) as generally depicted in Table C for red coachwhip. Take will be in the form of death and injury.
- Red coachwhips within a small, but undetermined, area affected by maintenance of infrastructure, habitat restoration, and adaptive management activities in the 530.7-ac (215-ha) Prima Deshecha Landfill SOS. Take of red coachwhips will be in the form of death or injury.
- Red coachwhips within a small, but undetermined, area affected by habitat restoration and adaptive management activities in County Parks and SOS in Subarea 3. Take of red coachwhips will be in the form of death or injury.

“San Diego” Coast Horned Lizard

The proposed action is anticipated to result in the permanent loss of up to 3,627 ac (1,469 ha) of suitable San Diego horned lizard habitat (coastal sage scrub and chaparral), including 12 known locations of San Diego horned lizard, and the temporary loss of up to 81 ac (33 ha) of suitable habitat. Minimization measures may relocate some San Diego horned lizards out of harms way prior to grading and grubbing activities. However, any remaining individuals in impact areas will likely be killed. Grazing, maintenance of infrastructure, habitat management and restoration activities, monitoring, and implementation of BRCPs may also impact individual San Diego horned lizards. Due to the difficulty in quantifying the number of San Diego horned lizards occupying the areas impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows:

RMV

- All San Diego horned lizards, including 12 known locations, within up to 3,328 ac (1,347 ha) of suitable San Diego horned lizard habitat permanently impacted by RMV Covered Activities as generally depicted in Table C for San Diego horned lizard. Take will be in the form of death and injury.
- All San Diego horned lizards within up to 56 ac (23 ha) of suitable San Diego horned lizard habitat temporarily impacted by RMV Covered Activities in the action area. Take will be in the form of death and injury.
- Death or injury of a few San Diego horned lizards within areas affected by maintenance of infrastructure, habitat restoration, and adaptive management activities within the Habitat Reserve is anticipated. Take will be in the form of death or injury.
- A small, but undetermined, acreage of San Diego horned lizard habitat within the Habitat Reserve may become unsuitable for San Diego horned lizards due to restoration and adaptive management activities. Take will be in the form of harm due to loss of suitable habitat.
- Trapping and handling of San Diego horned lizard individuals associated with monitoring activities in the Habitat Reserve and implementation of project-specific BRCPs is authorized. Death or injury of San Diego horned lizard individuals during monitoring activities and implementation of BRCPs is anticipated over the 75-year permit term. If two (2) San Diego horned lizards are found killed or injured from any one monitoring session or BRCP-related action, then the take threshold will be reached and the permittee will cease the monitoring and contact the Service to discuss methods to avoid further death/injury.

SMWD

- All San Diego horned lizards within up to 25 ac (10 ha) of suitable habitat permanently impacted by SMWD Covered Activities as generally depicted in Table C for San Diego horned lizard. Take will be in the form of death and injury.
- All San Diego horned lizards, including 2 known locations, within up to 23 ac (9 ha) of suitable habitat temporarily impacted by SMWD Covered Activities in the action area. Take will be in the form of death and injury.

County of Orange

- All San Diego horned lizards within up to 276 ac (112 ha) of suitable habitat permanently impacted by County of Orange Covered Activities within the action area at Prima Deshecha (165 ac (67 ha)), La Pata Avenue (52 (21 ha)), and Coto de Caza (59 ac (24 ha)) as generally depicted in Table B for San Diego horned lizard. Take will be in the form of death and injury.
- San Diego horned lizards within a small, but undetermined, area affected by maintenance of infrastructure, habitat restoration, and adaptive management activities in the 530.7-ac (215-ha) Prima Deshecha Landfill SOS. Take of horned lizards will be in the form of death or injury.
- San Diego horned lizards within a small, but undetermined, area affected by habitat restoration and adaptive management activities in County Parks and SOS in Subarea 3. Take of red coachwhips will be in the form of death or injury.

Southwestern pond turtle

The proposed action is anticipated to result in the permanent loss of suitable upland habitat for southwestern pond turtle, including two known southwestern pond turtle locations, within the maximum 8,168-ac (3,306-ha) area of permanent impacts and the maximum 432-ac (175-ha) area of temporary impacts authorized under the Plan. Minimization measures may relocate some turtles out of harms way prior to grading and grubbing activities. However, any remaining turtles in impact areas will likely be killed. Grazing, maintenance of infrastructure, habitat management and restoration activities, monitoring, and implementation of BRCPs may also impact individual southwestern pond turtles. Due to the difficulty in quantifying the number of southwestern pond turtle individuals occupying the areas impacted by the proposed action over the 75-year permit term, we are quantifying the take as follows:

RMV

- All southwestern pond turtles, including two known locations, within the maximum 6,687-ac (2,706-ha) area permanently impacted by RMV Covered Activities in the action area. In addition, the impacted habitat will no longer be available for use by southwestern pond turtles adjacent to the impact area. Therefore, take will be in the form of harm, death, and injury.
- All southwestern pond turtles within the maximum 271-ac (110-ha) area temporarily impacted by RMV Covered Activities in the action area. Because temporarily impacted habitat will be restored and available for use by southwestern pond turtles adjacent to the impact area soon after project completion, take will only be in the form of death and injury.
- A few southwestern pond turtles within areas affected by maintenance of infrastructure, habitat restoration, and adaptive management activities within the Habitat Reserve. Take will be in the form of death or injury.
- A small, but undetermined, acreage of southwestern pond turtle habitat within the Habitat Reserve may become unsuitable for southwestern pond turtles due to habitat restoration and adaptive management activities. Take will be in the form of harm due to loss of suitable habitat.
- Trapping and handling of southwestern pond turtle individuals associated with monitoring activities in the Habitat Reserve and implementation of project-specific BRCPs is authorized. Death or injury of southwestern pond turtle individuals during monitoring activities and implementation of BRCPs is anticipated over the 75-year permit term. If two (2) southwestern pond turtles are found killed or injured from any one monitoring session or BRCP-related action, then the take threshold will be reached and the permittee will cease the monitoring and contact the Service to discuss methods to avoid further death/injury.
- Death or injury of a few southwestern pond turtles from trampling and/or temporary increases in turbidity and sedimentation associated with cattle grazing is anticipated over the 75-year permit term. Take will be in the form of death or injury. These effects are anticipated to be reduced through the measures described in the Grazing Management Plan.

SMWD

- All southwestern pond turtles within the maximum 73-ac (30 ha) area permanently impacted by SMWD Covered Activities in the action area. In addition, the impacted habitat will no longer be available for use by southwestern pond turtles adjacent to the impact area. Therefore, take will be in the form of harm, death, and injury.
- All southwestern pond turtles within the maximum 161-ac (65 ha) area temporarily impacted by SMWD Covered Activities in the action area. Because temporarily impacted habitat will be restored and available for use by southwestern pond turtles adjacent to the impact area soon after project completion, take will only be in the form of death and injury.

County of Orange

- A few southwestern pond turtles within a small, but undetermined, area affected by habitat restoration and adaptive management activities in County Parks and SOS in Subarea 3, including restoration of 24 ac (10 ha) along San Juan Creek in Caspers Regional Park. Take of southwestern pond turtles will be in the form of death or injury.

EFFECT OF THE TAKE

Listed Species

For reasons stated in the analyses of effects of the Southern NCCP/HCP, the Service determined that the level of incidental take specified in the effects of the action and this Incidental Take Statement is not likely to result in jeopardy to the following listed species: the endangered arroyo toad, least Bell's vireo, southwestern willow flycatcher, Riverside fairy shrimp, San Diego fairy shrimp, and the threatened coastal California gnatcatcher. For reasons set forth in the HCP Conservation Strategy, and as reviewed in the EIR/EIS, the effect of the conservation measures over time will be such that net habitat value of designated or proposed critical habitat will be maintained and therefore, the Service has also determined that the proposed action will not destroy or adversely modify designated or proposed critical habitat for the coastal California gnatcatcher, designated critical habitat for the Riverside fairy shrimp or proposed critical habitat for the San Diego fairy shrimp.

Unlisted Species

For reasons stated in the analyses of effects of the Southern NCCP/HCP, the Service determined that the level of incidental take specified in the effects of the action and this Incidental Take Statement is not likely to result in jeopardy to the following unlisted Covered Species should they become listed: western spadefoot toad, burrowing owl, coastal cactus wren, Cooper's hawk, grasshopper sparrow, long-eared owl, tricolored blackbird, white-tailed kite, yellow-breasted chat, yellow warbler, arroyo chub, threespine stickleback, Belding's orange-throated whiptail, California glossy snake, coast patch-nosed snake, northern red-diamond rattlesnake, red coachwhip, "San Diego" coast horned lizard, southwestern pond turtle.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

The Southern NCCP/HCP and accompanying agreements identify anticipated adverse effects to Covered Species likely to result from the proposed actions, and the specific measures and levels of species and habitat protection that are necessary and appropriate to minimize those adverse effects. All of the conservation and management measures in the Southern NCCP/HCP and accompanying agreements, together with the special terms and conditions identified in the Permits are hereby incorporated by reference as reasonable and prudent measures, and the terms and conditions for this incidental take statement pursuant to 50 C.F.R. 402.14(I). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Endangered Species Act to apply. If the Permittees fail to adhere to these terms and conditions, the protection of the Permit(s), and section 7(o)(2), may lapse. The amount or extent of the incidental take anticipated under the Southern NCCP/HCP, associated reporting requirements, and provisions for disposing of dead or injured animals are described in the Permit.

Further, the following terms and conditions apply to the Service after issuance of the Permit:

1. The Service shall provide technical assistance to the Permittees throughout the term of the Permit(s).

2. The Service shall, at the time of listing of any of the currently unlisted Covered Species, reinitiate consultation on the proposed actions in accordance with 50 C.F.R. 402.16.

REPORTING REQUIREMENTS

Annual Report(s) will be prepared and submitted by the Permittee(s) to the Wildlife Agencies on or before November 15 of each year. These report(s) shall describe and summarize certain facts and issues relevant to the Habitat Reserve and any take of Covered Species and impacts to habitats under the Permits during the reporting period, in accordance with *Chapters 7*and *14* of the Southern NCCP/HCP and associated documents.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or develop information. The Service has the following conservation recommendation:

> Pursue available funding sources to assist the Permittee(s) in habitat restoration and enhancement activities that are complimentary to the Southern NCCP/HCP conservation strategy and mitigation requirements.

REINITIATION-CLOSING STATEMENT

This concludes formal consultation and conference on the issuance of Permits to implement the Southern NCCP/HCP. As provided in 50 C.F.R. 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount of extent of incidental take is exceeded; (2) new information reveals that the agency action may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount of extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Incidental Take Statement provided in this conference opinion for unlisted Covered Species does not become effective until the unlisted Covered Species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation. If you have any questions regarding this consultation, please contact Karen A. Goebel, Assistant Field Supervisor, at (760) 431-9440.

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Appendix 1

Table 1. Prior section 7 consultations in the Action Area.

Year	Project Name	Species Affected	Take	Habitat Acres	
				Impacted	Conserved
1996	Foothill Transportation Corridor North (FTC-N) – Antonio Parkway to Oso Parkway	Coastal California gnatcatcher	12 locations	68	507
1996	Antonio Parkway – Ortega Hwy and Avenida La Pata Intersection	CoastalCalifornia gnatcatcher	15	14	31
1999	Live Oak Plaza	Riverside fairy shrimp	0	0.0	Project did not proceed. Property subsequently purchased by TCA as conserved land.
2001	Saddleback Meadows	Coastal California gnatcatcher Critical Habitat only	0	40.7	74
2002	Prima Deshecha Landfill Landslide Remediation	Coastal California gnatcatcher and Critical Habitat	0	5.5	11
2002	Arroyo Trabuco Golf Course	Least Bell's Vireo; Coastal California gnatcatcher and Critical Habitat	8	11.9	360
2002	FTC-N Arroyo Trabuco Bridge	Coastal California gnatcatcher and Critical Habitat	0	3.1	3.1
2003	Whispering Hills	Coastal California gnatcatcher	15	52.18	123
2003	Ranch Potrero Academy	Coastal California gnatcatcher and Critical Habitat	2	14.7	44.1
		TOTALS	**52**	**210.08**	**1,153.2**

Table 2. Prior special 4(d) Interim Habitat Loss Plans in the Action Area.

Date	Project Name	Take Individual Birds	CSS Acres		
			Impacted	Conserved (restored/ preserved) Acres	or In Lieu Payment
1993	Coto de Caza-25778 Coto de Caza-South Golf Course Area	Unknown	1.46	8	
1993	Coto de Caza-TT 14758 PA 12-B	1	0.71	0	
1994	Coto de Caza-Lot 40	Unknown	0.20	0	
1994	Santa Margarita H2O-Transmission main in ID #8 and project #6 pipeline, C-1430A	Unknown	0.70	0.70	
1994	Pacific Hills-Mission Viejo (Barrett Homes)	12	38	5.50	
1994	Santa Margarita H2O Dist. Woods Hole Reservoir (Coto de Caza)	0	7.8	7.8	
1994	Coto de Caza – planning areas 9D. 12C, 2E, 13 & School/Park Site TT 13574, 13575, 14337 & 14955	14	59.44	131.56	
1995	Lomas San Juan Federal Areas C&D	Unknown	29.4	29.4	
1995	Coto de Caza-PA 10 (A-D)	8	40.1	158.6	
1995	TT14398 San Juan Villas (Concorde Development), City of San Juan Capistrano	6	36.7	82.7	
1995	Coto de Caza-TT13332 Lot 1	0	0.14	0	
1996	Rancho Trabuco planning areas 7 & 9 and Rancho Trabuco TT14143	4	8.52	10.74	
1996	Rancho Santa Margarita lots 1-6 TT12946	2	2.24	4.48	
1997	Pacific Point Project, TT 14196, City of San Juan Capistrano	6	30.3	42.8	
1997	Coto de Caza-TT15241&15330	1	17.6	49.96	
1997	Coto de Caza-Lot 16, TT 9507	1	2.4	5.9	
1997	Coto de Caza– PA2, 8.2 and 17.3	1	5.8	38.9	
1998	Ladera Master Planned Community	22	29.2	315.7	
1998	Talega-Subarea A	2	56.4	48.6	
1998	Coto de Caza – (PA 8.1, 10.5, 10.6, 14.0 and 17.2)	18	45.3	90.2	
1998	Forster Ranch, City of San Clemente	33	77.75	125	
1998	Tesoro High School	4	1.68	1.83	
1998	Coto de Caza-Lot 43 tract 11510	2	0.9	1.0	
1998	Capistrano Ford, City of San Juan Capistrano	0	1.34	6.7	
1999	Santa Margarita H2O Dist. Coto de Caza Zone III, Vista Reservoir Storm Drain Project	0	0	Project not implemented	
1999	FTC-S Alignment-geotech. Boring	34	10.98	10.98	
1999	Rosan/Weseloh Chevrolet & Honda, City of San Juan Capistrano	0	2.93	6.7	

Date	Project Name	Take Individual Birds	CSS Acres		
			Impacted	Conserved (restored/ preserved) Acres or	In Lieu Payment
1999	Coto de Caza Lot 9, Tract 11980	2	0.6		$17,160
1999	Coto de Caza Lot 127 Cambridge Ct.	3	0.75		$21,450
1999	Coto de Caza Lot 29, Tract 9507	4	3.8		$108,680
1999	Coto de Caza Lot 33, Tract 11510	2	0.06		$1,716
1999	Coto de Caza Lot 35, Tract 11510	2	2.23		$63,778
1999	Coto de Caza Lot 28, Tract 11510	2	1.12		$32,032
1999	Chiquita Ridge Water Reservoirs and Pipelines Zone I – Latera	4	6.7	16.3	
1999	Coto de Caza-Lot 11 Tract 9507	2	0.66		$18,876
1999	Talega – Subarea B	See Talega 2001 entry	22.83	45.66	
2000	Lambrose Canyon Road Lot 1 Tract 78-35	Unoccupied	0.5		$14,500
2000	Capistranno Valley Water Dist. – soil borings	4	1	1	
2000	Coto de Caza-lot 47 tract 13015	1	0.51		$14,500
2000	Coto de Caza-lot 49 tract 13015	2	0.55		$14,300
2000	Stonehill Drive – Home Depot	Unknown	0.63	0	
2000	Coto de Caza-lot 48 tract 13015	1	0.28		$5,720
2000	Coto de Caza-lot 26-TT9507	Unknown	1.47	4.61	$6,375
2001	Coto de Caza TT 9507 Lot 30	Unknown	?	Unauthorized clearing	
2001	Coto de Caza TT 9507 Lot 22	Unknown	?	Unauthorized clearing	
2001	Rancho Potrero Academy access road (Geotechnical)	2	0.61	0.61	
2001	Coto de Caza (Gogh Way)	2	3		$150,000
2001	Coto de Caza-Violeta Lane-Millennium Homes	2	3.2		$160,000
2001	Talega-Subarea B (Southern Portion)	4	26.39	52.78	
2001	SC04-pipeline connector (San Juan Capistrano)	2	1.18		$78,500
2001	Coto de Caza (Albertyn Residence)	2	0.51		$25,000
2001	Coto de Caza (Persons Residence)	2	1.3		$65,000
2002	SMWD Water transmission line	0	0.12	0.12	$9,000
2002	Talega	0	0.94	1.88	
2002	San Juan Capistrano Terminal Reservoir Number 2	2	0.38		$19,000
2002	Quest Diagnostics	0	0.4	1.2	
2003	San Juan Capistrano Terminal Reservoir Number 2	0	0.1		$5,000
2003	Talega IHLMP#4	0	8.53	20.76	
2003	Joplin Youth Center Pond and Road Repair	0	2.5	20.4	
2003	Talega IHLMP#5	0	31.82	63.64	

Date	Project Name	Take Individual Birds	CSS Acres		
			Impacted	Conserved (restored/ preserved) Acres or In Lieu Payment	
2003	SC-04 Pipeline (additional impacts), City of San Juan Capistrano	0	0.24	None additional to original project mitigation	
2004	Marblehead Coastal, City of San Clemente	0	3.06	92.9	
2004	San Juan Capistrano Terminal Reservoir Number 2	0	0.12	12.54	$6,000
2004	Zone 760 Reservoir, City of San Juan Capistrano	10	8.58		$165,000
2004	Cotton Hill, City of San Clemente	0	1.27		$31,750
2004	Coto de Caza, Tract 9507, Lot23	4	2.83		$141,000
2004	Presidio (Tri-Cities) Parcel, Unauthorized Clearing	Unknown	2.26	0	
2004	Avenida Placida Landslide Geotechnical Investigation	0	0.16		$8,000
2004	Live Oak Canyon Estates Geotechnical Investigation	0	0.41		$10,250
2004	Coto de Caza TT 11510 Lot 42	0	0.44		$22,000
2005	Saddleback College, City of Mission Viejo	Unknown	0.64		$48,000
2005	Coto de Caza, Tract 11510, Lot 29	0	1.4		$45,000
2005	Prima Deshecha Landfill Landslide	0	0.26	0.26	
2005	Marblehead Coastal, City of San Clemente	0	0.26*	*minor additional impact above prior authorization; see 2004 entry for mitigation	
2005	San Juan Creek Force Main #5 and Non-Domestic Water Pipeline Replacement Project	0	0.5	0.5	$12,500
2005	Coto de Caza, Davidson, Tract 11510, Lot 29	0	0.8		$30,000
2005	Chiquita Canyon Open-Water Reservoir	0	0.27		$13,500
2005	Avenida Placida Landslide	2	3.38	4.92	
2005	Villages of Coto de Caza	Unknown	Unknown	None	
2006	Foothill Trabuco Specific Plan Area; 20041 Trabuco Oaks Drive	0	0.99		$49,500
2006	Paseo Activo Landslide, San Juan Capistrano	0	0.03	0.03	
2006	Foothill Transportation Corridor South Geotechnical Investigation	0	4.39	4.39	
TOTALS		**234**	**664.95**	**1,528.25**	**$1,413,087**

Appendix 2

The tables below detail the amount of habitat and number of locations/occurrences expected to be conserved/managed and impacted as a result of the implementation of regional Habitat Conservation Plans in southern California.

Arroyo Toad

Habitat ConservationPlan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
Central/Coastal Orange County NCCP	2,450±	1,700±	750±	69 / 31	Covered Species[2]			
San Diego MSCP[3]	Covered Species – acres not quantified[4]				Covered Species – locations/occurrences not quantified[4]			
San Diego MHCP[5]	Covered Species – acres not quantified[6]				Covered Species – locations/occurrences not quantified[6]			
Western Riverside MSHCP	20,259	9,695	10,564	48 / 52	42	39	3	93 / 7

[1] SDG&E NCCP (Table 3.1) – Effects of Plan on species are considered insignificant because impacts would generally be very small, and the Plan minimizes or mitigates (in that order) any potential impacts that occur to the species' habitats. The Plan also preserves habitats to maximum extent practicable and preserves corridors connecting habitats. It may also restore and reclaim habitats that may include the species.

[2] NCCP – Current status and distribution of the species' within the Plan area is not well documented. The site of the only suspected arroyo toad population that may be affected by a Planned Activity is in the Limestone Creek Special Linkage Area. Two of the known historical locations of the toad occur within the vicinity of Black Star Canyon, Baker Canyon, and Silverado Canyon Creeks where they join Santiago Creek. These sites are not within the Reserve but are a part of the Policy Plan Area, which is subject to future planning and no take in this area is authorized by the proposed permits.

[3] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans.

[4] All known locations and 78% of riparian wetland areas in suitable habitat will be conserved by the Plan. The Plan conserves 90-95% of the upland habitats within the Marron Valley area. Impacts to upland habitats within 1km of riparian corridors within the MNPA will be minimized during project review by CDFG and the Service. Participating jurisdictions' guidelines and ordinances and state and federal wetland regulations will provide additional habitat protection resulting in no net loss of wetlands.

[5] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

[6] MHCP – does not quantify acreage but states that all potential breeding habitat within the Plan is 100% conserved based on no net loss of wetlands habitat and that it is unlikely that the study area currently supports sustainable populations.

Coastal California Gnatcatcher

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
Central/Coastal Orange County NCCP	30,750	23,250	7,500	76 / 24	600	479	121	80 / 20
San Diego MSCP[2]	140,600±	73,300±	67,300±	52 / 48	2,814	1,819	995	65 / 35
San Diego MHCP[3]	9,148	5,580	3,568	61 / 39	539	333	206	62 / 38
Western Riverside MSHCP	133,801	71,188	62,613	53 / 47	1,345	570	775	42 / 58

[1] SDG&E NCCP (Table 3.1) – Effects of Plan on species are considered insignificant because impacts would generally be very small, and the Plan prioritizes avoidance, minimization, and mitigation (in that order) for any potential impacts. The Plan preserves individuals and habitats to maximum extent practicable and preserves corridors connecting habitat. It may also restore and reclaim habitat that may include the species.

[2] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans.

[3] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

Least Bell's vireo

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
Central/Coastal Orange County NCCP	3,750±	2,500±	1,250±	67 / 33	Covered Species – locations/occurrences not quantified[2]			
San Diego MSCP[3]	2,100±	1,700±	400±	81 / 19	82[4]	82[4]	0[4]	100 / 0[4]
San Diego MHCP[5]	2,664	2,664	0	100 / 0	181	154	27	85 / 15
Western Riverside MSHCP	12,518	9,713	2,805	78 / 22	690	628	62	91 / 9

[1] SDG&E NCCP (Table 3.1) – Effects of Plan on species are considered insignificant because impacts would generally be very small, and the Plan prioritizes avoidance, minimization, and mitigation (in that order) for any potential impacts. The Plan preserves individuals and habitats to maximum extent practicable and preserves corridors connecting habitats. It may also restore and reclaim habitats that may include this species.

[2] NCCP – conserves six sites of potentially significant long-term conservation value.

[3] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans.

[4] Major populations.

[5] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

Southwestern willow flycatcher

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
Central/Coastal Orange County NCCP	3,750±	2,500±	1,250±	67 / 33	Covered Species – location/occurrences not quantified[2]			
San Diego MSCP[3]	6,300±	4,900±	1,400±	78 / 22	Not quantified[4]	Not quantified[4]	Not quantified[4]	88 / 12
San Diego MHCP[5]	2,414	2,414	0	100 / 0	6	6	0	100 / 0
Western Riverside MSHCP	13,049	10,022	3,027	77 / 23	30	22	8	73 / 23

[1] SDG&E NCCP (Table3.1) – Effects of Plan on species are considered insignificant because impacts would generally be very small, and the Plan prioritizes avoidance, minimization and mitigation (in that order) for any potential impacts. The Plan preserves individuals and habitats to maximum extent practicable and preserves corridors connecting habitats. It may also restore and reclaim habitats that may include the species.

[2] NCCP – conserves six sites of potentially significant long-term conservation value.

[3] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans.

[4] The MHPA includes eight of nine known locations for this species (all nine of which are within the City of San Diego).

[5] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

Riverside fairy shrimp

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted
SDG&E NCCP	Covered Species – acres/locations/occurrences not quantified[1]			
Central/Coastal Orange County NCCP	53	11	42	21 / 79
San Diego MSCP[2]	1,183[3]	1,041[3]	142[3]	88 / 12[3]
San Diego MHCP[4]	22	9	13	41 /[5]
Western Riverside MSHCP	42,349	16,517	25,832	39 / 61

[1] SDG&E NCCP (Table 3.1) – Adequately conserved by the Plan because impacts to vernal pools will be avoided unless deemed necessary for emergencies or repairs.

[2] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans.

[3] Total mapped vernal pool habitat within the MSCP planning area. Within the MSCP study area, the Riverside fairy shrimp is only known to occur in several vernal pool complexes on Otay Mesa. Riverside fairy shrimp appear to require specific conditions that restrict the species distribution to a relatively small number of pools. It is unknown how many vernal pools within the MSCP study area meet these conditions.

Two of the eight distinct management areas in southern California which comprise locally variable vernal pool complexes are at least partially located within the County Subarea. This species has an extremely restricted distribution within a very limited number of vernal pools within San Diego county. One location is known to occur within the County Subarea Plan. This occurrence occurs within Category 1 lands and will be preserved and managed. The Service anticipates zero (0) RFS will be killed, harmed, or harassed as a result of actions proposed in the County Subarea Plan. The County BMO requires avoidance to the maximum extent practicable of all vernal pools throughout the County Subarea. Unavoidable impacts associated with reasonable use or essential public facilities will be minimized and mitigated to achieve no net loss of function and value.

[4] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

[5] There are two RFS location points in the MHCP both of which are considered critical and are within the FPA in Carlsbad (100% conserved). The MHCP no net loss policy for wetlands includes vernal pool habitat. Therefore, all vernal pools within the MHCP are expected to be 100% conserved regardless of location inside or outside the FPA. The MHCP Narrow Endemic Policy is expected to protect any additional populations found in the future.

San Diego fairy shrimp

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted
SDG&E NCCP	Covered Species – acres/locations/occurrences not quantified[1]			
Central/Coastal Orange County NCCP	53	11	42	21 / 79
San Diego MSCP[2]	1,183	1,041	142	88 / 12
San Diego MHCP[3]	22	9	13	41 /[4]

[1] SDG&E NCCP (Table 3.1) – Adequately conserved by the Plan because impacts to vernal pools will be avoided unless deemed necessary for emergencies or repairs.

[2] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans. Two of the eight distinct management areas in southern California which comprise locally variable vernal pool complexes are at least partially located within the County Subarea. Site-specific data on this species was not included in the MSCP database but the species is known to occur in vernal pools throughout the MSCP planning area. The Service anticipates zero (0) SDFS will be killed, harmed, or harassed as a result of actions proposed in the County Subarea Plan. The County BMO requires avoidance of vernal pools to the maximum extent practicable. Unavoidable impacts associated with reasonable use or essential public facilities will be minimized and mitigated to achieve no net loss of function and value. The BMO requires avoidance of a sufficient amount of watershed necessary for the continuing viability of vernal pools.

[3] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

[4] There are two SDFS location points in the MHCP both of which are considered critical and are within the FPA in Carlsbad (100% conserved). The MHCP no net loss policy for wetlands includes vernal pool habitat. Therefore, all vernal pools within the MHCP are expected to be 100% conserved regardless of location inside or outside the FPA. The MHCP Narrow Endemic Policy is expected to protect any additional populations found in the future.

Thread-leaved brodiaea

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved within the reserve/preserve	Acres of impact	Percent of acres conserved/ impacted
SDG&E NCCP	Covered Species – acres/locations/occurrences not quantified[1]			
San Diego MSCP[2]	Covered Species[3]			88 / 12
San Diego MHCP[4]		313[5]		27 /[5]
Western Riverside MSHCP[6]	11,462	8,250	3,231	72 / 28

[1] The SDG&E plan includes special mitigation measures requiring avoidance of vernal pools and their watersheds for new facilities and minimization of impacts for the repair of existing facilities.

[2] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans.

[3] Twelve percent of vernal pool habitat may be impacted, but this habitat is subject to no net loss of function and value and 404(b)1 guidelines. This species is not known to occur within the MSCP area.

[4] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

[5] Habitat for this species includes clay soils in grasslands and vernal pools. Acres conserved indicates appropriate habitat (i.e., habitat supporting suitable vegetation and soil types). Under this Plan 65 of 70 or 93% of point locations; 92% of major populations; and 92% of critical locations will be conserved.

[6] Western Riverside MSHCP addressed 12 known locations of which 11 (92%) will be conserved with 1 (8%) location impacted.

Western spadefoot toad

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
Central/Coastal Orange County NCCP	21,500±	9,500±	12,000±	44 / 56	13[2]	10[2]	3[2]	77 / 23[2]
San Diego MHCP[3]	3,768	3,768	0	100 / 0	4	3	1	75 / 25
Western Riverside MSHCP	7,074 breeding 666,282 upland	6,089 breeding 369,267 upland	985 breeding 297,016 upland	86 / 14 breeding 55 / 45 upland	31	23	8	74 / 26

[1] SDG&E NCCP (Table 3.1) – Effects of Plan on species are considered insignificant because impacts would generally be very small, and the Plan minimizes or mitigates (in that order) any potential impacts that occur to the species' habitats. The Plan also preserves habitats to maximum extent practicable and preserves corridors and connecting habitats. It may also restore and reclaim habitats that may include the species.

[2] Known breeding sites.

[3] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

Burrowing owl

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
San Diego MSCP[2]	9,000±	4,000±	5,000±	44 / 56	20	12	8	60 / 40
San Diego MHCP[3]	5,272	1,687	3,585	32 / 68	10	6	4	60 / 40
Western Riverside MSHCP[4]	210,423	45,513	164,910	22 / 78	98	27	71	28 / 72

[1] SDG&E NCCP (Table 3.1) – Adequately conserved by the Plan because impacts will be avoided; no direct killing or injury to individuals will occur unless deemed necessary for emergencies or repairs. Covered species is *Speotyto cunicularia hypogea*.

[2] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans. Covered species is *Speotyto cunicularia hypugaea*.

[3] Umbrella Plan for northern San Diego county. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved Subarea plan. Covered species for this plan is *Speotyto cunicularia hypugaea*.

[4] MSHCP covers *Speotyto (=Athene) cunicularia*.

Coastal cactus wren

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
Central/Coastal Orange County NCCP	30,750±	23,250±	7,500±	76 / 24	994±	777±	217±	78 / 22
San Diego MSCP[2]	1,430±	850±	580±	59 / 41	5[3]	4[3]	1[3]	82 / 20[3]
San Diego MHCP[4]	Covered Species – acres not quantified[5]				Not quantified[5]	34[5]	Not quantified[5]	Not quantified[5]
Western Riverside MSHCP	136,018	73,339	62,679	54 / 46	80	32	48	40 / 60

[1] SDG&E (Table 3.1) – Adequately conserved by the Plan because impacts will be avoided; no direct killing or injury to individuals will occur unless deemed necessary for emergencies or repairs.

[2] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans.

[3] Major populations.

[4] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

[5] MHCP – This is a narrow endemic species and all points and habitat are assumed to be conserved at 95 to 100% (with an overall estimate of 99%).

Cooper's Hawk

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
San Diego MSCP[2]	227,300± potential foraging habitat 10,905± potential nesting habitat	133,400± potential foraging habitat 5,705± potential nesting habitat	93,900± potential foraging habitat 5,200± potential nesting habitat	59 / 41 52 / 48	Not quantified	Not quantified	Not quantified	57 / 43
San Diego MHCP[3]	1,807	1,626	181	90 / 10	57	34	23	60 / 40
Western Riverside MSHCP	72,466	53,786	18,680	74 / 26	202	56	146	28 / 72

[1] SDG&E NCCP (Table 3.1) – Effects of Plan are discountable because the species has such a widespread distribution. Also, the Plan preserves its habitats to the maximum extent practicable.

[2] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans.

[3] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

Grasshopper sparrow

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
San Diego MHCP[2]	5,272	1,687	3,585	32 / 68	23	12	11	52 / 48
Western Riverside MSHCP[3]	118,653	36,919	81,734	31 / 69	54	21	33	39 / 61

[1] SDG&E (Table 3.1) – Effects on species are considered insignificant because impacts would generally be very small, the species has a broad distribution, and the Plan minimizes or mitigates (in that order) any potential impacts that occur to the species' habitats. The Plan also preserves habitats to maximum extent practicable and preserves corridors connecting habitats thereby providing for genetic material exchange and opportunities for natural population expansion. It may also restore and reclaim habitats that may include the species.

[2] Umbrella Plan for northern San Diego County. Although umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

[3] The grasshopper sparrow will not be considered a Covered Species adequately conserved by the MSHCP until the MSHCP conservation acres includes at least 8,000 acres in 7 core areas.

Tricolored blackbird

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDE&G NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
San Diego MSCP[2]	6,200±	4,800±	1,400±	77 / 23	Not quantified[3]	Not quantified[3]	Not quantified[3]	59 / 41
San Diego MHCP[4]	7,440	3,943	3,497	53 / 47	7	5	2	71 / 29
Western Riverside MSHCP	235,849	61,399	174,450	26 / 74	35	9	26	26 / 74

[1] SDG&E NCCP (Table 3.1) – Effects of Plan on species are considered insignificant because impacts would generally be very small, and the Plan minimizes or mitigates (in that order) any potential impacts that occur to the species' habitats. The Plan also preserves habitats to maximum extent practicable and preserves corridors connecting habitats thereby providing for genetic material exchange and opportunities for natural population expansion. It may also restore and reclaim habitats that may include the species.

[2] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans.

[3] MSCP – With a Plan goal of no net loss of wetlands, most of the suitable breeding sites will continue to be available. Fifty-nine percent of mapped localities will be conserved.

[4] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

White-tailed kite

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
Western Riverside MSHCP	666,382	290,798	375,583	44 / 56	175	65	110	37 / 63

Yellow-breasted chat

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
San Diego MHCP[1]	2,664	2,664	0	100 / 0	60	54	6	90 / 10
Western Riverside MSHCP	11,463	8,882	2,581	77 / 23	55	40	15	73 / 27

[1] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

Yellow warbler

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
Western Riverside MSHCP	45,463	33,403	12,060	73 / 27	112	40	72	36 / 64

Arroyo chub

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted
Western Riverside MSHCP[1]	9,026	8,388	638	93 / 7

[1] Ten occurrences are in the dataset for the Plan Area. This species exists within the Santa Ana and Santa Margarita River watershed and the population distribution appears to fall largely within PQP Lands and Additional Reserve Lands.

Orange-throated whiptail

Habitat Conservation Plan	Acres Addressed by the Plan	Acres Conserved	Acres Impacted	Percent of Acres Conserved/ Impacted	Locations/ Occurrences Addressed by the Plan	Locations/ Occurrences Conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
Central/Coastal Orange County NCCP	25,500± coastal scrub 38,750± other wildlands	18,250± coastal scrub 20,000± other wildlands	7,250± coastal scrub 18,750± other wildlands	72 / 28 52 / 48	Covered Species – locations/occurrences not quantified			
San Diego MSCP[2]	219,400±	129,600±	89,800±	59 / 41	Not quantified	Not quantified	Not quantified	62 / 38
San Diego MHCP[3]	18,429	12,163	6,266	66 / 34	92	55	37	60 / 40
Western Riverside MSHCP	380,334	224,471	155,863	59 / 41	117	43	74	27 / 63

[1] From SDG&E HCP Table 3.1 – Effects on species are considered insignificant because impacts would generally be very small, and the Plan minimizes or mitigates (in that order) any potential impacts that occur to the species' habitats. The Plan also preserves habitats to maximum extent practicable and preserves corridors connecting habitats. It may also restore and reclaim habitats that may include the species.

[2] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans.

[3] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

Coast patch-nosed snake

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres of impact	Percent of acres conserved/ impacted
SDG&E NCCP	Covered Species – acres/locations/occurrences not quantified[1]			

[1] SDG&E NCCP (Table 3.1) - Effects of plan on species are considered insignificant because impacts would generally be very small, and the Plan minimizes or mitigates (in that order) any potential impacts that occur to the species' habitats. The Plan also preserves habitats to maximum extent practicable and preserves corridors connecting habitats. It may also restore and reclaim habitats that may include the species.

Northern red-diamond rattlesnake

Habitat Conservation Plan	Acres Addressed by the Plan	Acres Conserved/Managed	Acres Impacted	Percent of Acres Conserved/ Impacted	Locations/ Occurrences Addressed by the Plan	Locations/ Occurrences Conserved	Locations/ Occurrences Impacted	Percent of Locations/ Occurrences Conserved/ Impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
Central/Coastal Orange County NCCP	30,750±	23,250±	7,500±	76 / 24	Covered Species – locations/occurrences not quantified			
Western Riverside MSHCP	547,946	337,247	210,699	62 / 38	44	19	25	43 / 57

[1] SDG&E NCCP Table 3.1 – Effects on species are considered insignificant because impacts would generally be very small, and the Plan minimizes or mitigates (in that order) any potential impacts on the species habitats.

"San Diego" coast horned lizard

Habitat Conservation Plan	Acres Addressed by the Plan	Acres Conserved/ Managed	Acres Impacted	Percent of Acres Conserved/ Impacted	Locations/ Occurrences Addressed by the Plan	Locations/ Occurrences Conserved	Locations/ Occurrences Impacted	Percent of Locations/ Occurrences Conserved/ Impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
Central/Coastal Orange County NCCP	73,750±	49,750±	24,000±	67 / 33	Covered Species – locations/occurrences not quantified			
San Diego MSCP[2]	221,700±	132,000±	89,700±	60 / 40	Not quantified	Not quantified	Not quantified	63 / 37
San Diego MHCP[3]	24,612	14,521	10,091	59 / 41	34	22	12	65 / 35
Western Riverside MSHCP	771,553	447,990	323,543	58 / 42	38	17	21	45 / 55

[1] SDG&E NCCP Table 3.1 – Effects on species are considered insignificant because impacts would generally be very small, and the Plan minimizes or mitigates (in that order) any potential impacts on the species habitats.

[1] From SDG&E HCP Table 3.1 – Effects on species are considered insignificant because impacts would generally be very small, and the Plan minimizes or mitigates (in that order) any potential impacts that occur to the species' habitats. The Plan also preserves habitats to maximum extent practicable and preserves corridors connecting habitats. It may also restore and reclaim habitats that may include the species.

[2] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans.

[3] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan.

Southwestern pond turtle

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
San Diego MSCP[2]	13,301+or-	9,501+or-	3,800+or-	71 / 29	Covered Species – locations/occurrences not quantified			
San Diego MHCP[3]	3,768	3,768	0	100 / 0	7	7	0	100 / 0
Western Riverside MSHCP	10,363 wetland 81,679 upland	9,337 wetland 54,480 upland	1,025 wetland 26,200 upland	90 / 10 wetland 67 / 33 upland	18	8	10	44 / 56

[1] SDG&E NCCP (Table 3.1) – Effects on the species are considered insignificant because impacts would generally be very small, and the Plan minimizes or mitigates (in that order) any potential impacts that occur to the species' habitats. The Plan also preserves habitats to maximum extent practicable and preserves corridors connecting habitats. It may also restore and reclaim habitats that may include the species. Permitting pursuant to Section 404 of the federal Clean Water Act and/or Section 1600 of the California Fish and Game Code may be necessary for impacts to ACOE and/or CDFG jurisdictional areas.

[2] Umbrella Plan for southwest San Diego County. Although the umbrella MSCP has been approved for these jurisdictions, only the cities of Chula Vista, La Mesa, Poway, and San Diego and portions of unincorporated County have approved subarea plans.

[3] Umbrella Plan for northern San Diego County. Although the umbrella MHCP has been approved for these jurisdictions, only the City of Carlsbad has an approved subarea plan. All locations points, major populations and critical locations will be 100% conserved.

Many-stemmed dudleya

Habitat Conservation Plan	Acres addressed by the plan	Acres conserved	Acres impacted	Percent of Acres conserved/ impacted	Locations/ Occurrences addressed by the plan	Locations/ Occurrences conserved	Locations/ Occurrences impacted	Percent of Locations/ Occurrences conserved/ impacted
SDG&E NCCP	Covered Species – acres not quantified[1]				Covered Species – locations/occurrences not quantified[1]			
Western Riverside MSHCP	311,155	138,582	172,573	45 / 55	19	10	9	53 / 47

[1] SDG&E NCCP (Table 3.1) – Effects of Plan on species are considered insignificant because impacts would generally be very small, and the Plan minimizes or mitigates (in that order) any potential impacts that occur to the species' habitats.