SECTION 2.0 COVERED SPECIES CONSERVATION ANALYSES AND SPECIES ACCOUNTS

This section provides detailed Conservation Analyses and Species Accounts for the 32 species proposed for regulatory coverage. For each species a Conservation Analysis for Subarea 1 of the B-12 Alternative is presented, followed by the Species Account to allow the interested reader to learn more about each species and to review in more detail the information used for the Conservation Analysis. The Species Accounts are not exhaustive summaries of the entire known biology of the species, but are intended to provide the baseline information to support the Conservation Analyses and proposed Habitat Reserve Management Program (HRMP).

Each Conservation Analysis includes the following information:

- Conservation Goals
- Conservation Strategy
- Habitat and Species Conservation and Impact Analysis
- Adaptive Management Program, which includes:
    - Stressors
    - Goals
    - Management and Monitoring Objectives
    - Conceptual Model (if applicable)
    - Regional and Subregional Management Information Needs
    - Level of Management and Monitoring Priority
    - Level of Monitoring (*i.e.*, species-specific, habitat or landscape based, or some combination thereof)
    - Monitoring Variables
    - Management Actions
    - Potential Target Studies

Each Species Account includes the following information:

- Rangewide and Regional Status
- Subregional Status
- Biological Considerations

For proposed Covered Species that are also planning species, the Species Account also include:

- Protection Recommendations
- Management Recommendations
- Restoration Recommendations

These recommendations are reproduced from the Draft Southern Planning Guidelines (May 2004) and, in most cases, have been greatly expanded upon in the Conservation Analysis based on additional information collected since 2004, Wildlife Agency input, Mitigation Measures in the Ranch Plan GPA/ZC EIR and USACE Permit Special Conditions in the SAMP.

Map figures referenced herein for each proposed Covered Species discussed in *Section 2* are found in *Part IV, Map Book*. Maps for non-Covered planning species accounts in *Section 3.0* are attached to that *Section.*

GLOBAL GOALS AND OBJECTIVES

As noted above, the Species Accounts and Conservation Analyses contained in this section identify conservation goals and associated management and monitoring objectives for each of the 32 species being proposed for regulatory coverage. In addition to the species-specific goals and objectives, one universal goal for indirect effects and associated management and monitoring objectives applies to all Covered Species. This goal and associated objectives are set forth below and are not repeated in each Species Account to avoid repetitiveness. Specific measures for implementing the objectives with respect to Covered Activities are set forth in the final NCCP/MSAA/HCP EIR/EIS.

Indirect Effects Goal:

Mitigate and/or manage potential adverse edge effects such as urban-related predators, lighting, noise, public access, dry season and wet season runoff, and pollutants.

Indirect Effects Management and Monitoring Objectives:

Objective 1: Implement design features and to avoid, minimize and mitigate edge effects and encroachments into the Habitat Reserve:

- Prohibit plants identified by the California Exotic Plant Pest Control as an invasive risk in southern California from development and fuel management zones adjoining the Habitat Reserve.

- Create fuel management zones combining irrigated and non-irrigated native plantings separating the Habitat Reserve from adjacent urban land uses.

- Provide barriers, fencing and walls to control access to the Habitat Reserve by urban-related predators such as cats and dogs.

- Shield and/or direct lighting away from habitat areas through the use of low-sodium or similar intensity lights, light shields, native shrubs, berms, and/or shielding methods.

- Manage pesticide and herbicide use and fertilizer application techniques in landscaped areas, including golf courses, located adjacent to the Habitat Reserve (see Objective 2).

- Provide homeowner education regarding the need for control of domestic pets (*e.g.* cats and dogs) (see Objective 3).

Objective 2: Implement the RMV Water Quality Management Plan (WQMP; *Appendix K*) as a Coordinated Management Plan to provide comprehensive management and monitoring of "pollutants of concern" and "hydrologic conditions of concern." The management and monitoring of Covered Vegetation Communities and Covered Species pursuant to the Adaptive Management Program (AMP) element of the HRMP will be coordinated with WQMP management and monitoring relating to streamcourse and groundwater conditions and pollutants of concern.

Objective 3: Manage public access to the Habitat Reserve in accordance with County of Orange requirements:

- Access to the Habitat Reserve shall be managed and directed as specified in the Open Space Agreement between the County of Orange and RMV. Prior to the issuance of building permits for a tract adjacent to the Habitat Reserve, the County of Orange shall verify that measures, such as fencing, signs etc., to direct the public to public access points within the RMV Habitat Reserve lands have been incorporated into the building plans. To the extent that public access points are not identified, the County of Orange shall verify that measures, such as fencing, signs etc., to prohibit public access have been incorporated into the building plans (GPA/ZC EIR MM 4.9-29).

REGIONAL AND SUBREGIONAL MANAGEMENT INFORMATION NEEDS

Each proposed Covered Species analysis includes identification of regional and subregional management information needs related to conservation of the species. Some of the management information needs are basic research questions best studied at a rangewide or regional scale, such the autecology of the species, and are beyond the scope of the HRMP to address comprehensively. Management and monitoring activities in the Habitat Reserve, however, may help provide information for addressing these management information needs; *e.g.,* how does arroyo toad response to giant reed control? Other management information needs are more focused or site-specific to the Habitat Reserve and will be addressed by HRMP. Finally, some management information needs can be addressed extensively at the Habitat Reserve level, but may benefit significantly from regional scale information (*e.g.,* cactus wren dispersal characteristics). At this time, these management information needs are presented as a single list of needs for each species without distinguishing whether each should specifically be addressed at the regional or subregional level, or a combination of the two. It is anticipated that the Reserve Manager and Science Panel will consider the management information needs and determine the best approach to each; *e.g.,* whether the information need can be met at the Habitat Reserve level through the HRMP, whether the information need can be met through a regional cooperative effort with other management entities in southern California, or whether the management information need is best addressed by another agency such as the USGS Western Ecological Research Center (WERC) or university scientists such as the UC Riverside Center for Conservation Biology.

GLOSSARY FOR FEDERAL AND STATE STATUS DESIGNATION ACRONYMS

The following are the federal and state status acronyms for the Covered Species discussed in this species

BCC	U.S. Fish and Wildlife Service Bird of Conservation Concern
FE	Federally Listed Endangered Species
FSC	Federal Species of Concern
FP	State Fully Conserved
FT	Federally Listed Threatened Species
MNBMC	U.S. Fish and Wildlife Service Migratory Nongame Birds of Management Concern
CSC	California Species of Special Concern
SE	State Listed Endangered
ST	State Listed Threatened

2.1 BURROWING OWL

Species: Western Burrowing Owl (*Athene cunicularia hypugea*)
Federal Status: FSC, BCC
State Status: CSC
CNDDB Rank: G4S2
Science Advisors Group: 3
Covered Species: Yes
Focal Monitoring Species: No
Planning Species: No

CONSERVATION GOAL

1. Protect and manage suitable wintering habitat for the western burrowing owl in the planning area to "contribute to recovery" on a rangewide basis.

CONSERVATION STRATEGY

1. Create a permanent subregional Habitat Reserve that provides sufficient winter foraging habitat in large, contiguous patches to support wintering burrowing owls.

2. Formulate a HRMP to provide for long-term protection and management burrowing owl habitat and provide for restoration of native grasslands in the Habitat Reserve to increase suitable habitat.

3. If nesting sites are documented, avoid impacts to the extent feasible and create artificial burrow sites for passive relocation if necessary.

HABITAT AND SPECIES CONSERVATION AND IMPACT ANALYSIS

The conservation analysis for the burrowing owl is based on habitat conservation and impacts, site-specific observations of wintering owls, and the refined habitat block analysis described in *Part I, Chapter 13*. There are no documented nesting sites in the planning area. For the purpose of the impact analysis, it is assumed that the burrowing owl could use any grassland and barley field habitat (*i.e.*, excludes existing orchards in Chiquita Canyon and Cristianitos Canyon and proposed orchard in PAs 6 and 7 in Cristianitos Canyon) in Subarea 1 for winter foraging.

Table 2.1 provides a summary of the existing conditions, proposed conservation, and permanent and temporary impacts of burrowing owl habitat in the planning area and within the Subarea 1 permit area. The description of impacts and conservation below is limited to Subarea 1 which is the permit action area. The planning area conservation and impact estimates reported in *Table 2-1* include SOS and potential impact areas in Subareas 2, 3 and 4 and do not reflect future planning within those Subareas that may result in changes to the SOS and impact estimates. For example, future planning in the Subarea 2 (Foothill-Trabuco Specific Plan Area) will result in changes to the open space and impact estimates.

TABLE 2-1
WESTERN BURROWING OWL
CONSERVATION AND IMPACT SUMMARY

	Acres	Percent
Planning Area		
Existing Total	19,090	
Habitat Reserve	7,568	40%
Supplemental Open Space[1]	3,816	20%
Total Protected[1]	11,384	60%
Total Permanent Impact[1]	4,780	25%
Subarea 1		
Existing Total	12,626	
Habitat Reserve	7,568	60%
Supplemental Open Space	957	8%
Total Protected	8,525	68%
Total Permanent Impact	4,199	33%
Total Temporary Impact	212	

[1] The SOS, Total Protected and Total Permanent Impact estimates are based on the current mapping of SOS and potential development in Subareas 2-4. These estimates are subject to change based on future planning and development in those areas. This qualification applies to all Conservation and Impact tables in this Section.

Subarea 1 Impacts

The proposed Covered Activities in Subarea 1 would result in permanent impacts to 4,199 acres (33 percent) of grassland (2,669 acres including 3 acres of alkali meadow) and agriculture (1,530 acres) that provide suitable winter foraging habitat for the burrowing owl (*Table 2-1* and *Figure 194-M*). No nesting sites of the burrowing owl are known from the Subarea and no impacts would occur. The proposed Covered Activities also would result in temporary impacts to 212 acres of suitable habitat (*Table 2-1*).

Subarea 1 Conservation

A total of 7,568 acres (60 percent) of suitable grassland and agricultural habitat for the burrowing owl would be conserved and managed in the Habitat Reserve (*Table 2-1* and *Figure 194-M*). Notably, all of Chiquita Canyon bottom north of the treatment plant and grasslands on the Radio Tower Road mesa south of San Juan Creek where wintering owls have been observed in the recent past would be conserved and managed. In addition, the vast majority of grasslands in Cristianitos Canyon would be conserved and managed because the proposed orchards in PAs 6 and 7, which under the conservation analysis encompass 431 acres, would be limited to 50 acres; approximately an additional 300 acres of grassland would be in the Habitat Reserve. An additional 957 acres (8 percent) of habitat would be in SOS, for an overall conservation of 8,525 acres (68 percent) of habitat.

The refined habitat block analysis (*Part I, Chapter 13, Table 13-9*) shows that substantial grassland and agriculture habitat for the burrowing owl is conserved in habitat blocks, ranging from 477 acres in the Wagon Wheel block to 2,722 acres in the Southeastern block, which includes Cristianitos Canyon. The Chiquita Ridge block where owls have been observed contains 1,331 acres of suitable habitat.

Pre-Construction Surveys

Although nesting burrowing owls have not been documented in the planning area, an additional conservation measure will be to conduct pre-construction surveys for nesting owls for any construction-related clearing of grassland or agriculture initiated during the owl's typical breeding season (generally February 1 to August 31). Focused pre-construction surveys will be conducted according to a set of guidelines acceptable to the Wildlife Agencies. If nesting burrowing owls are found in impact areas, avoidance measures will be implemented, including no direct disturbance of active dens during the breeding season (generally February 1 to August 31) and maintaining approximately 6-7 acres of contiguous foraging habitat (or about a 300-foot radius) around the nest site throughout the breeding season. Post-construction, if the nest site is contiguous with the Habitat Reserve and no suitable existing burrow sites are available (*e.g.*, ground squirrel burrows), an artificial burrow in suitable habitat will be constructed at least 165 feet from the impacted areas within the Habitat Reserve and such that at least 6-7 acres of suitable foraging habitat are contiguous with the new burrow. Passive relocation, as opposed to trapping and active relocation, will be used to the extent feasible. The reader is also directed to MMs 4.9-26 and 4.9-30 of the Ranch Plan GPA/ZC EIR for raptor-related construction monitoring and preparation of a Biological Resources Construction Plan (BRCP).

ADAPTIVE MANAGEMENT PROGRAM

Stressors

Management of habitat for the burrowing owl will consider environmental stressors that have been identified for the species, including:

- Urbanization adjacent to Habitat Reserve
- Rodent controls
- Pesticides
- Predators
- Crushing of burrows by heavy equipment
- Roads (causing increased vehicle collisions)
- Human harassment of nest sites

Threats to survival of the burrowing owl include development of grasslands and other habitat destruction, collision with vehicles, pesticides/poisoning of ground squirrels, as well as predators (Grinnell and Miller 1944). Pesticides may also have adverse secondary impacts through contamination and impacts on primary prey (insects and small rodents). Specifically, the pesticide Carbofuran has been shown to have negative impacts; while Sevin appears to be a safer alternative (Hjertaas *et al.* 1995; Blus 1996). A ranking by the resource agencies of the most important threats to the species include loss of habitat, reduced burrow availability due to rodent control and pesticides (James and Espie 1997). Intense cultivation, heavy machinery and ground-maintenance equipment are attributed to losses of burrowing mammal colonies. On the other hand, burrowing owls have expanded into areas where mowing, grazing and wetland drainages have artificially created suitable habitat; this species commonly uses human-modified landscapes as long as suitable habitat, den sites and prey are available.

In addition to the substantial conservation of suitable habitat, habitat restoration actions to benefit the burrowing owl include implementation of a Coastal Sage Scrub/Valley Needlegrass Grassland (CSS/VGL) restoration program at the discretion of the Reserve Manager and Science Panel. Areas targeted for restoration include Chiquita Ridge, Chiquadora Ridge, in Sulphur Canyon and in upper Cristianitos Canyon to enhance habitat value and improve habitat connectivity. In addition, CSS/VGL restoration in upper Gabino Canyon would enhance habitat value for the species, although it has not been observed in this area. As described in *Part I, Chapter 7*, the Reserve Manager and Science Panel will determine the timing and extent of the upland restoration actions that would best serve the Habitat Reserve over the long term.

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. Non-native, urban-related predators of burrowing owls (*e.g.*, cats and dogs) will be controlled in the Habitat Reserve, primarily through homeowner education, but also possibly through direct controls such as trapping if necessary and to the extent feasible. Public education to minimize human harassment of owls will be incorporated. Potential crushing of active burrows will be addressed by the BRCP.

Other adaptive management actions in the Habitat Reserve that would benefit overwintering burrowing owls, and any future breeding populations may include fire to help improve the quality of grassland. Although not part of the HRMP, the coordinated Grazing Management Plan (GMP) will help maintain high quality grassland habitat by preventing over-grazing.

Goals

Goals for protecting and managing habitat for the burrowing owl, and nesting sites if they are found in the future, include:

1. Protect and manage grasslands to maintain approximate existing acreage in the Habitat Reserve, subject to natural fluctuations in vegetation community acreages.
2. Restore native grassland and enhance the quality of existing native grassland in the Habitat Reserve.
3. Manage grassland fire regimes to sustain and enhance native grassland habitat quality in the Habitat Reserve.
4. Manage exotic invasions of native grassland and weedy invasions of annual grassland (*e.g.*, artichoke thistle) in the Habitat Reserve.
5. Protect in the short-term any newly discovered breeding sites in proposed development areas and other areas supporting Covered Activities.
6. Protect and manage in the long-term any newly discovered breeding sites in the Habitat Reserve.

Management and Monitoring Objectives (number of goal met by objective in parentheses)

Objective 1: Implement Conservation Strategy to protect and manage approximately 7,568 acres of grassland and agriculture foraging habitat in the Habitat Reserve (Goal 1).

Objective 2: Remap vegetation communities in Habitat Reserve within two (2) years of executing IA to establish a baseline for long-term tracking of the Reserve (Goal 1).

Objective 3: Update vegetation community map at 5-year intervals (Goal 1).

Objective 4: Collect regional climate, weather and air quality information to examine potential correlations between vegetation and environmental variables (Goal 1).

Objective 5: Conduct annual botanical and wildlife field studies within pre-designated sample plots to monitor fine-grained changes in grasslands and other focal grassland species (Goals 1, 2, 3& 4).

Objective 6: Implement Habitat Restoration Plan to restore (including revegetation and enhancement) native grassland (Goals 1 & 2).

Objective 7: Implement Wildland Fire Management Plan to manage native grassland fire regimes such that existing habitat values are maintained and enhanced (Goals 1, 2, 3 & 4).

Objective 8: Implement Invasive Species Control Plan to manage invasive exotic plant species native and annual grasslands, focusing on artichoke thistle control (Goals 1, 2 & 4).

Objective 9: Conduct focused pre-construction presence/absence surveys in grassland and agricultural areas slated for development-related Covered Activities within 30 days prior to any ground disturbance, where such disturbances would occur during the burrowing owl's breeding season (generally February 1 to August 31). Impacts to active nests and surrounding habitat within about a 300-ft radius of nest (6-7 acres) will be avoided and passive relocation (use of one-way doors and collapse of burrows) will be conducted following the breeding season and when young are determined to be no longer dependent on the natal den (Goal 5).

Objective 10: Provide for long-term protection of any newly discovered nesting locations in the Habitat Reserve. If active nests are found in areas slated for development-related Covered Activities in proximity to the Habitat Reserve, and no suitable burrow sites are available in the Habitat Reserve in proximity to the active nest (*e.g.*, ground squirrel burrows), an artificial burrow in suitable habitat will be constructed in the Habitat Reserve at least 165 feet (50 m) from the impacted area and such that at least 6-7 acres of suitable foraging habitat are contiguous with the new burrow (Goal 6).

Conceptual Model

No model constructed because species is uncommon and not known to nest in planning area.

Regional and Subregional Management Information Needs

- As a likely colonial species that evolved in association with burrowing mammal species (Dyer 1987), the minimum viable colony size, and associated habitat area size associated with minimum viable colonies.
- The key factors in habitat selection (*e.g.,* habitat structure, soils, prey availability).
- The effectiveness of artificial burrow systems for attracting and supporting successful reproduction and long-term productivity.
- Why nesting burrowing owls are absent from the planning area; *e.g.,* critical habitat features absent or existing land uses that actively preclude nesting activity.
- Management actions that can be taken to increase the likelihood of attracting both wintering and nesting owls to the Habitat Reserve.

Level of Management and Monitoring Priority - Low

Because of the apparent current rarity of nesting burrowing owls in southern Orange County (*e.g.*, Hamilton and Willick 1996), and because there are no identified imminent threats to the burrow owl in the subregion, it is recommended that studies and management actions to attract nesting burrowing owls to the Habitat Reserve be a relatively low priority for the HRMP, particularly in the initial years of the program.

Level of Monitoring (*e.g.*, Species-specific, habitat, landscape, combination)

In consideration of the low priority of this species for management and monitoring, except in the case of newly discovered active nests, monitoring of the burrowing owl will be as follows:

- Monitoring will be primarily at the habitat landscape level due to the lack of nesting owls in the planning area.
- Species-specific monitoring in the Habitat Reserve will be opportunistic (*i.e.*, anecdotal) in the context of standard wildlife surveys. Periodic focused surveys for burrowing owls will not be conducted in the Habitat Reserve but any observations of owls will be recorded. Anecdotal observations will be followed by more intensive monitoring to document the status of the owl(s) as wintering or nesting. If nest sites are discovered in the Habitat Reserve, periodic monitoring (*e.g.*, at least monthly) will be conducted during the breeding season to assess the status and reproductive success of the pair.
- Pre-construction focused burrowing owl surveys will be conducted in suitable habitat areas supporting development-related Covered Activities. If nest sites are discovered in areas slated for development-related Covered Activities during pre-construction surveys, periodic (*e.g.*, at least monthly) surveys of the active nest sites will be conducted throughout the breeding season; *i.e.*, until young are determined to no longer be dependent on the natal den.

Monitoring Variables

Listed below are suggested species- and habitat-based monitoring variables. The detailed monitoring program for the burrowing owl will be developed by the Reserve Manager and Science Panel.

Species-specific Monitoring Variables

1. If wintering owls are opportunistically detected, location and number of owls will be recorded.
2. If nesting owls are opportunistically detected in the Habitat Reserve or detected during focused pre-construction surveys, location and number of adults and fledged offspring will be recorded.

Habitat-based Monitoring Variables

1. Grassland communities long-term status
2. Native grassland habitat quality in terms of proportion of native/non-native species
3. Evidence of urban-related predators in Habitat Reserve (dogs and cats)

Abiotic Monitoring Variables

1. Climate
2. Weather
3. Air quality
4. Water quality and runoff

Management Actions

The following management actions implemented as part of the HRMP will directly benefit the burrowing owl and its habitat:

- Habitat Restoration Plan including restoration of native grassland and native grassland/coastal sage scrub
- Wildland Fire Management Plan
- Invasive Species Control Plan

"Coordinated Management Plans" that are not formal elements of the HRMP but will also benefit the burrowing owl are:

- Grazing Management Plan
- Water Quality Management Plan

Potential Target Studies

The main uncertainty regarding the burrowing owl in the planning area is the absence of nesting owls. A potential target study would be conduct a general habitat suitability assessment in the Habitat Reserve to assess factors that could preclude or limit nesting by burrowing owls; *e.g.*, lack ground squirrel burrow systems, non-suitable habitat structure, lack of prey, etc., and ways of enhancing habitat that could attract nesting owls. However, as described above, the burrowing owl is a low priority species for management and monitoring in the Habitat Reserve at this time and it is recommended that such a study be deferred until adequate funding is available or, alternatively, an outside research group offers to fund and/or carry out the study.

SPECIES ACCOUNT

Rangewide Status

The burrowing owl is broadly distributed in western North America, with historic breeding populations in southern interior British Columbia (nearly extirpated), southern Alberta, southern Saskatchewan, southern Manitoba, 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. In California, the burrowing owl occurs throughout the state, except for the humid northwest coastal forests and high mountains. Although the burrowing owl is a geographically widespread species, its CNDDB global and state rank for nest sites is G4S2, indicating a global rank of "apparently secure; some factors existing to cause some concern such as narrow habitat or continuing threats" and a state rank indicating endangered, defined as 6-20 viable occurrences, 1,000 to 3,000 individuals, or 2,000 to 10,000 acres of occupied habitat. A petition to list the subspecies "western" burrowing owl (*A. c. hypugea*) as threatened or endangered was submitted to the California Fish and Game Commission (FGC) by the Center for Biological Diversity in 2003. On February 4, 2004, based on the recommendation of CDFG, the FGC denied the petition, indicating a lack of a reasonable amount of information to warrant the listing. Although the petition was denied, it appears likely that the debate about the status of burrowing owl will continue, raising the possibility of a state or federal listing in the future. The general rangewide decline of the burrowing owl is attributed to habitat conversion and other human-caused impacts. Much of its grassland and agricultural habitat in California and elsewhere has been converted to urban uses and it also has suffered from losses of rodent burrows that provide breeding dens due to rodent control. Vehicle collisions and pesticides (affecting the prey base) also are cited as sources of decline (Grinnell and Miller 1944; James and Espie 1997; Remsen 1978; Zarn 1974).

Subregional Status

Although the burrowing owl is a rare breeder in southern Orange County, there are records for overwintering owls (*i.e.*, non-breeding) in the subregion. Bontrager reported individual burrowing owls in Cristianitos Canyon and east of the Prima Deshecha Landfill in 1989 and 1990, but neither was confirmed to be nesting. MBA (1996) reported that overwintering owls were observed in 1995 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. However, no active nest sites have been found along either alignment in over a decade of surveying. The lack of nesting records for the burrowing owl in the planning area indicates that it is likely a rare to uncommon breeder in the planning area.

However, burrowing owls are known to breed on neighboring MCB Camp Pendleton, thus providing a potential source of immigrants.

Biological Considerations

The burrowing owl typically occurs in shortgrass prairies, grasslands, lowland scrub, agricultural lands, coastal dunes, and desert floors (Haug *et al.* 1993). It also uses some artificial, open areas such as golf courses, cemeteries, road allowances, vacant lots, fairgrounds, abandoned buildings, and irrigation ditches as a year-round resident (Haug, *et al.* 1993; Hayworth pers. obs. 1990). It Burrowing owls require large, open expanses with little vegetation on gently rolling or level terrain with a high number of active small mammal burrows.

The burrowing owl is a crepuscular predator that largely feeds on insects, but that will also eat small mammals, reptiles, other birds, and carrion (Thomsen 1971). It hunts from a perch by using a short flight, or by running along the ground. Foraging typically occurs in mowed, short-grass, or overgrazed pasture, golf courses, and airports (Thomsen 1971). During the breeding season, the percentage of invertebrates in the diet is higher than that of vertebrate prey (Haug *et al.* 1993)

Old ground squirrel burrows are usually used for nesting; at times it may dig its own burrow in soft soil. When burrows are scarce or soil conditions are poor, nest boxes, culverts and pipes are sometimes occupied. Nests are lined with excrement, pellets, debris, grass, or feathers, and occasionally are unlined (Robertson 1929). The breeding season typically is from March to August, peaking in April and May. Average clutch size is 7-9 eggs, but may be higher in the north (Bent 1938).

Average home range is 2 acres with a mean distance between burrows of 436 feet (Thomsen 1971; Martin 1973). Territory size and available habitat and burrow are directly proportionate to each other (Haug *et al.* 1993).

Common predators include prairie falcons, red-tailed hawks, Swainson's hawks, ferruginous hawks, northern harriers, golden eagles, foxes, coyotes, and domestic dogs and cats (Martin 1973).

2.2 COASTAL CACTUS WREN

Species:	Coastal Cactus Wren (*Campylorhynchus brunneicapillus couesi*)
Federal Status:	BCC
State Status:	CSC
CNDDB Rank:	G5T3QS3
Science Advisors Group:	2
Other:	NCCP Target Species
Covered Species:	Yes
Focal Monitoring Species:	Yes
Planning Species:	Yes

CONSERVATION GOAL

1. Manage habitat and populations of the coastal cactus wren to maximize the likelihood that populations are sustained in the planning area, and in doing so "provide for recovery" on a subregional basis and "contribute to recovery" on a rangewide basis.

CONSERVATION STRATEGY

1. Create a permanent subregional Habitat Reserve that provides sufficient breeding habitat to maximize the likelihood of the species' persistence within the planning area.

2. Formulate a HRMP to provide for long-term protection and management of the cactus wren and its habitat and provide for restoration of scrub habitat to enhance the amount and quality of existing habitat.

HABITAT AND SPECIES CONSERVATION AND IMPACTS ANALYSIS

The conservation analysis for the coastal cactus wren is based on site-specific information (*i.e.*, mapped locations) and landscape-level factors including overall habitat conservation, habitat blocks, and habitat contiguity and connectivity. Coastal sage scrub is used as the surrogate habitat for the cactus wren because the mapped distribution of southern cactus scrub does not correspond well with wren locations; within the NCCP planning area only about 10 percent of the cactus wren locations are within mapped southern cactus scrub. The refined habitat block analysis also is applied to the cactus wren because, as a relatively sedentary species, it may be more affected by roads than other more mobile avian species such as the gnatcatcher, raptors and

the migrants such as the least Bell's vireo, southwestern willow flycatcher, yellow-breasted chat and yellow warbler.

Table 2-2 provides a summary of the existing conditions, proposed conservation, and permanent and temporary impacts of cactus wren locations and habitat in the planning area and within the Subarea 1 permit area. The description of impacts and conservation below is limited to Subarea 1 which is the permit action area. The planning area conservation and impact estimates reported in *Table 2-2* include SOS and potential impact areas in Subareas 2, 3 and 4 and do not reflect future planning within those Subareas that may result in changes to the SOS and impact estimates. For example, future planning in the Subarea 2 (Foothill-Trabuco Specific Plan Area) will result in changes to the open space and impact estimates.

TABLE 2-2
COASTAL CACTUS WREN
CONSERVATION AND IMPACT SUMMARY

	Acres	Percent	Locations	Percent
Planning Area				
Existing Total	20,956		1,408	
Habitat Reserve	12,191	58%	853	61%
Supplemental Open Space	4,363	21%	213	15%
Total Protected	16,554	79%	1,066	76%
Total Permanent Impact	3,262	16%	216	15%
Subarea 1				
Existing Total	16,811		1,171	
Habitat Reserve	12,191	73%	853	73%
Supplemental Open Space	2,196	13%	98	8%
Total Protected	14,387	86%	951	81%
Total Permanent Impact	2,242	14%	216	18%
Total Temporary Impact	71		7	

Subarea 1 Impacts

The proposed Covered Activities would result in permanent impacts to 2,242 acres (14 percent) of coastal sage scrub and 216 cactus wren locations (18 percent) (*Table 2-2* and *Figure 195-M*). The proposed Covered Activities would also result in temporary impacts to 71 acres of habitat and seven locations (*Table 2-2*).

Subarea 1 Conservation

A total of 12,191 acres (73 percent) of coastal sage scrub and 853 cactus wren locations (73 percent) would be conserved in the Habitat Reserve (*Table 2-2* and *Figure 195-M*). An

additional 2,196 acres (13 percent) of coastal sage scrub and 98 locations (8 percent) are in Subarea 1 SOS, resulting in the total conservation of 14,387 acres (87 percent) of coastal sage scrub and 951 locations (81 percent). Of the 2,196 acres and 98 locations in SOS, 2,061 acres and 96 locations are on NAS Starr Ranch (*Table 2-2* and *Figure 195-M*).

Because the cactus wren is a relatively sedentary species and thus less likely to disperse between isolated habitat patches (*i.e.*, patches separated by urban landscape) compared to other more mobile avian species, habitat patch size, contiguity and connectivity are key reserve design considerations for this species. The results of the refined habitat block delineation used to analyze patch size are presented in *Part I, Chapter 13, Table 13-9* and depicted in *Figure 193-M*. These habitat blocks combined include about 13,370 acres (including sage scrub in SOS in Coto de Caza in Subarea 3) of the 14,387 conserved coastal sage scrub that provides suitable habitat for the cactus wren. Patches of coastal sage scrub within the blocks range from 206 acres in the Radio Tower Road mesa block to 5,841 acres in the Southeastern block. A total of 853 of the 951 conserved (Habitat Reserve and SOS) cactus wren locations (90 percent) are contained within six of the seven habitat blocks: 19 locations in the Arroyo Trabuco block; 273 locations in the Southeastern block; 141 locations in the Chiquita Ridge block; 63 locations in the Upper Chiquita block; 82 locations in the Wagon Wheel block; and 275 locations in the Northeastern block. There are no documented cactus wren locations in the Radio Tower Road block.

There are no data on the minimum effective patch size for maintaining the viability of "local cactus wren populations" (*i.e.*, contiguous occupied habitat considered to be within the typical dispersal distance of wrens as opposed to rare dispersals between more disparate populations). As a generalization based on a review of the literature (Franklin 1980), it has been suggested that the minimum effective local breeding population to maintain genetic variation should be 50 individuals over the short term and 500 individuals over the long term. Using the refined habitat blocks as the functional habitat patch for each cactus wren local population, the smallest local population of cactus wrens within habitat blocks is in the Arroyo Trabuco block with 19 locations. The next smallest local population is 63 locations in the Upper Chiquita block. Although the number of locations cannot be strictly equated with population numbers, the documented locations do reflect at least the potential carrying capacity of an area or the number of sites potentially supporting breeding pairs. Using 50 individuals as a guideline to qualitatively estimate the relative risk of local extirpation, based on Franklin (1980), the Arroyo Trabuco local population, at 19 locations would be at the greatest risk due to its relatively small number of documented locations. Over the short-term it is possible that this local population could be extirpated as result of wildfire, for example. But because it is linked to larger populations in Chiquita Canyon by contiguous natural habitat between Ladera Ranch and Las Flores that would allow lower frequency, long distance dispersal events, as described below, the long-term risk of permanent extirpation of the Arroyo Trabuco local population should be relatively low.

Although little is known about the dispersal of cactus wrens, it is assumed that this relatively sedentary species requires contiguous natural habitat for dispersal and that they are unlikely to disperse through urban landscapes (sightings of cactus wrens away from suitable habitat are rare; Unitt 1984 cites only two observations out of typical habitat). The Habitat Reserve would provide for habitat connectivity among local populations and dispersal of cactus wrens throughout the Habitat Reserve, including north-south connections along Chiquita and Chiquadora ridges (linkages C and G); east-west connectivity between Arroyo Trabuco and Caspers Wilderness Park (linkages B, D, and I); along the San Juan Creek floodplain (linkage J); and north-south connections west of and through the Trampas and Cristianitos sub-basins (linkages K and N).

ADAPTIVE MANAGEMENT PROGRAM

Stressors

Management for the cactus wren and its habitat will consider several environmental stressors identified for the species, including:

- Urbanization adjacent to Habitat Reserve
- High frequency fires
- Cattle-related impacts
- Urban-related predators (*e.g.*, cats and dogs)
- Roads and trails
- Prolonged drought

The key stressors on cactus wrens and their habitat appear to be wildfires and urban-related predators (cats and dogs).

The cactus wren is especially vulnerable to wildland fires because of its narrow habitat requirements, sedentary behavior, and low dispersal characteristics; even if cactus wrens disperse as a result of fire, they may not find suitable habitat to survive. Intense fires may actually kill cactus plants and eliminate nesting habitat for the cactus wren (*e.g.*, Bontrager *et al.* 1995). However, cactus patches within less intense burns that do not kill the cactus may be utilized soon after the burn (*e.g.*, Harmsworth Associates 1997, 1998a, 2001). As a result of competition from invasive plants, grazing, weather patterns and other natural and human-influenced disturbances, the reestablishment 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, although other conservation plans such as the Central and

Coastal NCCP/HCP and Western Riverside County MSHCP are helping to preserve habitat connectivity.

Cactus wrens are vulnerable to a number of non-native and native predators, including cats, dogs, roadrunners, coachwhips, gopher snakes, loggerhead shrikes, kestrels, Cooper's hawks, and woodrats (Anderson and Anderson 1973; Solek and Szijj 1999). Cactus wrens that are confined to isolated patches of habitat in urbanizing areas are exposed to increased levels of predation as larger predators such as coyotes are replaced by greater numbers of smaller non-native and native predators (*i.e.*, mesopredator release).

Goals

Goals for protecting and managing the coastal cactus wren and its habitat include the following:

1. Protect and manage coastal sage scrub habitat to maintain approximate existing acreage in the Habitat Reserve.
2. Maintain the physiographic diversity of coastal sage scrub in the Habitat Reserve.
3. Restore coastal sage scrub and enhance the quality of existing coastal sage scrub in the Habitat Reserve such that the net habitat value of the existing coastal sage scrub system is maintained.
4. Manage coastal sage scrub fire regimes such that a natural diversity of age-stands, particularly cactus patches, is maintained throughout the Habitat Reserve.
5. Manage exotic invasions of coastal sage scrub, especially along the Habitat Reserve-urban interface or other vulnerable areas (*e.g.*, along paved and unpaved roads, utility easements).
6. Protect and manage the coastal cactus wren population in the Habitat Reserve.
7. Protect and manage identified key habitat linkages between local populations to maximize the likelihood of genetic and demographic connectivity.

Management and Monitoring Objectives (number of goal met by objective in parentheses)

Objective 1: Implement Conservation Strategy to protect and manage approximately 12,147 acres of coastal sage scrub in Habitat Reserve (actual acreage will vary in relation to natural and anthropogenic environmental effects such as wildfires and drought) (Goals 1 & 2).

Objective 2: Remap vegetation communities in Habitat Reserve within two (2) years of executing IA to establish a baseline for long-term tracking of the Reserve (Goals 1, 2 & 5).

Objective 3: Update vegetation community map at 5-year intervals (Goals 1, 2 & 5).

Objective 4: Collect regional climate, weather and air quality information to examine potential correlations between vegetation and population changes and environmental variables (Goals 1, 2 & 6).

Objective 5: Conduct annual botanical and wildlife field studies within predesignated sample plots to monitor fine-grained changes in coastal sage scrub community, coastal cactus wren and other focal coastal sage scrub species. (Goals 1, 2, 5 & 6).

Objective 6: Implement Habitat Restoration Plan to restore (including revegetation and enhancement) approximately 363 acres of coastal sage scrub in designated locations that currently are in agriculture, grazed, or otherwise do not currently support coastal sage scrub to enhance carrying capacity and connectivity (Goals 1, 2, 3, 5, 6 & 7).

Objective 7: Implement Wildland Fire Management Plan to manage coastal sage scrub fire regimes such that a natural diversity of age-stands is maintained throughout the Habitat Reserve to protect source populations to the extent feasible (Goals 1, 2, 4, 5 & 6).

Objective 8: Implement Invasive Species Control Plan to manage invasive exotic species in coastal sage scrub (Goals 1, 2, 5, 6 & 7).

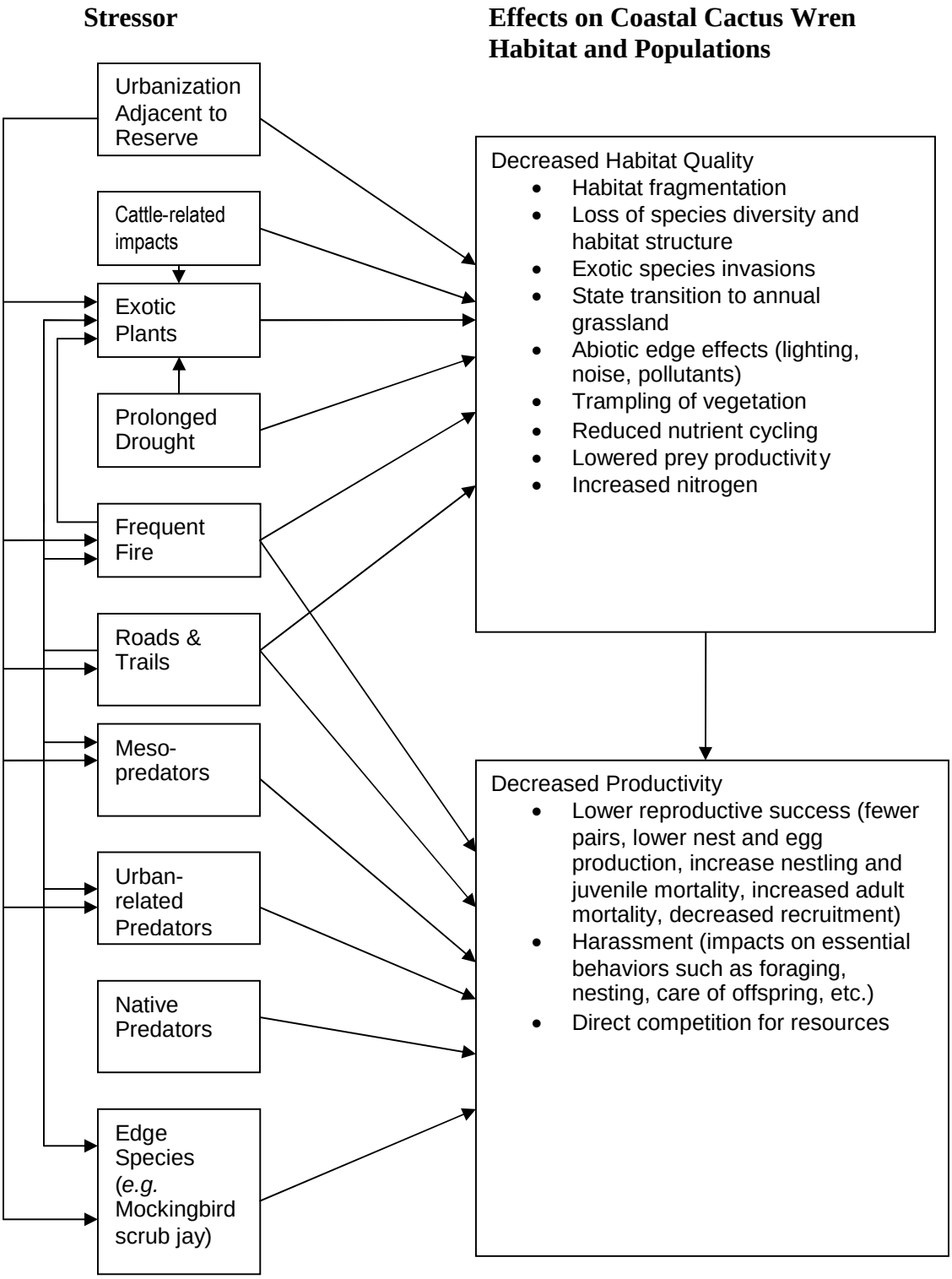
Objective 9: Implement management and monitoring of identified key habitat linkages to maximize the likelihood of continued function as "live in" and dispersal habitat for coastal cactus wrens (Goals 7 & 8)

Objective 10: Identify and rectify constraints to use or movement (*e.g.*, physical obstacles or bottlenecks) or sources of disturbance or degradation in key habitat linkages and wildlife corridors that serve cactus wrens (Goals 6, 7 & 8).

Conceptual Model

Yes – see figure below (note that line weights in this model and in those for other species reflect the relative impact of the stressor; *i.e.*, heavier line weights indicate a greater stressor impact.)

Coastal Cactus Wren Conceptual Stressor Model



Regional and Subregional Management Information Needs

- The relationship between habitat patch size and/or contiguity and cactus wren occupancy and productivity (*i.e.*, reproductive success and recruitment).
- The dispersal patterns and capabilities of coastal cactus wrens.
- Whether prolonged drought (*e.g.*, > 5 years) has a significant relationship with cactus wren productivity.
- Whether there is a relationship between climate and weather factors and clutch timing, clutch size, and reproductive success.
- Whether there an interaction between fire and grazing management in maintaining suitable habitat for the cactus wren.
- Whether there is decreased cactus wren productivity (*i.e.*, reproduction and recruitment) along the Habitat Reserve-urban development interface. If so, what is (are) the cause(s); *e.g.*, lower prey base, changes in habitat structure, increased predation, harassment, microclimate changes such as increased solar or wind exposure along habitat edges?
- The risk Argentine ants pose to cactus wren nestlings.
- Whether cactus wrens are significantly harassed by aggressive urban-related edge species such as northern mockingbirds and scrub jays.

Level of Management and Monitoring Priority - Low

At this time the cactus wren population within the Habitat Reserve and SOS in Subarea 1, with over 950 locations, appears to be robust and, with the exception of wildfires, at relatively low risk. Management and monitoring of this species should focus on the Habitat Reserve-urban development interface where risks from urban-related predators and human activities likely are greatest. Monitoring of "interior" populations can be conducted in conjunction with standard wildlife surveys in sample transects. Wildfire impacts also should be monitored on a case-by-case basis at the discretion of the Reserve Manager and Science Panel to track recovery of cactus patches and wren populations.

Level of Monitoring (*e.g.*, Species-specific, habitat, landscape, combination)

Monitoring will be conducted at both a species-specific and habitat landscape level.

Monitoring Variables

Listed below are suggested species- and habitat-based monitoring variables. The detailed monitoring program for the cactus wren will be developed by the Reserve Manager and Science Panel.

Species-specific Monitoring Variables

1. Number of occupied cactus wren locations
2. Enumeration of family size at occupied sites
3. Proportion of occupied cactus patches
4. Colonization of unoccupied, restored or recovering (*e.g.*, from wildfire) cactus patches

Habitat-based Monitoring Variables

1. Vegetation communities long-term status
2. Relative cover of different native plant species
3. Mapping of southern cactus scrub
4. Evidence of urban-related predators (*e.g.*, tracks, scat, direct observations)
5. Evidence of aggressive edge species and harassment of cactus wrens
6. Evidence of urban runoff, erosion, pollutants
7. Evidence of unauthorized public activities (*e.g.*, trespass, trampling, illegal trails, trash, shooting, etc.)

Abiotic Monitoring Variables

1. Climate
2. Weather
3. Air quality
4. Water quality and runoff

Management Actions

The following management actions implemented as part of the HRMP will directly benefit the coastal cactus wren and its habitat:

- Habitat Restoration Plan
- Wildland Fire Management Plan
- Invasive Species Control Plan

Habitat restoration actions to benefit the coastal cactus wren include: **(1)** subject to Reserve Manager and Science Panel discretion, implementation of a CSS/VGL restoration program within targeted areas (Chiquita Ridge, Chiquadora Ridge and in Sulphur Canyon) to enhance habitat value and improve habitat connectivity; and **(2)** planting of cacti in fuel modification zones and within the Habitat Reserve, where appropriate, along the Habitat Reserve-urban development interface to provide additional habitat for the coastal cactus wren and inhibit unauthorized intrusions into the Habitat Reserve by the public and non-native urban-related predators.

The Wildland Fire Management Plan (*Appendix N*) will address the issue of wildfires in the Habitat Reserve. The Wildland Fire Management Plan describes both a Short-term Tactical Fire Suppression Plan and a Long-term Strategic Fire Management Plan, which in tandem are designed to protect vegetation communities and species to the extent feasible and to maintain diverse age stands of the coastal sage scrub in the study area. By maintaining diverse age stands of sage scrub throughout the Habitat Reserve, suitable habitat for the cactus wren and other species will always be available even if some areas have burned and will take several years to fully recover. Coastal cactus wren populations are widely distributed throughout the Habitat Reserve. Only a truly catastrophic fire that burned virtually all of the sage scrub in the planning area could feasibly cause local extirpation of the coastal cactus wren. Even without the proposed Covered Activities, the risk of such a fire exists today, as was seen in the San Diego Cedar fire in 2003. The Wildland Fire Management Plan, as a component of the HRMP, should reduce the risk of such a catastrophic fire occurring in southern Orange County compared with existing conditions, but realistically, based on the fire history map (*Figure 20-M*), catastrophic fires are a likelihood over the long term.

The Short-term Tactical Fire Suppression Plan component of the Wildland Fire Management Plan includes guidelines for fire suppression in biologically sensitive areas, including bulldozer policy, new fire roads policy, backfiring policy, ground tactical units policy, off-road policy, grading techniques and erosion control policy and fire prevention techniques policy. The Long-Term Strategic Plan identifies Fire Management Compartments (FMCs) and Fire Management Units (FMUs) within the FMCs. The FMCs generally are based on broad physiographic features such as ridgelines, roads, key vegetation transitions, and water courses that define "natural" boundaries for fighting wildfires. Within the FMCs, the FMUs are defined by sub-basin watershed boundaries. The goal of the Strategic Plan is to confine all wildfires to a particular FMU if at all possible. While under severe wildland fire conditions, such as a Santa Ana wind condition, this may not always be possible, but it is a reasonable fire suppression guideline for all other average or above-average fire weather conditions.

The other management action in Subarea 1 to benefit the coastal cactus wren is control of non-native, urban-related predators (*e.g.,* cats and dogs) in the Habitat Reserve, primarily through homeowner education, but also possibly through direct controls such as trapping if necessary and to the extent feasible.

"Coordinated Management Plans" that are not formal elements of the HRMP but that will also benefit the cactus wren area:

- Grazing Management Plan
- Water Quality Management Plan

Each of these plans will contribute to maintaining general habitat quality for the cactus wren and/or specifically protecting occupied habitat areas and cactus wren individuals. The reader is directed to the two coordinated plans for more details.

Potential Target Studies

Several management information needs relevant to management of the coastal cactus wren were listed above, some of which could be addressed at the subregional scale and would help inform management of the Habitat Reserve. Other management information needs, particularly those related to rangewide persistence of the species (*e.g.,* landscape habitat patch size and fragmentation) are best studied at a rangewide scale. The following are potential target studies that could be implemented at the subregional scale:

- Focused studies on sources of mortality or nest site/cactus patch abandonment; *e.g.*, in relation to various edge effects.
- Relationship between grazing, fire and cactus wren occupation of cactus patches
- Recruitment of new cactus patches with potential to support cactus wrens.
- Success of cacti plantings within the Habitat Reserve, especially along edges, for attracting breeding pairs and increasing carrying capacity in the Habitat Reserve.
- Reoccupation of cactus patches following wildfires.
- Interactions of cactus wrens with "edge-enhanced" species such as northern mockingbird and scrub jay.

The Reserve Manager and Science Panel will determine and recommend to the RMVLC Board what target studies (possibly including studies not listed above) should be pursued, based on the identification and prioritization of management and monitoring issues and available funding.

SPECIES ACCOUNT

Rangewide and Regional Status

The coastal cactus wren is one of the original target species of the NCCP planning effort, and is a high profile species for conservation planning in southern California. The full species of cactus wren occurs from southern California to southern Baja California, southern Nevada, southwestern Utah, western and central Arizona, southern New Mexico, and central Texas south to Mexico (Terres 1980). Historically, the California coastal populations of the coastal cactus wren were found continuously along the coastal slopes and lowlands of southern California in arid and semiarid regions with abundant cacti and were directly connected to desert populations through the San Gorgonio Pass in the Banning/Beaumont and Cabazon areas of western Riverside County. Breeding populations of the coastal cactus wren currently are present in Ventura, Los Angeles, Orange, San Bernardino, Riverside and San Diego counties.

Solek and Szijj (1999) provide a comprehensive review and summary of the distribution of the cactus wren. Breeding populations of the cactus wren occur in Ventura, Los Angeles, Orange, San Bernardino, Riverside and San Diego counties. *Table 2-3* provides a range-wide summary of localities by county for the cactus wren (Solek and Szijj 1999).

Range-wide estimates of the total cactus wren population are not available by county, but location counts within NCCP or multi-species conservation planning areas and on military lands in southern California are summarized in *Table 2-4*.

Table 2-5 shows the existing and proposed conservation status of the cactus wren and its habitat in the San Diego MSCP and MHCP, Central and Coastal NCCP/HCP and Western Riverside County MSHCP.

TABLE 2-3
RANGEWIDE DISTRIBUTION OF THE CACTUS WREN IN SOUTHERN CALIFORNIA

County	General Localities
Ventura	Camarillo, Moorpark, Newbury Park, Santa Rosa Valley, Simi Valley, Thousand Oaks
Los Angeles	Baldwin Hills, Claremont, Duarte, Glendora, Irwindale, La Puente, Laverne, Malibu, Palos Verdes, Pomona/San Dimas, Puente Hills, San Dimas, San Fernando Valley, San Jose Hills, Walnut, West Covina
Orange	Anaheim, Caspers Wilderness Park, Chino Hills, Crystal Cove State Park, Dana Point, East Orange, Costa Mesa, Fullerton, Irvine, La Mirada, Laguna Beach, Laguna Hills, Laguna Niguel, Lake Forest, Loma Ridge, Mission Viejo, Newport Beach, Placentia, Portola Hills, Rancho Mission Viejo, Rancho Santa Margarita, San Clemente, San Joaquin Hills, San Juan Capistrano, Starr Ranch, Tustin, Yorba Linda
San Bernardino	Chino Hills, Fontana, Loma Linda, Mentone, Rancho Cucamonga, Redlands, Rialto
Riverside	Aguanga, Beaumont, Cajalco, Calimesa, Corona, Lake Mathews, Lake Perris State Recreation Area, Moreno Valley, Morongo Indian Reservation, Riverside City, Sage, San Jacinto, Murrieta, Temescal Wash
San Diego	Bonsall, Camp Pendleton, Carlsbad, Chula Vista, Dennery Canyon, El Cajon, Encinitas, Escondido, Johnson Canyon, Lake Jennings, Lakeside, Lilac, Mission Hills, Mother Miguel Mountain, Otay Mesa, Otay Ranch, Paradise Hills, Pauma Valley, Poway, Proctor Valley, Rancho Santa Fe, San Pasqual Valley, Santee, Spring Canyon, Sunnyside, Sweetwater Reservoir

TABLE 2-4
CACTUS WREN SITES IN NCCP/MULTI-SPECIES CONSERVATION PLANNING AREAS AND MILITARY LANDS

Planning Area	Number of Sites
Southern Orange County Subregion	1,410[1]
Central & Coast Orange County Subregion	994[2]
Shell HCP	45-55[3]
North San Diego County MHCP	24[4]
San Diego County MSCP	397[5]
MCB Camp Pendleton	278[6]
Western Riverside County MSHCP	100-110[7]

1 2002 Southern Subregion Cumulative Database
2 Central and Coastal Subregion NCCP/HCP, Table 1-ES, July 17, 1996
3 Shell HCP. Estimated number of sites conserved with restoration (W. Boyd, pers. comm. 2003)
4 MHCP Public Review Draft, Vol. II, pg. 4-319 (SANDAG 2000). Number of locations in the Focused Planning Area (FPA) and estimated to be 97 percent of locations in MHCP planning area.
5 San Diego Multiple Species Conservation Plan, Table 3-5, page 3-45, August 1996. This value represents the number of locations within the MSCP planning area. An estimated 268 locations are in the proposed reserve.
6 Estimated locations from 1993-1994 census conducted by Griffith Wildlife Biology.
7 Estimated number of pairs by McKernan (pers. comm., 1998), Western Riverside County Draft MSHCP, Vol. II, The MSHCP Reference Document, 2002, pg. B-90.

TABLE 2-5
CONSERVATION STATUS OF THE CACTUS WREN IN SOUTHERN CALIFORNIA

Conservation Planning Area	Number of Cactus Wren Locations and Percent Conserved	Potential Habitat Conserved
San Diego MSCP	397 locations, of which 68% conserved	47% of maritime succulent scrub
North San Diego County MHCP	24 locations, of which 97% conserved	95-100% conservation of major population in "critical" habitat location in San Pasqual Valley
Central/Coastal NCCP Reserve, Special Linkage and Existing Use Areas, Non-Reserve Open Space, and the Policy Plan Area	994 locations, of which 78% conserved.	Not analyzed
Shell HCP	45-55 sites conserved	60+ acres conservation of cactus scrub, including CSS restoration areas
Western Riverside MSHCP	34 "precision locations," of which 41% in public/quasi-public land and Criteria Area	77,070 acres of suitable habitat (55%) and 11 of 12 identified core areas.

In the early 1990s there was a taxonomic debate about whether the coastal southern California population, including southern Orange and western San Diego counties, constituted a separate subspecies named "San Diego" cactus wren (*C. b. sandiegensis*) by Rea and Weaver (1990). The proposed subspecies "San Diego" cactus wren was petitioned for federal listing as endangered on September 21, 1990 due to its limited distribution and declining habitat. Subsequently the American Ornithologists' Union (AOU) rejected this proposed subspecies as a valid taxon and the petition for the San Diego cactus wren was no longer valid. The currently accepted subspecies of cactus wren in coastal California is the relatively widespread coastal cactus wren (*C. b. couesi*). Based on the AOU findings rejecting the San Diego cactus wren as a valid taxon, the USFWS (1994a) made several determinations in their 1-year finding on the petition to list the Pacific coastal population of the cactus wren that are important for understanding the status of the species in southern California and establishing Conservation Recommendations for the Southern NCCP, including conclusions that:

- the coastal population of the cactus wren does not constitute a distinct population segment (59 Federal Register, 45660, 9/2/94);
- the habitat preference of coastal birds (coastal sage scrub) does not readily separate them from other members of the subspecies *C. b. couesi* (59 Federal Register, 45660, 9/2/94); and
- cactus wrens occupying coastal southern California are not likely significant to the continued existence of wrens in other parts of the species' range because the species is

> relatively common throughout much of its range (59 Federal Register, 45660-45661, 9/2/94).

However, the USFWS also stated that:

> *This finding announced herein is not intended to discount the importance of the coastal sage scrub ecosystem in southern California, which is the subject of intense multi-species and ecosystem planning efforts… Cactus wrens living in southern California have declined in numbers and coastal sage scrub habitats are becoming increasingly depleted. Efforts to conserve these depleted habitats will be of benefit to cactus wrens residing in southern California.*
> (59 Federal Register, 45661, 9/2/94)

Subregional Status

The coastal cactus wren is widely distributed throughout the Southern NCCP/MSAA/HCP planning area (*Figure 195-M*). Although population numbers are not available for the northern portions of the coastal cactus wren's range (*i.e.*, Ventura, Los Angeles and western San Bernardino counties), the Southern NCCP/MSAA/HCP planning area clearly supports a substantial portion of the coastal cactus wren population; about 44 percent of the documented locations within Orange, Riverside and San Diego counties are in the Southern Subregion (*Table 2-4*). Within the planning area the coastal cactus wren is widely distributed in the San Juan Creek and San Mateo Creek watersheds, with essentially continuous connectivity among occupied areas. Within the context of the coastal populations of the coastal cactus wren, the population in the planning area constitutes a *major population*. Because of its widespread distribution and abundance in the planning area, however, it was not appropriate to identify any specific portions of the population as *key locations* in the subregion. The population in the planning area is strategically located as a linkage between the San Diego County populations on Camp Pendleton and conserved populations in the Central and Coastal Subregion Habitat Reserve. Substantial conservation of this species in the planning area and maintaining connections both within the planning area and between the planning area population and conserved populations in the Central and Coastal Subregion Habitat Reserve and populations located on Camp Pendleton would contribute to and provide for conservation of the species in the subregion.

Biological Considerations

The cactus wren is an obligate, non-migratory resident of the coastal sage scrub and chaparral plant communities that include substantial cover of cacti (*Opuntia* spp.). Coastal populations inhabit cactus scrubs typically occurring in a mosaic of coastal sage scrub and chaparral on mesas and lower slopes of the coast ranges at elevations up to 450 m (1,475 ft). In addition to cacti, characteristic shrubs in suitable habitat include California buckwheat, coastal sagebrush, several sages (*Saliva* spp.) and scattered shrubs approaching tree-size, such as laurel sumac and lemonadeberry. Thickets of this xeric vegetation may provide cover and thermal relief for wrens. The nest is also used as a roost site (Anderson and Anderson 1957).

Although most of the biological information collected for cactus wrens has not focused on the coastal subspecies (*e.g.*, Anderson and Anderson's studies cited below were in Arizona), it is assumed that general life history information is applicable to the cactus wren.

Cactus wrens tend to forage on the ground or in low vegetation for insects and other small invertebrates, cactus fruits and other fruits, seeds and nectars. Fruits comprise 15-20 percent of the species' annual diet. Foraging is often regulated by heat stress (Ricklefs and Hainsworth 1968), requiring retreat from exposed sites into the shade of shrubs and tree.

The breeding season of the cactus wren extends from March into June, with two broods per season being common. The nest is usually built in cholla or other large, branching cacti, which also is used as a roost site. The nest is an intricate, woven cylinder, usually placed horizontally 1.2 to 1.5 m (4-5 ft) above the ground (Anderson and Anderson 1957). Clutch sizes typically are 4-5 eggs, with a range of 3-7 eggs (Harrison 1978). Nestlings fledge at 17-23 days, with an average of 21 days (Hensley 1959; Anderson and Anderson 1960). Young may return to roost in the nest after fledging. The young become independent at about one month after leaving the nest (Harrison 1978). There are limited data for dispersal, but birds appear to be highly sedentary and tend to return to the same territories each year (Solek and Szijj 1999). On the Palos Verdes Peninsula in Los Angeles County, for example, Atwood (1998) observed a mean dispersal distance of 1.6 km (1 mi) by juvenile cactus wrens from their natal territories. It should be noted, however, that the Palos Verdes population is a highly fragmented, isolated population and dispersal opportunities may be limited (Solek and Szijj 1999). Arizona data indicate that females disperse farther from natal territories than males (Anderson and Anderson 1973).

The home range of cactus wrens may be the same as the territory range. In Arizona, the average home range/territory is 1.9 ha (4.8 ac), varying from 1.2-2.8 ha (2.9-6.9 ac), and is maintained all year round (Anderson and Anderson 1963).

Threats to the cactus wren include habitat loss and fragmentation from urbanization and agricultural development. Domestic cats, roadrunners, snakes, and loggerhead shrikes prey on adults and nestlings (Anderson and Anderson 1973). Cactus wrens that are confined to isolated patches of habitat in urbanizing areas are subject to increased levels of predation pressures as larger predators are replaced by greater population levels of smaller predators and domestic animals. This species is especially vulnerable to stochastic events, especially wildland fires. Because of its narrow habitat requirements, sedentary behavior, and low dispersal characteristics, cactus wren are subject to loss by fires and, if they disperse, may not find suitable habitat to survive. Intense fires may actually kill cactus plants and eliminate nesting habitat for the cactus wren (*e.g.*, Bontrager *et al.*1995). Nests typically are placed in cactus at least 1 m above ground level. However, cactus patches within less intense burns that do not kill the cactus may be utilized soon after the burn (*e.g.,* Harmsworth Associates 1997, 1998a, 2001). As a result of competition from invasive plant competition, grazing, weather patterns and other natural and human-influenced disturbances, the reestablishment 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.

Protection Recommendations

- Protect at least 70 percent (about 987 mapped sites) of the cactus wren sites located throughout the planning area.
- Protect the major north-south connection to Central San Juan Creek for the cactus wren by providing a habitat linkage between Chiquita Creek and the eastern edge of the Ladera Open Space.
- Protect, to the extent feasible, patches of coastal sage scrub and southern cactus scrub in the San Mateo Watershed to maintain resident and dispersal habitat for the cactus wren between San Juan Creek and populations on Camp Pendleton.
- Maintain east-west biological connectivity for the cactus wren by protecting habitat linkages between Arroyo Trabuco, Chiquita Canyon, and Gobernadora Canyon. Biological connectivity should be maintained between Chiquita, Gobernadora and Arroyo Trabuco by protecting habitat linkages at a minimum of three locations within the sub-basin: **(1)** via rim-to-rim preservation of Sulphur Canyon (approximately 2,000 to 2,500 feet wide); **(2)** at the "Narrows" where the canyon is only 700-800 feet wide (approximately 3,000 feet south of Tesoro High School) and connects to Sulphur Canyon; and **(3)** in contiguous patches of coastal sage scrub through the major side canyon north and east of the wastewater treatment plant.

- Maintain a continuous upland habitat linkage along the east-facing slopes of Chiquadora Ridge Canyon between San Juan Creek and Sulphur Canyon for occupation and dispersal by the cactus wren.
- Provide floodplain and upland habitat linkages adjacent to San Juan Creek for east-west and north-south dispersal by the cactus wren between the San Juan Creek and San Mateo Creek watersheds.
- Maintain upland north-south habitat linkages through the central and western portions of the Trampas Canyon subunit to convey dispersal of the cactus wren between San Juan Creek, San Juan Capistrano, San Clemente, Cristianitos Canyon, the Donna O'Neill Land Conservancy at Rancho Mission Viejo and Camp Pendleton.
- Provide for cactus wren dispersal by maintaining a ridgeline east-west habitat linkage south of the artificial lake in the Trampas Canyon subunit to link Prima Deshecha, Talega Open Space and other habitat to the west in San Juan Capistrano and San Clemente with the Donna O'Neill Land Conservancy and Gabino, La Paz and Talega canyons to the east.
- Protect a habitat linkage, consisting of the Donna O'Neill Land Conservancy and an area along the east side of Cristianitos Creek, to provide connectivity for cactus wrens in the upper portion of the sub-basin with other populations in lower Gabino Creek and Camp Pendleton along lower Cristianitos/San Mateo Creek, and to maintain habitat integrity through connectivity within the Donna O'Neill Land Conservancy at Rancho Mission Viejo.

Management Recommendations

- Pursuant to the Fire Management Plan, implement fire management to help protect patches of southern cactus scrub occupied by the cactus wren while protecting the public, property, and other resources, and, where appropriate reducing fuel loads for fire.
- Pursuant to the Grazing Management Plan, implement grazing management techniques to help protect patches of southern cactus scrub occupied by the cactus wren while allowing for continued cattle grazing sufficient to support cattle ranching operations, and, where appropriate reducing fuel loads for fire.
- Protect southern cactus scrub patches occupied by cactus wrens to the extent feasible from nest predation by non-native mesopredators (*e.g.*, cats).

Restoration Recommendations

- Implement a CSS/VGL restoration program to enhance habitat connectivity and mitigate for impacts to existing habitat associated with future development. Identified restoration areas include Chiquita Ridge, Sulphur Canyon, Chiquadora Ridge and upper Gabino Canyon.

- Plant cacti, where appropriate, along the urban-Habitat Reserve edge to provide additional habitat for the cactus wren and to inhibit unauthorized intrusions into the Habitat Reserve by the public and domestic animals (cats and dogs).

SECTION 2.3 COASTAL CALIFORNIA GNATCATCHER

Species: Coastal California Gnatcatcher (*Polioptila californica californica*)
Federal Status: Threatened
State Status: CSC
CNDDB Rank: G3T2S2
Science Advisors Group: 2
Other: NCCP Target Species
Covered Species: Yes
Focal Monitoring Species: Yes
Planning Species: Yes

CONSERVATION GOALS

1. Maintain conditions in the planning area that will allow for normal evolutionary processes and genetic integrity and exchange through conservation and management of coastal sage scrub habitat and a functional Habitat Reserve, including habitat linkages and dispersal corridors.
2. Manage habitat and populations of the coastal California gnatcatcher to maximize the likelihood that populations are sustained in the planning area, and in doing so "provide for recovery" on a subregional basis and "contribute to recovery" on a rangewide basis.

CONSERVATION STRATEGY

1. Create a permanent subregional Habitat Reserve that provides sufficient breeding habitat in large, contiguous patches to support identified *major* and *important populations* in *key locations* to maximize the likelihood of the species' persistence within the planning area.
2. Formulate a HRMP to provide for long-term protection and management of the coastal California gnatcatcher and its habitat and provide for restoration of coastal sage scrub habitat to increase carrying capacity of the Habitat Reserve and improve habitat linkages.

HABITAT AND SPECIES CONSERVATION AND IMPACTS ANALYSIS

The conservation analysis for the coastal California gnatcatcher is based on site-specific information (*i.e.,* mapped locations) and landscape-level factors including overall habitat conservation, habitat blocks, and habitat contiguity and connectivity.

Table 2-6 provides a summary of the existing conditions, proposed conservation, and permanent and temporary impacts of gnatcatcher locations and coastal sage scrub habitat in the planning area and within the Subarea 1 permit area. The description of impacts and conservation below is limited to Subarea 1 which is the permit action area. The planning area conservation and impact estimates reported in *Table 2-6* include SOS and potential impact areas in Subareas 2, 3 and 4 and do not reflect future planning within those Subareas that may result in changes to the SOS and impact estimates. For example, future planning in the Subarea 2 (Foothill-Trabuco Specific Plan Area) will result in changes to the open space and impact estimates.

TABLE 2-6
COASTAL CALIFORNIA GNATCATCHER
CONSERVATION AND IMPACT SUMMARY

	Acres	Percent	Locations	Percent
Planning Area				
Existing Total	20,956		737	
Habitat Reserve	12,191	58%	396	54%
Supplemental Open Space	4,363	21%	56	7%
Total Protected	16,554	79%	452	61%
Total Permanent Impact	3,262	16%	104	14%
Subarea 1				
Existing Total	16,811		518	
Habitat Reserve	12,191	73%	400	77%
Supplemental Open Space	2,196	13%	28	5%
Total Protected	14,387	86%	428	83%
Total Permanent Impact	2,242	14%	90	17%
Total Temporary Impact	71		3	

Subarea 1 Impacts

The proposed Covered Activities would result in permanent impacts to 2,242 acres (14 percent) of coastal sage scrub and 90 locations (17 percent) in Subarea 1 (*Table 2-6* and *Figure 171-M*). The proposed Covered Activities would also result in temporary impacts to 71 acres of habitat and three locations (*Table 2-6*).

With regard to *major/important populations* in Subarea 1, the proposed Covered Activities would result in impacts to 60 locations within Subarea 1 *major/important populations* in *key locations*, including:

- 51 locations (15 percent) in the Chiquita Canyon/Wagon Wheel sub-basins and Chiquadora Ridge *major population/key location*, including 38 locations in proposed

RMV development in PA 2, four locations in upper Chiquita for the SMWD reservoir project, and nine locations for infrastructure;

- two locations in the East San Juan Capistrano *important population/key location*, including one location on RMV and one location on the Prima Deshecha Landfill;
- five locations on the Prima Deshecha Landfill in the North San Clemente *important population/key location*;
- one location in the Trampas Canyon *important population/key location*; and
- one location in potential orchard in the upper Cristianitos *important population/key location.*

An additional three locations in Subarea 4 in the North San Clemente *important population/key location* would be impacted by the Avenida La Pata improvements.

A total of 27 additional locations outside *major/important populations* would be impacted, including 24 locations in proposed residential/commercial RMV development areas, one location in potential orchard and two locations in the Prima Deshecha Landfill.

Of the 2,653 acres of coastal sage scrub in the Chiquita Canyon/Wagon Wheel sub-basins and Chiquadora Ridge *major population/key location* area, 331 acres (12 percent) would be permanently impacted by proposed PA 2 development (265 acres) and proposed infrastructure construction, operation, and maintenance/repair (66 acres).

Subarea 1 Conservation

A total of 12,191 acres (73 percent) of coastal sage scrub and 400 California gnatcatcher locations (77 percent) would be conserved in the Habitat Reserve (*Table 2-6* and *Figure 171-M*). An additional 2,196 acres (13 percent) of coastal sage scrub and 28 locations (5 percent) are in SOS in Subarea 1, resulting in the total conservation of 14,387 acres (87 percent) of coastal sage scrub and 428 locations (83 percent). Of the 2,196 acres and 28 locations in SOS, 2,061 acres and 21 locations are on NAS Starr Ranch (*Table 1* and *Figure 171-M*).

Conservation of the California gnatcatcher includes 298 of 349 locations (85 percent) and 2,320 acres of 2,653 acres of coastal sage scrub (87 percent) within the *major population/key location* in the Chiquita Canyon/Wagon Wheel sub-basins and Chiquadora Ridge portion of the Gobernadora sub-basin that are in Subarea 1 (*Figure 171-M*). (Note that 44 locations and 441 acres of coastal sage scrub in this *major population/key location* are located in Subarea 3 [Coto de Caza], of which 26 locations are in SOS.)

Conservation of *important populations* is as follows:

- All 14 locations of the East Caspers Wilderness Park *important population* are in Habitat Reserve (note: one location is mapped in the Nichols Institute property and is not a part of the analysis);
- 14 locations of the East Coto de Caza/Starr Ranch *important population*/*key location* are in Habitat Reserve in Caspers Wilderness Park and 19 locations are in SOS on NAS Starr Ranch (19 locations are in Subarea 3, of which seven are in SOS);
- six of seven locations of the Trampas Canyon *important population/key location* are in Habitat Reserve;
- 28 of 41 locations of the Arroyo Trabuco *important population* are in Habitat Reserve (six locations are in areas "Not a Part" of the plan and seven have no designated protection status);
- seven of 21 locations in the North San Clemente *important population/key location* are in Prima Deshecha SOS (eight locations are in SOS in Subarea 4);
- 11 of 13 locations in the upper Cristianitos *important population/key location* are in Habitat Reserve and one location is in Subarea 4 SOS; and
- two locations in the West Foothill-Trabuco Specific Plan *important population/key location* are in Habitat Reserve in O'Neill Regional Park and three are in SOS in the Foothill-Trabuco Specific Plan (FTSP).

Overall, of the 428 conserved locations, 399 locations (93 percent) are within *major/important populations,* and 29 locations are outside of *major/important populations.* The 399 conserved locations in *major/important populations,* of which 373 are in the Habitat Reserve and 26 are in SOS, comprise 83 percent of the 483 total locations mapped in *major/important populations* in Subarea 1. Of the gnatcatcher locations outside *major/important populations* in Subarea 1, 29 of 56 locations (52 percent) would be conserved.

The results of the refined habitat block delineation used to analyze patch size are presented in *Part I, Chapter 13, Table 13-9* and depicted in *Figure 193-M*. The seven habitat blocks each support all or portions of *major* and *important populations* and *key locations* of California gnatcatchers and combined include about 13,370 acres (including sage scrub in SOS in Coto de Caza in Subarea 3) of the 14,387 conserved coastal sage scrub that provides suitable habitat for the California gnatcatcher. Patches of coastal sage scrub within the blocks range from 206 acres in the Radio Tower Road mesa block to 5,841 acres in the Southeastern block. Of the 428

conserved gnatcatcher locations, 314 locations (73 percent) are contained within the seven habitat blocks as follows:

- 108 locations in the Chiquita Ridge block, 71 locations in the Upper Chiquita block, and 45 locations in the Wagon Wheel block, all of which are part of the Chiquita Canyon, Western Gobernadora/Chiquadora Ridge *major population/key location*;
- 17 locations in the Arroyo Trabuco block, of which 12 locations are in the Lower Arroyo Trabuco *important population;*
- 34 locations in the Southeastern block, of which 25 locations comprise the Upper Cristianitos *important population/key location* and East Caspers *important population*;
- four locations in the Radio Tower Road block, of which three locations comprise a portion of the Trampas Canyon *important population/key location*; and
- 35 locations in the Northeastern block, of which 23 locations are within the Coto de Caza/Starr Ranch *important population/key location*.

As a general guideline, moderately productive habitats should include at least 50 individuals to be considered a self-sustaining viable population over the short-term (Franklin 1980; Ogden 1993) and highly productive habitats may support as few as 20 pairs and remain viable (Ogden 1993). Although some of the local populations of California gnatcatchers in the defined habitat blocks number less than 50 locations, this species' dispersal capabilities are much greater than the cactus wren (*e.g.,* Bailey and Mock 1998) and all of the local populations are linked by virtually contiguous natural habitat, as discussed below. Also, the 17 locations in the Arroyo Trabuco block are directly linked to 16 additional locations in the Habitat Reserve associated with Arroyo Trabuco Golf Course/Ladera Open Space that were not included in the habitat block.

Related to the habitat block analysis, a key issue for conservation of the coastal California gnatcatcher is Habitat Reserve configuration and particularly habitat connectivity to support dispersal between local populations. Subregional habitat connectivity for gnatcatcher dispersal within Subarea 1 would be maintained, including north-south connections along Chiquita and Chiquadora ridges (linkages C and G); east-west connectivity between Arroyo Trabuco and Caspers Wilderness Park (linkages B, D, and I); along the San Juan Creek floodplain (linkage J); and north-south connections west of and through the Trampas Canyon sub-basin (linkages K and N) and southern portion of the Chiquita sub-basin, connecting to the Donna O'Neill Land Conservancy and Cristianitos Canyon. All of these linkages, except B, J and K are at least 2,000 feet wide: linkage B, located between existing Las Flores and Ladera Ranch residential developments, has a minimum width of 1,500 feet; linkage J has a minimum width of about

1,000 feet and linkage K has minimum widths of 600 to 700 feet at its narrowest points. However, although these linkages have sections less than 1,000 feet wide, each maintains continuous habitat. With the documented capability of gnatcatchers to disperse through highly modified urban landscapes (Bailey and Mock 1998), and the fact that these relatively narrow linkages still contain continuous natural habitat, they will not significantly impede gnatcatcher dispersal.

ADAPTIVE MANAGEMENT PROGRAM

Stressors

Adaptive management will consider a number of environmental stressors identified for the California gnatcatcher, including

- Urbanization adjacent to Habitat Reserve
- Short-interval fires
- Low frequency fires (?)
- Cattle-related impacts
- Exotic plant invasions
- Exotic and urban-related predators (*e.g.*, cats, Argentine ants)
- Cowbird nest parasitism
- Prolonged drought
- Wet and cold weather

Gnatcatchers are vulnerable to stochastic events such as weather-related catastrophes (*e.g.*, cold, wet weather, prolonged drought) and wildfires, emphasizing the importance of a well-distributed Habitat Reserve to provide for recolonization and refugia. Habitat structure is sensitive to frequency of wildfires, with high frequency fires (*e.g.*, less than 5-year return intervals) resulting in long-term, and possibly irreversible, habitat degradation, such as state-transition to annual grassland.

Habitat structure also is likely sensitive to grazing levels and invasive species, although, at least for the gnatcatcher, some level of disturbance appears to be tolerable. In the present landscape, there likely is a tradeoff between potential disturbance factors such as fire and grazing and a "no touch" policy of habitat management. For example, well-timed managed grazing and prescribed burns may offset or suppress invasions by exotic grasses and weeds that may proliferate in the absence of any intervention.

Gnatcatchers are parasitized to some extent by brown-headed cowbirds and nestlings may be killed by Argentine ants, although the risk from these species is not well documented. Predation by native and non-native species, especially those associated with urbanization, such as cats, raccoons, ground squirrels and scrub jays, are a significant threat to gnatcatchers (Braden *et al.* 1997). On the other hand, gnatcatchers appear to be relatively tolerant of residential development (Dudek 2004) and human activities such as passive recreation (*e.g.*, Miner *et al.* 1998) in proximity to nesting areas.

Goals

Goals for protecting and managing the California gnatcatcher and its habitat include the following:

1. Protect and manage coastal sage scrub habitat to maintain approximate existing acreage in the Habitat Reserve.
2. Maintain the physiographic diversity of coastal sage scrub in the Habitat Reserve.
3. Restore coastal sage scrub and enhance the quality of existing coastal sage scrub in the Habitat Reserve such that the net habitat value of the existing coastal sage scrub system is maintained.
4. Manage coastal sage scrub fire regimes such that a natural diversity of age-stands is maintained throughout the Habitat Reserve.
5. Manage exotic invasions of coastal sage scrub, especially along the Habitat Reserve-urban interface or other vulnerable areas (*e.g.*, along paved and unpaved roads, utility easements).
6. Protect and manage the California gnatcatcher populations within the Habitat Reserve, particularly identified *major* and *important populations* in *key locations*, to maximize the likelihood of the species persistence in Subarea 1.
7. Protect and manage identified key habitat linkages between *major* and *important populations* in *key locations* to maximize the likelihood of genetic and demographic connectivity.

Management and Monitoring Objectives (number of goal met by objective in parentheses)

Objective 1: Implement Conservation Strategy to protect and manage approximately 12,191 acres of coastal sage scrub in the Habitat Reserve (actual acreage will vary in relation to natural and anthropogenic environmental effects such as wildfires and drought) (Goals 1 & 2).

Objective 2: Remap vegetation communities in Habitat Reserve within two (2) years of executing IA to establish a baseline for long-term tracking of the Reserve (Goals 1, 2 & 5).

Objective 3: Update vegetation community map at 5-year intervals (Goals 1, 2 & 5).

Objective 4: Collect regional climate, weather and air quality information to examine potential correlations between vegetation and population changes and environmental variables (Goals 1, 2 & 6).

Objective 5: Conduct annual botanical and wildlife field studies within predesignated sample plots to monitor fine-grained changes in coastal sage scrub community, California gnatcatchers and other focal coastal sage scrub species (Goals 1, 2, 5 & 6).

Objective 6: Implement Habitat Restoration Plan to restore (including revegetation and enhancement) approximately 363 acres of coastal sage scrub (including a mosaic of sage scrub and native grassland that would be suitable habitat for gnatcatcher where appropriate) in designated locations that currently are in agriculture, grazed, or otherwise do not currently support coastal sage scrub to enhance carrying capacity and connectivity (Goals 1, 2, 3, 5, 6 & 7).

Objective 7: Implement Wildland Fire Management Plan to manage coastal sage scrub fire regimes such that a natural diversity of age-stands is maintained throughout the Habitat Reserve and such that source populations are adequately protected (Goals 1, 2, 4, 5 & 6).

Objective 8: Implement Invasive Species Control Plan to manage invasive exotic species in coastal sage scrub, including controls of invasive plants, Argentine ants, and brown-headed cowbirds (Goals 1, 2, 5, 6 and 7).

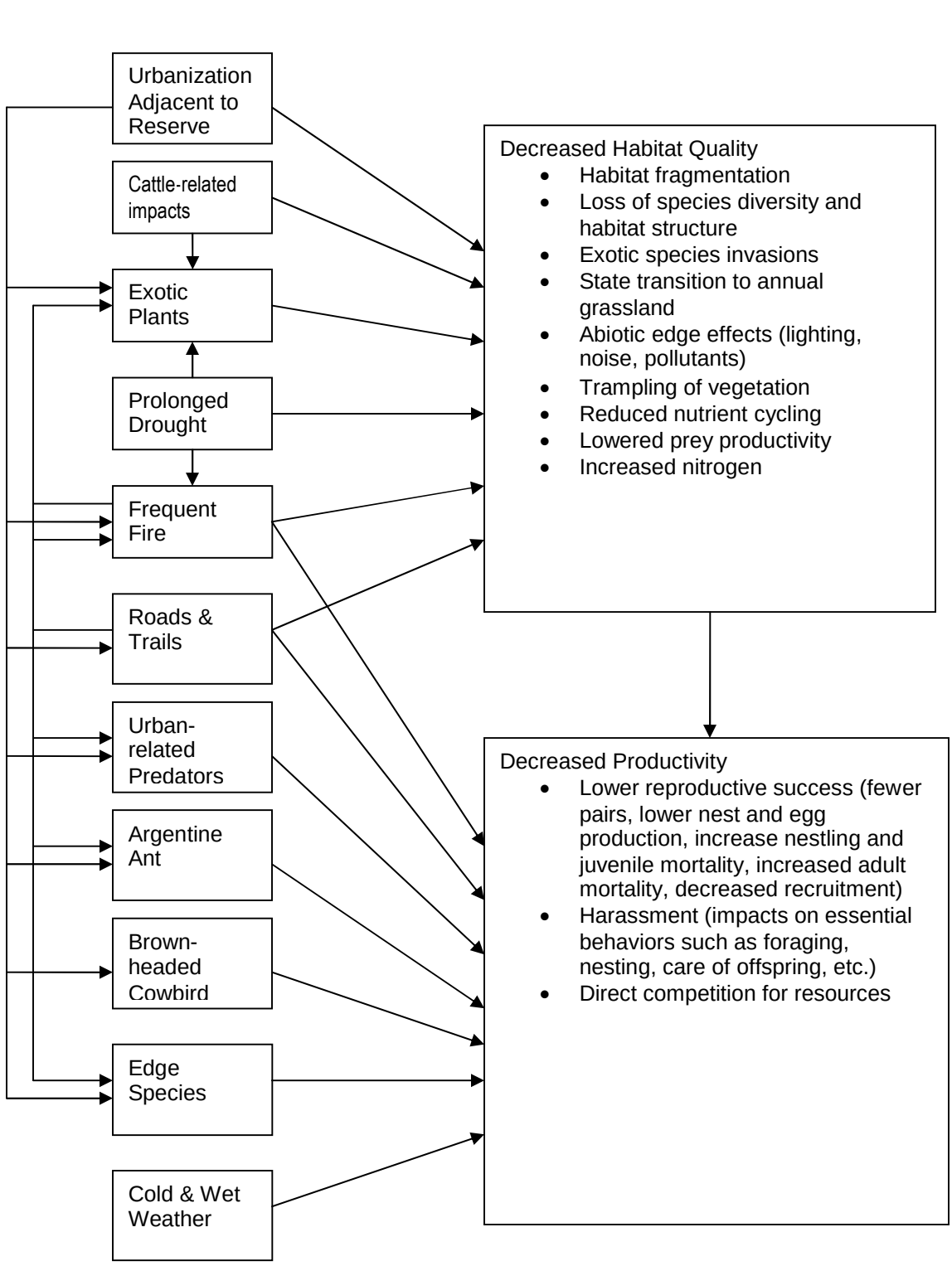
Objective 9: Implement management and monitoring of identified key habitat linkages to maximize the likelihood of continued function as "live in" and dispersal habitat for California gnatcatchers (Goal 7)

Objective 10: Identify and rectify constraints to use or movement (*e.g.*, physical obstacles or bottlenecks) or sources of disturbance or degradation in key habitat linkages and wildlife corridors that serve California gnatcatchers (Goals 6 & 7).

Conceptual Model

Yes – see figure below.

Coastal California Gnatcatcher Conceptual Stressor Model



Regional and Subregional Management Information Needs

- The effects of range-wide habitat fragmentation on gnatcatcher metapopulation viability.
- The key factors in gnatcatcher habitat selection (*e.g.*, species composition, habitat structure, slope, aspect, etc.) and regional variations in habitat selection.
- Whether gnatcatchers are subject to significant resource competition or active displacement along the reserve-urban development interface.
- The relationship of prolonged drought (*e.g.*, > 5 years) to gnatcatcher productivity.
- Whether there an interaction between fire and grazing in maintaining suitable habitat for the gnatcatcher. For example, in the absence of periodic fire, what effect does low-level grazing have on habitat structure, including species diversity and exotic species?
- Whether Argentine ants are a significant impact on gnatcatchers in the subregion.
- Whether gnatcatchers suffer significant predation by urban-related predators along the reserve-urban interface.
- Whether cowbird parasitism poses a significant risk to the gnatcatcher in the subregion.

Level of Management and Monitoring Priority - Medium

At this time the California gnatcatcher population within the Habitat Reserve and SOS in Subarea 1, with over 425 locations that are functionally interconnected, appears to be robust and, with the exception of wildfires, at relatively low risk of extirpation over the long-term. Monitoring of "interior" populations can be conducted in conjunction with standard wildlife surveys in sample transects. Wildfire impacts also should be monitored on a case-by-case basis at the discretion of the Reserve Manager and Science Panel to track recovery of coastal sage scrub and gnatcatcher populations.

Level of Monitoring (*e.g.*, Species-specific, habitat, landscape, combination)

Monitoring will be conducted at both a species-specific and habitat landscape level.

Monitoring Variables

Listed below are suggested species- and habitat-based monitoring variables. The detailed monitoring program for the California gnatcatcher will be developed by the Reserve Manager and Science Panel.

Species-specific Monitoring Variables

1. Number of occupied gnatcatcher locations
2. Proportion of occupied habitat
3. Colonization of unoccupied, restored or recovering (*e.g.,* from wildfire) habitat
4. Brown-headed cowbird nest parasitism
5. Argentine ant impacts
6. Urban-related predator impacts (*e.g.*, tracks, scat, direct observations)

Habitat-based Monitoring Variables

1. Vegetation communities long-term status
2. Relative cover of different native plant species
3. Proportion of exotic plant species/native plant species
4. Evidence of urban run-off, erosion, pollutants
5. Evidence of unauthorized public activities (*e.g.,* trespass, trampling, illegal trails, trash, shooting, etc.)

Abiotic Monitoring Variables

1. Climate
2. Weather
3. Air quality
4. Water quality and runoff

Management Actions

The following management actions implemented as part of the HRMP will directly benefit the California gnatcatcher and its habitat:

- Habitat Restoration Plan
- Wildland Fire Management Plan

Habitat restoration actions to benefit the California gnatcatcher include, subject to Reserve Manager and Science Panel discretion, implementation of a CSS/VGL restoration program within targeted areas (Chiquita Ridge, Chiquadora Ridge and in Sulphur Canyon) to enhance habitat value and improve habitat connectivity

The Wildland Fire Management Plan (*Appendix N*) will address the issue of wildfires in the Habitat Reserve. The Wildland Fire Management Plan describes both a Short-term Tactical Fire Suppression Plan and a Long-term Strategic Fire Conservation Plan, which in tandem are designed to protect vegetation communities and species to the extent feasible and to maintain diverse age stands of the coastal sage scrub in the study area. By maintaining diverse age stands

of sage scrub throughout the Habitat Reserve, suitable habitat for the gnatcatcher and other species will always be available even if some areas have burned and will take several years to fully recover. California gnatcatcher populations are widely distributed throughout the Habitat Reserve. Only a truly catastrophic fire that burned virtually all of the sage scrub in the planning area could feasibly cause local extirpation of the gnatcatcher. Even without the proposed Covered Activities, the risk of such a fire exists today, as was seen in the San Diego Cedar fire in 2003. The Wildland Fire Management Plan, as a component of the HRMP, should reduce the risk of such a catastrophic fire occurring in southern Orange County compared with existing conditions, but realistically, based on the fire history map (*Figure 20-M*), catastrophic fires are a likelihood over the long term.

The Short-term Tactical Fire Suppression Plan component of the Wildland Fire Management Plan includes guidelines for fire suppression in biologically sensitive areas, including bulldozer policy, new fire roads policy, backfiring policy, ground tactical units policy, off-road policy, grading techniques and erosion control policy and fire prevention techniques policy. The Long-Term Strategic Plan identifies Fire Management Compartments (FMCs) and Fire Management Units (FMUs) within the FMCs. The FMCs generally are based on broad physiographic features such as ridgelines, roads, key vegetation transitions, and water courses that define "natural" boundaries for fighting wildfires. Within the FMCs, the FMUs are defined by sub-basin watershed boundaries. The goal of the Strategic Plan is to confine all wildfires to a particular FMU if at all possible. While under severe wildland fire conditions, such as a Santa Ana wind condition, this may not always be possible, but it is a reasonable fire suppression guideline for all other average or above-average fire weather conditions.

The other management actions in Subarea 1 to benefit the California gnatcatcher are **(1)** controls of non-native, urban-related predators such as cats in the Habitat Reserve, primarily through homeowner education, but also possibly through direct controls such as trapping if necessary and to the extent feasible; and **(2)** implementation of cowbird trapping.

"Coordinated Management Plans" that are not formal elements of the HRMP but will also benefit the California gnatcatcher are:

- Grazing Management Plan
- Water Quality Management Plan

The reader is referred to the two coordinated plans for more details.

Potential Target Studies

Several management information needs relevant to management of the California gnatcatcher were listed above, some of which could be addressed at the subregional scale and would help inform management of the Habitat Reserve. Other management information needs, particularly those related to rangewide persistence of the species (*e.g.,* landscape habitat fragmentation) are best studied at a rangewide scale. The following are potential target studies that could be implemented at the subregional scale:

- Relationship between grazing, fire and gnatcatcher occupation
  - *e.g.*, recolonization of burned areas
- Relationship between "edge" species (*e.g.*, mockingbird) and gnatcatcher occupation;
  - *e.g.*, is there resource competition, displacement, etc. occurring?
- Occupation or use of "constrained" habitat linkages
- Colonization of restored areas by gnatcatchers
- Mortality caused by Argentine ants
- Brown-headed cowbird nest parasitism
- Effects of urban-related predators on gnatcatchers

The Reserve Manager and Science Panel will determine and recommend to the RMVLC Board what target studies (possibly including studies not listed above) should be pursued, based on the identification and prioritization of management and monitoring issues and available funding.

SPECIES ACCOUNT

Rangewide and Regional Status

Historically, the California gnatcatcher ranged from southern Ventura County southward through Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties, and into Baja California, Mexico, to approximately 30 degrees North latitude near El Rosario (Atwood 1990). The gnatcatcher was considered locally common in the mid-1940s; but by the 1960s, this subspecies had declined substantially in the United States owing to widespread destruction of its habitat (Atwood 1990). Currently, the subspecies occurs on coastal slopes of southern California, ranging from southern Ventura southward through Palos Verdes Peninsula in Los Angeles County through Orange, Riverside, San Bernardino and San Diego Counties into Baja California to El Rosario, Mexico, at about 30 degrees North latitude (Atwood 1991).

Gnatcatcher sites listed in *Table 2-7* include cumulative observed locations of gnatcatchers dating from about 1989 to 2001. The sites may include breeding pairs or some unpaired individuals. Because gnatcatcher breeding populations fluctuate from year to year, these data are not intended to provide an accurate population estimate, but include gnatcatcher observations recorded since about 1989 to provide a relative measure of gnatcatcher distribution and densities within southern California for the purpose of conservation planning.

TABLE 2-7. REGION-WIDE SUMMARY: 2001 STATUS OF COASTAL CALIFORNIA GNATCATCHER SITES WITHIN KNOWN RANGE IN SOUTHERN CALIFORNIA

Regional Population Area(s)	Number of Counted Gnatcatcher Sites[1,2]
San Diego MSCP	1,819[3]
North San Diego County MHCP	378[4]
Central/Coastal NCCP Reserve	340[5]
Central/Coastal Special Linkage, NRPPA, Existing Use Area and Non-Reserve Open Spaces	140[6]
Protected Gnatcatcher Sites in Southern Orange County Subregion NCCP (Conservation Easements)	348[7]
Unprotected Sites in the Southern Subregion NCCP	389[7]
Palos Verde Peninsula, Los Angeles County	38[8]
APPROXIMATE TOTAL SITES IN NCCP/HCP PLANNING AREAS	***3,452 sites***
GNATCATCHER SITES LOCATED ON FEDERAL LANDS	
MCB, Camp Pendleton	620
Miramar MCAS	53
TOTAL GNATCATCHER SITES ON FEDERAL LANDS	***673 sites***
GNATCATCHERS WITHIN AREAS NOT COVERED BY 4(D) RULE PROTECTIONS BUT SUBJECT TO SECTION 9 ESA PROTECTIONS	
Riverside County	326[9]
Los Angeles County	97
San Bernardino County	27
Ventura County	12[10]
TOTAL GNATCATCHER SITES SUBJECT TO SECTION 9	***462 sites***
GNATCATCHER SITES IN NCCP/HCP PLANNING AREAS, FEDERAL LANDS OR SUBJECT TO SECTION 9 PROTECTIONS	
Gnatcatchers Sites in NCCP Planning Areas	3,452
Gnatcatchers Sites on Federal Lands	673
Gnatcatcher Sites Subject to Section 9 Protections	462
GNATCATCHER SITES NOT AUTHORIZED FOR TAKE	***4,587***
GNATCATCHER SITES AUTHORIZED FOR TAKE BY APPROVED NCCP'S	**1,103**
GRAND TOTAL	**5,6990**

1 Gnatcatcher sites include cumulative observed locations of gnatcatchers dating from 1989 to 2001. The sites may include breeding or unpaired individuals. These data are intended to provide information about observed occupied habitat.

2 Non-footnoted numbers are taken from the 1999 USFWS Biological Opinion for the Gnatcatcher 4(d) rule (USFWS 1999a).

3 San Diego Multiple Species Conservation Plan, Table 3-5, page 3-45, August 1996.

4 Source is Dr. Wayne Spencer, Conservation Biology Institute, 2001.

5 Central and coastal Subregion NCCP/HCP, Table 1-ES, July 17, 1996.

6 Central and coastal Subregion NCCP/HCP with updated survey data by Harmsworth Associates for the North Ranch Policy Plan Area, 2001.

7 Source is Dr. Philip Behrends, Dudek & Associates, Inc., 2001.

8 Atwood *et al.*, 1996

9 Source is Western Riverside County Multi-Species Habitat Conservation Program sensitive species data base, 2001.

10 Source is Susan Davison, EDAW, 2003.

Subregional Status

The 737 mapped locations for the California gnatcatcher in the Southern Subregion are distributed throughout the subregion, with population concentrations at the lower elevations. About 97 percent of the 737 mapped locations are at elevations below 366 m (1,200 ft) (*Figure 171-M*). The locations above 366 m are concentrated in the Foothill-Trabuco Specific Plan area and the eastern portion of Caspers Wilderness Park. *Table 2-8* provides a breakdown of mapped gnatcatcher locations by watershed and sub-basin. As illustrated in *Table 2-8*, the vast majority of gnatcatcher locations are in the San Juan Creek Watershed. The San Clemente Hydrological Unit includes about 7 percent of the locations and the portion of the San Mateo Creek Watershed in the planning area supports only 4 percent of the locations.

TABLE 2-8
CALIFORNIA GNATCATCHER DISTRIBUTION IN THE SOUTHERN SUBREGION

	No. Mapped Locations	Percent of Total
Sub-basins in San Juan Creek Watershed		
Chiquita Canyon	282	38%
Canada Gobernadora	109	15%
Central San Juan & Trampas Canyon	17	2%
Wagon Wheel Canyon	23	3%
Bell Canyon	29	4%
Lucas Canyon	10	1%
Verdugo Canyon	1	<1%
Other Sub-basins within Watershed	185	25%
SUBTOTAL	**654**	**89%**
Sub-basins in San Mateo Creek Watershed		
Cristianitos Canyon	12	2%
Gabino & Blind Canyons	4	<1%
La Paz Canyon	1	<1%
Talega Canyon	7	1%
Other Sub-basins within Watershed	5	<1%
SUBTOTAL	**31**	**4%**
San Clemente Hydrological Unit	**52**	**7%**
TOTAL	***737***	***11%***

Gnatcatcher concentrations in the planning area also can be described in terms of relatively discrete local populations that lend themselves to an analysis of *major* and *important populations*

and *key locations.* Generally these local populations are comprised of clusters of locations that probably encompass typical dispersal patterns within the local area. For example, the Chiquita population exhibits a clearly defined cluster of points, although the break between this population and the cluster on the ridge between Coto de Caza and Bell Canyon is somewhat arbitrary. On the other hand, the population east of Coto clearly is less concentrated even though there are substantial patches of coastal sage scrub available. Although empirical data for dispersal in the subregion are not available, based on dispersal studies conducted elsewhere (*e.g.*, Galvin 1998; Bailey and Mock 1998), it can be hypothesized where birds may move within the planning area. For example, Galvin's (1998) study of dispersal by gnatcatchers in southern Orange County found that most dispersal movements by juvenile gnatcatchers were less than 1 km (3,275 ft), although birds are capable of moving much farther (*e.g.*, Bailey and Mock 1998).

The Southern Subregion supports one *major population* centered in the Chiquita Canyon area, including Chiquadora Ridge and Wagon Wheel Canyon. This *major population* includes approximately 404 locations, or about 55 percent of the total locations in the subregion. This population also is a *key location* because it is central to several other *important populations* that are distributed throughout the subregion, as well as populations to the south on Camp Pendleton. Some of these *important populations* may only number a few mapped locations, but occur in areas important for geographic diversity and representation of the gnatcatcher in the subregion. *Important populations* that are also identified as *key locations* are integral to the overall function of the reserve for this species because they provide linkages to other populations, including populations on Camp Pendleton.

Table 2-9 summarizes the identified *major* and *important populations* and *key locations* for the California gnatcatcher in the Southern Subregion. These populations and locations are depicted in *Figure 171-M*. *Table 2-9* is followed by a narrative summary of these populations and locations.

The Chiquita Canyon area (No. 1 on *Figure 171-M*), including Chiquadora Ridge and Wagon Wheel Canyon supports a *major population*, both within the Southern Subregion, and within the range of the gnatcatcher in southern California. This area, which extends from the "horseshoe" in northern Coto de Caza south to San Juan Creek, includes 404 mapped locations of the gnatcatcher and accounts for 55 percent of the gnatcatchers in the subregion. As the *major population* in the subregion, this population also is in a *key location*.

TABLE 2-9
MAJOR AND IMPORTANT POPULATIONS OF THE CALIFORNIA GNATCATCHER IN THE SOUTHERN SUBREGION

Population No.	Population Type/ Location	General Area	No. Locations
1	Major/Key Location	Chiquita Canyon, Western Gobernadora/ Chiquadora Ridge, Wagon Wheel	404
2	Important	Lower Arroyo Trabuco	41
3	Important/Key Location	West Foothill-Trabuco SP	6
4	Important	East Foothill-Trabuco SP	14
5	Important/Key Location	East Coto de Caza/Starr Ranch	52
6	Important	East Caspers Wilderness Park	15
7	Important/Key Location	West San Juan Capistrano	35
8	Important/Key Location	East San Juan Capistrano	28
9	Important/Key Location	Trampas Canyon	7
10	Important/Key Location	North San Clemente	21
11	Important/Key Location	Upper Cristianitos Canyon	13
12	Important/Key Location	Avenida Pico	8
Total Locations in Major and Important Population Areas			**644 (87%)**
Total Locations not included in Major or Important Population Areas			**93 (13%)**

Lower Arroyo Trabuco (No. 2 on *Figure 171-M*) between about Avery Parkway and Oso Parkway supports an *important population* containing about 41 mapped 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. This population is considered important because it contains a substantial number of gnatcatchers, provides dispersal areas and potentially a refugium for birds in Chiquita Canyon when wildfires occur. Although this area supports an *important population*, it is not considered a *key location* and a minor loss of locations would still be consistent with the species conservation goals.

- The portion of the Foothill-Trabuco Specific Plan area west of the Live Oak Canyon Road (No. 3 on *Figure 171-M*) supports an *important population* in a *key location*. Although there are only about six gnatcatcher locations here, the area is important as a low elevation habitat link to gnatcatcher populations in the Central Subregion.
- The portion of the Foothill-Trabuco Specific Plan in the Rose Canyon area (No. 4 on *Figure 171-M*) supports an *important population* of the gnatcatcher. Although the gnatcatcher is sparsely distributed and there are only 14 mapped locations for this area, it represents the upper elevation limit and edge of the geographic range for the species in the Southern Subregion. This population contributes to the physiographic diversity of the

species in the subregion. Birds in this population probably also disperse to the *important population* west of Live Oak Canyon Road and possibly to the *major* and *important populations* to the south.

- The population of gnatcatchers along the ridgeline between the Gobernadora and Bell Canyon sub-basins, and the scattered locations east of the northern Bell Canyon (No. 5 on *Figure 171-M*) comprise an *important population* in a *key location.* This population is physically linked to the Chiquita Canyon *major population* via the "horseshoe" north of Coto de Caza, but does not exhibit quite as high a concentration of birds despite the predominance of coastal sage scrub in the area. This population is considered important because it contains 52 gnatcatcher locations, provides dispersal areas and potentially refugia for birds in Chiquita Canyon when wildfires occur. It is also considered to be in a *key location* because it provides a north-south linkage to other gnatcatcher locations in Caspers Wilderness Park, including scattered locations west of San Juan Creek and *important population* No. 6 (*Figure 171-M*) located east of San Juan Creek.
- The population east of San Juan Creek in Caspers Wilderness Park (No. 6 of *Figure 171-M*) is an *important population.* This population comprising 15 locations represents the eastmost extension of the gnatcatcher in the subregion and thus provides physiographic diversity for the species in the subregion.
- The population located north of Camino Las Ramblas in San Juan Capistrano (No. 7 on *Figure 171-M*) is an *important population* in a *key location.* This area supports about 35 mapped locations and is the southwesternmost cluster of gnatcatchers in the subregion. This population contributes to the physiographic diversity of the species in the subregion and provides potential refugia in case of wildfire in locations to the east.
- The population generally located north of Camino Las Ramblas and west of La Pata Avenue in San Juan Capistrano (No. 8 on *Figure 171-M*) is an *important population* in a *key location.* This population numbers about 28 locations and is in a *key location* for the north-south linkage between the Chiquita Canyon *major population*, the *important population* to the west (No. 7) and the *important population* to the south (No. 10).
- The population generally located northwest of the silica sand mining operation in Trampas Canyon (No. 9 on *Figure 171-M*) is an *important population* in a *key location.* Although this area supports only about seven locations, 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 population of about 21 locations located mostly in San Clemente west of the proposed extension of La Pata Avenue and on either side of the proposed extension of

Camino Del Rio (No. 10 on *Figure 171-M*) is an *important population* in a *key location.* This population provides a low elevation east-west linkage between the San Juan Capistrano populations (Nos. 7 and 8) and the *important population* along Avenida Pico (No. 12), that then connects to the population along lower Cristianitos and San Mateo creeks and other populations on Camp Pendleton.

- The population in upper Cristianitos Canyon (No. 11 on *Figure 171-M*) is an *important population* in a *key location.* While this is a small population with only 13 mapped locations, it is located in a *key location* for connecting the Chiquita Canyon *major population* with populations in lower Cristianitos and San Mateo creeks on Camp Pendleton. It is the eastmost of the low elevation population connections.
- The population located south of Avenida Pico in San Clemente (No. 12 on *Figure 171-M*) is an *important population* in a *key location.* Although this area supports only eight locations, it is in a *key location* for the east-west linkage between populations in San Juan Capistrano and San Clemente and the population in lower Cristianitos and San Mateo creeks on Camp Pendleton. It is the only remaining southerly link for these populations.

Biological Considerations

The coastal California gnatcatcher is a small, long-tailed member of the thrush family (Muscicapidae). The gnatcatcher typically occurs in or near sage scrub habitat, which is a broad category of vegetation that includes the following plant communities as classified by Holland (1986): Venturan coastal sage scrub, Diegan coastal sage scrub, maritime succulent scrub, Riversidean sage scrub, Riversidean alluvial fan sage scrub, southern coastal bluff scrub, and coastal sage-chaparral scrub. Coastal sage scrub is composed of relatively low-growing, dry-season deciduous, and succulent plants. Characteristic plants of this community include coastal sagebrush (*Artemisia californica*), various species of sage (*Salvia* sp.), California buckwheat (*Eriogonum fasciculatum*), lemonadeberry (*Rhus integrifolia*), California encelia (*Encelia californica*), and *Opuntia* spp. Ninety-nine percent of all gnatcatcher locality records within coastal Orange and San Diego counties occur at or below an elevation of 300 m (984 ft) (Atwood 1990).

Gnatcatchers also use chaparral, grassland, and riparian habitats where they occur adjacent to sage scrub. The use of these habitats appears to be most frequent during late summer, autumn, and winter, with smaller numbers of birds using such areas during the breeding season. These non-sage scrub habitats are used for dispersal (see discussion below), but data on dispersal use are largely anecdotal (Bowler 1995; Campbell *et al.* 1998). Although existing quantitative data are poor regarding gnatcatcher use of these other habitats, these areas may be critical during

certain times of year for dispersal or as foraging areas during drought conditions. Breeding territories have also been documented in non-sage scrub habitat. Campbell *et al.* (1998) discuss likely scenarios explaining why non-coastal sage scrub is used by gnatcatchers, including food source availability, dispersal areas for juveniles, temperature extremes, fire avoidance, and lowered predation rate for fledglings.

The California gnatcatcher is primarily insectivorous, non-migratory, and exhibits strong site tenacity (Atwood 1990). The diet of gnatcatchers, based on fecal analyses, includes leaf- and plant hoppers and spiders as dominant prey, with true bugs, wasps, bees, and ants as only minor components of their diet (Burger *et al.* 1999).

The breeding season of the gnatcatcher extends from mid February through middle August, with the peak of the nesting activity occurring from mid-March through mid-May. The gnatcatcher nest is a small, cup-shaped basket usually found one to three feet above the ground in a small shrub or cactus. Clutch sizes range between three and five eggs, with the average being four. Juvenile birds associate with parents for several weeks (sometimes months) after fledging (Atwood 1990). The coastal California gnatcatcher is a year-round resident. Post-breeding dispersal of fledglings occurs between late May and late November.

Two studies have documented dispersal by California gnatcatchers. Mean dispersal of juveniles in Orange County was found to be 1.05 kilometer (km) (0.65 mile [mi]) with one individual dispersing a total of 7.5 km (4.7 mi) (Galvin 1998). In an isolated population on the Palos Verdes Peninsula, the mean dispersal distance of gnatcatchers banded as nestlings for males was 2.8 km (1.7 mi) and for females was 3.3 km (2.0 mi) (Atwood *et al.* 1996). Although the mean dispersal distances that have been documented above are relatively low, dispersal of juveniles is difficult to observe and to document without extensive banding studies. It is likely that the few current studies underestimate the gnatcatcher's typical dispersal capacity because of the difficulty of detecting (Bailey and Mock 1998). Juvenile coastal California gnatcatchers are apparently able to traverse highly man-modified landscapes, including non-native landscaping vegetation, for at least short distances (Bailey and Mock 1998). Additionally, natural and restored coastal sage scrub habitat along highway corridors has been documented to be used for foraging and nesting by gnatcatchers and may serve important dispersal functions (Famolaro and Newman 1998).

Coastal sage scrub is patchily distributed throughout the range of the gnatcatcher, and the gnatcatcher is not uniformly distributed within the structurally and floristically variable coastal sage scrub community. Rather, the subspecies tends to occur most frequently within the coastal sagebrush-dominated stands on mesas, gently sloping areas, and along the lower slopes of the coast ranges (Atwood 1990). Territory size increases as vegetation density decreases and with

distance from the coast, probably due to food resource availability. Therefore, gnatcatchers will use sparsely vegetated coastal sage scrub for shelter and to forage for insects as long as perennial shrubs are available.

Protection Recommendations

- Based on the application of the protection recommendations for overall biological resources in the Chiquita sub-basin, the goal is to protect at least 80 percent of the existing coastal sage scrub and gnatcatcher locations within the *major population* (including those sites within the Chiquita sub-basin and the Chiquadora Ridge portion of the Gobernadora sub-basin). Additional conservation of gnatcatcher habitat will be achieved by implementation of the restoration recommendations described below.
- Avoid impacts to the *important population* of the California gnatcatcher and coastal sage scrub in the portion of the Chiquita sub-basin south of San Juan Creek, as well as the locations west of Narrow Creek within the *major population* to the maximum extent feasible to maintain resident and dispersal habitat for the gnatcatcher between Chiquita Ridge and San Juan Capistrano and San Clemente.
- Protect the major north-south habitat connection for the California gnatcatcher to Central San Juan Creek by providing a habitat linkage between Chiquita Creek and the eastern edge of the Ladera Open Space.
- Maintain east-west biological connectivity for habitat linkages for the gnatcatcher between Arroyo Trabuco, Chiquita Canyon and Canada Gobernadora. Biological connectivity should be maintained between Chiquita, Gobernadora and Arroyo Trabuco by providing for connectivity at a minimum of three locations within the sub-basin: **(1)** via rim to rim preservation of Sulphur Canyon (approximately 2,000 to 2,500 feet wide), **(2)** at the "Narrows" where the canyon is only 210-244 m (700-800 ft wide) (approximately 900 m [3,000 ft] south of Tesoro High School) and connects to Sulphur Canyon; and **(3)** in contiguous patches of coastal sage scrub through the major canyon north and east of the wastewater treatment plant.
- Maintain connectivity between protected coastal sage scrub patches throughout Chiquadora Ridge to allow for dispersal of gnatcatchers between patches.
- Maintain a continuous upland habitat linkage for gnatcatchers along the east-facing slopes of Chiquadora Ridge between San Juan Creek and Sulphur Canyon.
- Provide floodplain and upland habitat linkages adjacent to San Juan Creek for east-west and north-south dispersal by the California gnatcatcher between the Chiquita Canyon and Cristianitos sub-basins.

- Avoid impacts to the *important populations* of California gnatcatchers and coastal sage scrub to the maximum extent feasible to maintain resident and dispersal habitat for the gnatcatcher between San Juan Creek and Cristianitos Canyon and populations on Camp Pendleton.
- Maintain upland north-south habitat linkages through the central and western portions of the Trampas Canyon subunit to convey gnatcatchers between San Juan Creek and Cristianitos Canyon, the Donna O'Neill Conservancy at Rancho Mission Viejo and other areas of the San Mateo Watershed.
- Within the Trampas Canyon subunit of the Central San Juan Creek and Trampas Canyon sub-basin, maintain upland east-west habitat linkage for gnatcatchers south of the artificial lake to link Prima Deshecha, Talega Open Space and other habitat to the west with the Donna O'Neill Conservancy and the San Mateo Watershed. This habitat linkage should allow for dispersal of gnatcatchers and other avian species, as well as provide a movement corridor for large mammals such as bobcat, coyote and mule deer.
- Maintain a north-south habitat linkage between San Juan Creek and lower San Mateo Creek for dispersal and movement of gnatcatchers and other avian species, as well as large mammals such as bobcat, coyote and mule deer, and, in particular, avoid occupied coastal sage scrub habitat in upper Cristianitos Canyon.

Management Recommendations

- Implement a cowbird trapping program to mitigate for impacts to existing habitat within the sub-basin and for potential impacts associated with future development. The cowbird trapping program will be evaluated on an annual basis and trap locations and trapping effort will be adjusted as part of the overall Adaptive Management Program (*e.g.*, if the number of trapped cowbirds drops to a prescribed threshold, the trapping program may be terminated or otherwise modified).

Restoration Recommendations

- Implement a coastal sage scrub (CSS)/valley needlegrass grassland (VGL) restoration program to enhance habitat connectivity and mitigate for impacts to existing habitat associated with future development. Identified restoration areas include Chiquita Ridge, Chiquadora Ridge and Sulphur Canyon.

2.4 COOPER'S HAWK

Species: Cooper's Hawk (*Accipiter cooperii*)
Federal Status: None
State Status: CSC
CNDDB Rank: G5S3
Science Advisors Group: 2
Covered Species: Yes
Focal Monitoring Species: No
Planning Species: Yes

CONSERVATION GOAL

1. Manage habitat and populations of the Cooper's hawk to maximize the likelihood that populations are sustained in the planning area, and in doing so "provide for recovery" on a subregional basis and "contribute to recovery" on a rangewide basis.

CONSERVATION STRATEGY

1. Create a permanent subregional Habitat Reserve that provides sufficient breeding and foraging habitat to maximize the likelihood of the species' persistence within the planning area, including the major riparian drainages and woodlands that support concentrations the species.
2. Formulate a HRMP to provide for long-term protection and management of the Cooper's hawk and its habitat and provide for restoration of riparian habitat to enhance the amount and quality of existing habitat.

HABITAT AND SPECIES CONSERVATION AND IMPACT ANALYSIS

The conservation analysis for the Cooper's hawk is based both on site-specific information including documented historic nest sites and identified important habitat areas (although no *major/important populations/key locations* were identified for this species) and the amount of total conserved suitable nesting and foraging habitat, defined as riparian and woodland habitats. The conservation analysis also considers potential indirect effects of existing and proposed development by analyzing buffers between nest sites and existing and proposed development, including roads.

Table 2-10 provides a summary of the existing conditions, proposed conservation, and permanent and temporary impacts of Cooper's hawks historic nest locations and riparian and woodland habitat in the planning area and within the Subarea 1 permit area. The description of impacts and conservation below is limited to Subarea 1 which is the permit action area. The planning area conservation and impact estimates reported in *Table 2-10* include SOS and potential impact areas in Subareas 2, 3 and 4 and do not reflect future planning within those Subareas that may result in changes to the SOS and impact estimates. For example, future planning in the Subarea 2 (Foothill-Trabuco Specific Plan Area) will result in changes to the open space and impact estimates.

TABLE 2-10
COOPER'S HAWK NESTING HABITAT CONSERVATION AND IMPACT SUMMARY

	Acres	Percent	Historic Nest Sites	Percent
Planning Area				
Existing Total	7,763		44	
Habitat Reserve	4,537	58%	30	68%
Supplemental Open Space	1,691	22%	6	14%
Total Protected	6,228	80%	36	82%
Total Permanent Impact	1,040	13%	6	14%
Subarea 1				
Existing Total	6,223		41	
Habitat Reserve	4,537	73%	30	73%
Supplemental Open Space	929	15%	5	12%
Total Protected	5,466	88%	35	85%
Total Permanent Impact	750	12%	6	12%
Total Temporary Impact	85		0	

Subarea 1 Impacts

The proposed Covered Activities would result in direct, permanent impacts to 750 acres (12 percent) of riparian and woodland habitat and six historic nest sites (12 percent) (*Table 2-10 Figure 196-M*). Two of the impacted sites are mapped in Habitat Reserve, but, as discussed below, the proposed Covered Activities would result in potential indirect impacts to these two nest sites such that their long-term viability is questionable. The proposed Covered Activities also would result in temporary direct impacts to 85 acres of habitat, but no historic nest sites.

Potential indirect impacts resulting from urban development, including roads, near nesting areas is an important consideration for assessing impacts to Cooper's hawk. Thus, in addition to clear impacts to sites in proposed development areas, the impact analysis considers potential indirect effects by examining the buffers between historic nest sites and existing and proposed development and existing and proposed roads. Any site within 300 feet of existing or planned development or roads is considered to be potentially impacted, unless there is some mitigating

factor to indicate otherwise, such as topographic separation. The linear distance of each "conserved" historic nest site (*i.e.,* sites within the Habitat Reserve or Subarea 1 SOS based on the GIS analysis) from the nearest existing and proposed development area (including the Cow Camp Road alignment and Cristianitos Road/"F" Street) was calculated. Based on the GIS analysis, the median distance from the nearest existing or proposed development or existing or new roads of 37 nest sites located in Habitat Reserve and Subarea 1 SOS is 1,020 feet, with a minimum of 155 feet. Thirty-two of the 37 historic nest sites in the Habitat Reserve or SOS are at least 300 feet from existing or proposed development and roads. Nest site 22 in Verdugo Canyon is located within 155 feet of proposed development in PA 4 (see *Figure 196-M*). Although the footprint of PA 4 has not been determined, it is assumed for this impact analysis that this nest site could be indirectly impacted. Nest site 34 is within 237 feet of the proposed Cristianitos/"F" Street in middle Chiquita (*Figure 196-M*). This site also is considered be potentially impacted by the proposed road. Nest sites 9 and 43 are in Arroyo Trabuco approximately 250 feet and 281 feet from existing development, respectively (*Figure 196-M*). Because these sites are in the arroyo, which provides additional topographic buffering to the absolute linear distance from existing development, and no new development is proposed for this area, they are considered extant and not subject to impacts resulting from the proposed Covered Activities. Finally, nest site 14 is 280 feet from the western boundary of PA 8 (*Figure 196-M*). Because this site approaches the 300-foot distance criterion and will be topographically separated from future development in PA 8, this site is considered conserved. In summary, the buffer analysis indicates that two additional historic Cooper's hawk nests sites could be indirectly impacted, in addition to the four located within the direct impact areas. Therefore, it is estimated that six Cooper's hawk nest sites could be directly or indirectly impacted.

Subarea 1 Conservation

A total of 4,537 acres (73 percent) of suitable nesting and foraging habitat (riparian and woodland) would be conserved in the Habitat Reserve (*Table 2-10* and *Figure 196-M*). An additional 929 acres (15 percent) of habitat would be in Subarea 1 SOS. Based on the impacts analysis described above, 30 historic nest sites (73 percent) would be conserved in the Habitat Reserve and five sites (12 percent) are in Subarea 1 SOS. Overall, 5,466 acres (88 percent) of habitat and 35 historic nests sites (85 percent) would be in the Habitat Reserve and Subarea 1 SOS.

Although no *major/important populations* were identified for the Cooper's hawk, breeding and foraging habitat within the major drainages in Subarea 1, including San Juan Creek, Bell Canyon, Wagon Wheel Canyon, lower Cañada Gobernadora, and Arroyo Trabuco, would be in the Habitat Reserve and SOS. In addition, habitat for the Cooper's hawk is generally well-buffered in the large habitat blocks. A total of 4,321 acres of riparian and woodland is located in

the Arroyo Trabuco, Northeastern and Southeastern habitat blocks, accounting for 79 percent of the conserved habitat (*Table 13-9*). An additional 388 acres are in the Chiquita Ridge, Upper Chiquita, Wagon Wheel and Radio Tower Road mesa blocks, accounting for an additional 7 percent of the conserved habitat. Overall, 86 percent of the conserved riparian and woodland is in the large habitat blocks.

ADAPTIVE MANAGEMENT PROGRAM

Stressors

A variety of environmental stressors identified for the Cooper's hawk will be considered for management, including:

- Urbanization adjacent to Habitat Reserve
- Altered hydrology
- Altered geomorphology
- Prolonged drought
- Exotic plant invasions (*e.g.*, giant reed)
- Frequent and/or high intensity wildfires
- Cattle-related impacts
- Disease affecting oak woodlands
- Predation on acorns, seedlings, saplings
- Human harassment
- Disease affecting nestlings
- Collisions with vehicles and windows

Currently the main threat to Cooper's hawks in California 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 acorn, seedling and sapling predation.

Short- and long-term indirect impacts also may pose a threat to nesting Cooper's hawks. Although Cooper's hawks exhibit some tolerance of human activity in fairly urbanized areas and nest in suitable habitat within about 100 feet of residences, their reproductive success is substantially higher in natural compared to urban settings (Boal and Mannan 1999). Urban nestlings often die from trichomoniasis and adults primarily die from collisions, often with windows (Boal and Mannan 1999). These indirect effects may include a behavioral component where nesting hawks may respond aggressively to human intrusion, with variations in relation to individual differences (*e.g.*, "urban" pairs may be more habituated to human presence) and stage

of nesting. Some individuals remain quiet and inconspicuous while others vocalize, behave aggressively, or abandon the nest (Rosenfield *et al.* 1995).

Goals

Goals for protecting and managing the Cooper's hawk and its habitat include the following:

1. Maximize the likelihood of the persistence of the physiographic diversity of riparian and woodland habitats and associated focal species in the Habitat Reserve.
2. Restore riparian and woodland habitats and enhance the quality of degraded habitats in the Habitat Reserve such that the net habitat values of the existing riparian and woodland habitat systems are preserved.
3. Manage fire regimes to sustain and enhance riparian and woodland habitat quality in the Habitat Reserve.
4. Control exotic invasions of riparian and woodland habitats such as giant reed, pampas grass, tamarisk, castor bean and artichoke thistle.
5. Protect and manage the Cooper's hawk nesting population in the Habitat Reserve.
6. Avoid and minimize impacts to Cooper's hawk active nest sites during construction-related Covered Activities.

Management and Monitoring Objectives (number of goal met by objective in parentheses)

Objective 1: Implement Conservation Strategy to protect and manage 4,537 acres of riparian and woodland in the Habitat Reserve (actual acreage will vary in relation to natural and anthropogenic environmental effects such as floods, wildfires and drought) (Goals 1 & 2).

Objective 2: Remap vegetation communities in Habitat Reserve within two (2) years of executing IA to establish a baseline for long-term tracking of the Reserve (Goals 1, 2 & 4).

Objective 3: Update vegetation community map at 5-year intervals (Goals 1, 2 & 4).

Objective 4: Collect regional climate, weather and air quality information to examine potential correlations between vegetation and population changes and environmental variables (Goals 1, 2 & 5)

Objective 5: Provide for no net loss of acreage and function of the waters of the U.S./State (Goals 1 & 2).

Objective 6: Maintain/restore riparian ecosystem integrity and maintain and/or restore floodplain connection (Goals 1 & 2).

- Address historic meander conditions and excessive sediment input from upstream land uses in Gobernadora Creek, including construction of the Gobernadora Multi-purpose Basin below Coto de Caza.
- Conduct riparian/wetland restoration on a case-by-case basis over the long-term management and monitoring of the Habitat Reserve, with an initial focus on GERA.

Objective 7: Maintain and/or restore sediment sources and transport equilibrium (Goals 1 & 2).

- Monitor channel morphology using transect lines for measuring cross-sectional profiles to monitor sediment movement (transport and deposition), peak discharges and changes in stream morphology

Objective 8: Conduct annual botanical and wildlife field studies within predesignated sample plots to monitor fine-grained changes in riparian and woodland habitats for the Cooper's hawk and other focal riparian and wetland species (Goals 1, 2, 4 & 5).

Objective 9: Implement Wildland Fire Management Plan such that riparian and woodland habitats and Cooper's hawk nesting areas are protected to the extent feasible (Goals 1, 2, 3 & 5).

Objective 10: Implement Invasive Species Control Plan to manage invasive exotic species in riparian and woodland habitats, particularly giant reed, pampas grass, tamarisk and castor bean in riparian areas and artichoke thistle in woodland areas (Goals 1, 2 & 4).

- Control major infestations of giant reed in San Juan Creek and Arroyo Trabuco, and smaller infestations in GERA and Cristianitos Creek.
- Control major infestations of tamarisk in Cristianitos Creek and isolated clusters in Gabino and San Juan creeks.
- Control pampas grass infestation in Arroyo Trabuco, San Juan Creek and Cristianitos Creek.
- Control substantial castor bean infestation Cristianitos Creek and scattered occurrences in Arroyo Trabuco and San Juan Creek.
- Control Spanish sunflower occurrences Gobernadora Creek (GERA) and monitor/conduct early eradication in Arroyo Trabuco, Chiquita Creek, San Juan Creek and Cristianitos Creek as needed.
- Continue artichoke thistle control program in upland areas of RMV.

Objective 11: Implement Biological Resources Construction Plan (BRCP) to avoid and minimize potential indirect impacts to active nest sites during construction or maintenance/repair activities (*e.g.*, infrastructure construction and maintenance) (Goal 6).

Conceptual Model

Yes - See figure below.

Regional and Subregional Management Information Needs

- Whether nesting Cooper's hawks are disturbed by public recreational and other activities in the Habitat Reserve.
- Whether local Cooper's hawks are subject to disease.
- Whether vehicle and window collisions affect the Cooper's hawk population in the Habitat Reserve.

Level of Management and Monitoring Priority - Medium

Based on existing information, riparian and woodland habitats in the Habitat Reserve generally are in good condition. There is no information indicating that the nesting Cooper's hawk population in the Habitat Reserve is vulnerable to any imminent threats that require immediate intervention. Management and monitoring of this species should focus on the Habitat Reserve-urban development interface where risks from urban-related predators and human activities likely are greatest. Monitoring of "interior" nesting areas can be conducted in conjunction with standard wildlife surveys in sample transects.

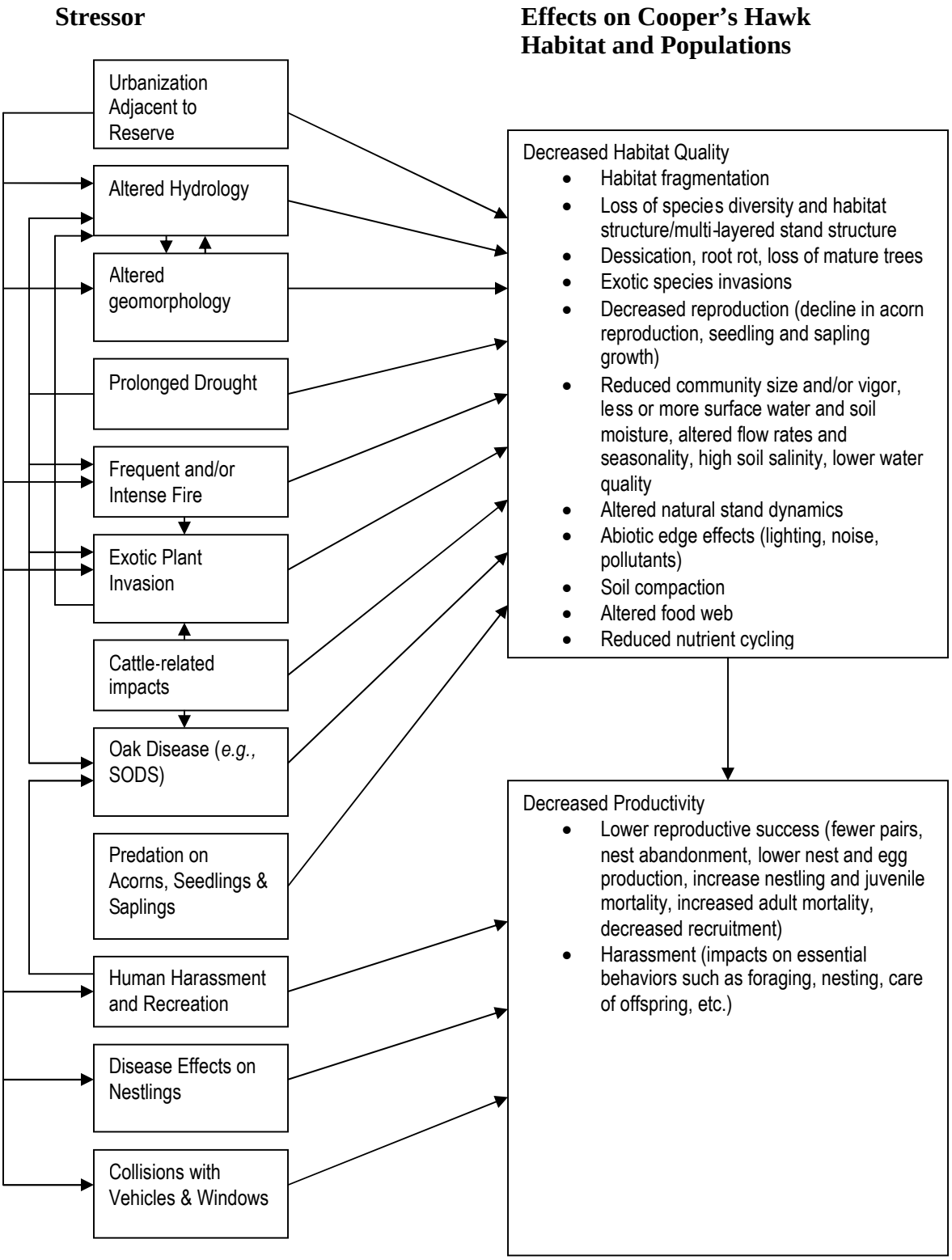
Level of Monitoring (*e.g.*, Species-specific, habitat, landscape, combination)

Monitoring will be conducted at both a species-specific and habitat landscape level.

Monitoring Variables

Listed below are suggested species- and habitat-based monitoring variables. The detailed monitoring program for the Cooper's hawk will be developed by the Reserve Manager and Science Panel.

Cooper's Hawk Conceptual Stressor Model



Species-specific Monitoring Variables

1. Status of active nesting sites in Habitat Reserve.
2. Opportunistic observations of vehicle collisions and other sources of mortality.

Habitat-based Monitoring Variables

1. Vegetation communities long-term status
2. Relative cover of different native plant species
3. Proportion of exotic plant species/native plant species
4. Results of habitat restoration activities, including invasive species controls, riparian/wetland restoration, and creek and soils stabilization programs.

Abiotic Monitoring Variables

1. Climate
2. Weather
3. Air quality
4. Water quality, surface water and groundwater
5. Stream channel morphology, sediment transport and deposition

Management Actions

The following management actions implemented as part of the HRMP will directly benefit the Cooper's hawk and its habitat:

- Aquatic Resources Restoration Plan
- Wildland Fire Management Plan
- Invasive Species Control Plan

"Coordinated Management Plans" that are not formal elements of the HRMP but will also benefit the Cooper's hawk are:

- Grazing Management Plan
- Water Quality Management Plan

The reader is referred to the individual management plans for more details.

In addition to the management plans listed above, minimization of human disturbance in close proximity to active nest sites will be implemented to the extent feasible. Potential indirect impacts to active nest sites during construction or maintenance/repair activities (*e.g.*, infrastructure construction and maintenance) will be addressed by minimizing activities within

300 feet of nest sites if activities occur during the breeding season through implementation of MMs 4.9-26 and 4.9-30 of the Ranch Plan GPA/ZC EIR for raptor-related construction monitoring and preparation of a BRCP. The HRMP also includes measures to minimize public disturbance in close proximity to active nest sites within the Habitat Reserve during the breeding season such as public education, signage and access restrictions where feasible.

Potential Target Studies

Several management information needs relevant to management of the Cooper's hawk were listed above. Although these management information needs apply at a rangewide scale for the species, they can also be addressed at the subregional scale and would help inform management of the Habitat Reserve.

- Effect of human activities in the Habitat Reserve on breeding activity and reproductive success
- Incidence of vehicle and window collisions
- Presence of disease (*e.g.,* trichomoniasis) in local population

The Reserve Manager and Science Panel will determine and recommend to the RMVLC Board what target studies (possibly including studies not listed above) should be pursued, based on the identification and prioritization of management and monitoring issues. It is anticipated that such target studies only would be initiated if anecdotal observations of problems such as public disturbance of nesting areas or mortality indicate systematic problems that requires further study and possibly management.

SPECIES ACCOUNT

Rangewide and Regional Status

The Cooper's hawk is a wide-ranging species in North America that breeds from British Columbia eastward to Nova Scotia and southward to northern Mexico and Florida (AOU 1998). Its nesting range includes southern British Columbia, northwestern Montana, Wyoming, eastern North Dakota, southern Manitoba, western Ontario, northern Michigan, southern Ontario, Southern Quebec, Maine, and Nova Scotia, south to Baja California, south-central Texas, Louisiana, central Mississippi, central Alabama, and central Florida (Terres 1980; Reynolds 1975).

Cooper's hawks winter from British Columbia eastward to New England and southward, primarily to Honduras (AOU 1998). Their wintering range includes Washington, Colorado, Nebraska, Iowa, southern Wisconsin, southern Minnesota, southern Michigan, southern Ontario, New York, southern Maine and Massachusetts, and south through the rest of the U.S. to Costa Rica (Terres 1980). Cooper's hawks are a large part of the great fall flights of hawks that pass over the U.S. in September, flying high and seemingly preferring to fly when the wind is from the northwest (Bent 1937).

The Cooper's hawk has a CNDDB rank of G5S3, indicating that it is secure throughout its range, but has a restricted range or is rare in California. A major decline that occurred in the 1970s during the nesting season probably was due to eggshell thinning resulting from pesticide exposure (Terres 1980; Henny and Wight 1972). However, habitat destruction, mainly in lowland riparian areas, due to urbanization is probably the main current threat, although direct or indirect human disturbance at nest sites may also be a factor (Remsen 1978; Boal and Mannan 1998).

Table 2-11 shows the distribution of the Cooper's hawk in California. For central and northern California counties the data are from the 2003 CNDDB and the more detailed information for Orange, San Diego and Riverside counties is from the conservation planning programs in those regions. As illustrated in *Table 2-11*, Cooper's hawks are widely distributed in California. The information in *Table 2-11* is intended to show the distribution in California in general and should not be interpreted as reflecting *major* or *important populations* or *key locations*. Cooper's hawks apparently may be found almost anywhere in suitable woodland habitats and a lack of information in a given area with habitat may be due to low survey effort. Also, interpretation of the occurrence data is complicated by the fact that many of the records may be for spring and fall migrating transients or a wintering population, and not just for the breeding population.

TABLE 2-11
DISTRIBUTION OF THE COOPER'S HAWK IN CALIFORNIA

County	General Location
Alameda County	Indian Joe Creek
Colusa County	Rail Canyon east of Bear Valley Road
Contra Costa County	South of Franklin Canyon Road
Fresno County	West of Baker Cutoff
Humboldt County	Maple Creek Road near Bear Creek
Imperial County	Northeast of Yuma, Bard, Potholes, Colorado River
Inyo County	Between Big Pine Creek and Baker Creek
Kern County	Walker Pass, South Fork Kern River at end of Lake Isabella
Monterey County	Fort Hunter Liggett Military Reservation at intersection of Ruby Canyon and Old Man Canyon and Mission Creek north of Headquarters
Los Angeles County	Palmdale
Orange County Southern Subregion	Talega Canyon, Cristianitos Canyon, Gabino Canyon, La Paz Canyon, Verdugo Canyon, Blind Canyon, Chiquita Canyon, San Juan Creek, Bell Canyon, Wagon

TABLE 2-11
DISTRIBUTION OF THE COOPER'S HAWK IN CALIFORNIA

County	General Location
	Wheel Canyon, Lower Cañada Gobernadora, Arroyo Trabuco, and Prima Deshecha
Orange County – Other Locations	Silverado Canyon
Placer County	Cedar Creek upstream of The Cedars
Riverside County MSHCP	Harford Springs County Park, Santa Rosa Plateau (Mesa de Colorado, Rancho Santa Rosa), Prado Basin-Santa Ana River, San Timoteo Canyon, Temescal Wash, Wasson Canyon, Slater Canyon, Temecula Creek, Murrieta Creek, Tucalota Creek, Vail Lake, Wilson Valley, San Bernardino and Cleveland National Forests, Box Springs Mountains, Mockingbird Canyon, Lake Mathews-Estelle Mountain, Gavilan Hills, Lake Perris-San Jacinto Wildlife Area-Mystic Lake, Quail Valley, Wildomar, Sage, Lake Skinner, Badlands, Bautista Creek, and Potrero Creek
Riverside County – Other Locations	Palm Canyon
San Bernardino County	Northeast of Granite Well, southwest of Hesperia, Victorville, Big Morongo Wildlife Sanctuary, Crystal Creek
Sacramento County	Goethe Park, White Rock Road, Mississippi Bar, Natomas East main drainage channel, Carmencita Road and Laguna Creek
San Diego County MSCP	Silverwood Wildlife Sanctuary, Sycamore Canyon, west Sycamore Canyon, on mesa north of McGinty Mountain, Loveland Reservoir, Sweetwater River, Lake Hodges, San Diego Wild Animal Park, Balboa Park, Dulzura Creek, San Ysidro Mountains.
San Diego County – MHCP	San Luis Rey River, Pilgrim Creek, San Marcos, Escondido
San Diego County – Other Locations	Scattered locations throughout western San Diego County and Borrego area, including Jacumba, Boucher Hill, Indian Canyon, Camp Pendleton, Santa Margarita River, San Diego River, Tijuana River
San Luis Obispo County	Baywood
Santa Barbara County	Botanic Garden, Upper Santa Ynez River
Santa Cruz County	East of Henry Cowell Redwoods State Park
Siskiyou County	Northwest slope of Bear Mountain
Tulare County	Eshom Creek
Ventura County	Santa Clara River east of Piru

Subregional Status

The Cooper's hawk is still a relatively common breeding resident in riparian and woodland habitats in the Southern Subregion and occurs in most major drainages (*Figure 196-M* and *Table 2-11*). The Cooper's hawk is still a relatively common breeding resident in riparian and woodland habitats in the planning area. The database includes 44 historic nest sites, of which 41 are in Subarea 1, distributed throughout the planning area, including San Mateo Creek, the confluence of Talega and Cristianitos canyons, Talega Canyon, Cristianitos Canyon, Gabino Canyon, La Paz Canyon, San Juan Creek, Bell Canyon, Wagon Wheel Canyon, lower Cañada Gobernadora, and Arroyo Trabuco. There is no apparent clustering of nest sites and no *major* or *important populations* were identified in the planning area. These drainages support high quality

riparian and woodland habitats that serve the Cooper's hawk as well as many other species, including several other raptors such as white-tailed kite, long-eared owl, red-shouldered hawk, red-tailed hawk, barn owl and great horned owl. Mapped locations of Cooper's hawk nests in the planning area occur most frequently in southern coast live oak riparian woodland, and also in coast live oak woodland and savanna, southern arroyo willow forest, southern sycamore riparian woodland, and mule fat scrub.

Biological Considerations

Cooper's hawks hunt in broken woodland and habitat edges; it catches prey in the air, on the ground, and in vegetation, and sometimes runs prey down in dense thickets. It uses cover to hide, attack, and approach prey; it also soars and makes low, gliding search flights (Zeiner *et al.* 1990). Cooper's hawks primarily take avian prey, especially passerines. Peterson and Murphy (1992) found that avian prey made up 70 percent of the food items and 58 percent of the dietary biomass delivered to broods at two nests surrounded by a mixed grass prairie, with mammal prey making up the remainder. Cooper's hawks also prey on amphibians, reptiles and fish.

Cooper's hawks primarily breed in riparian areas and oak woodlands, and apparently are most common in montane canyons (Garrett and Dunn 1981; Hamilton and Willick 1996). They usually nest in second-growth conifer stands, or in deciduous riparian areas, usually near streams or open water (Zeiner *et al.* 1990). Throughout much of the west, the Cooper's hawk nests in stands of cottonwoods along stream courses, especially where the tree stands are fairly large (Call 1978). Denser stands of trees with moderate crown-depth are used for nesting. It appears that the vertical structure of the nest site tree is more important to the nest site selection than the horizontal structure (Wiggers and Kritz 1991). Nest trees tend to be taller and of greater diameter and have more canopy cover than the average tree in a given area; nest trees are often the largest tree in the nest site area (Bosakowski *et al.* 1992). Nests may be located on the horizontal limbs of a pine or hardwood, near the trunk or in the crotch of a hardwood tree species, usually 3-18 m (10-60 ft) above the ground (Harrison 1978). They also often nest just below the lowest live limbs (Zeiner *et al.* 1990). The nest is typically a platform of sticks and twigs lined with bark (Call 1978).

Cooper's hawks lay eggs from February through June, with clutch sizes of three to six eggs, but usually four or five eggs (Brown and Amadon 1968). The female primarily incubates the eggs for approximately 24 days (Terres 1980). Incubation usually begins after the third egg is laid, resulting in asynchronous hatching for later eggs. Young birds usually leave the nest at 30 to 34 days but continue to be brought food for up to seven weeks afterwards. Young may remain together near the nest for another five to six weeks (Rosenfield and Bielefeldt 1993).

Seasonal home ranges of Cooper's hawks have been estimated at about 784 ha (1,930 ac) with the daily home range averaging about 231 ha (570 ac) (Murphy *et al.* 1988). Cooper's hawks may require a minimum of 6 ha (15 ac) of relatively undisturbed woodland or riparian habitat for nesting (Call 1978). Nest sites of the Cooper's hawk within stands of oaks are located approximately 2.7 km (1.6 mi) apart and thus are distributed widely but sparsely within woodland habitat (Zeiner *et al.* 1990). Rosenfield *et al.* (1995) found a nesting density of 331 ha/pair (817 ac/pair) in a long-term study in rural Wisconsin. Studies of urban areas have reported a maximum density of 272 ha/pair (672 ac/pair) (Rosenfield *et al.* 1995). Cooper's hawks defend nesting territories of about 100 m (330 ft) around the nest.

The migratory patterns of the Cooper's hawk are complex. Although it is mostly a yearlong resident in California, some individuals from more northern areas migrate into California. Furthermore, within California, hawks may move downslope and south from areas of heavy snow and return to the general nesting area in the spring (Zeiner *et al.* 1990). As a result, fall and winter observations of Cooper's hawks may include local breeding residents, resident California hawks from higher elevations and migrant hawks from outside of California.

Some data are available on dispersal behavior. The mean distance from the natal site to the breeding site is 12 km (7.4 mi) for males and 14.4 km (8.9 mi) for females. Adult birds frequently reoccupy nesting areas and breeding site fidelity is assumed (Rosenfield and Bielefeldt 1993). The Cooper's hawk may reuse the same nest site for multiple years (Call 1978).

Although Cooper's hawks are relatively common in California, a decline in the population was noted by Remsen (1978). For example, approximately only 40 pairs were detected in Orange County during a breeding bird atlas survey effort (Gallagher 1996). A major decline that occurred in the 1970s during the nesting season probably was due to eggshell thinning resulting from pesticide exposure (Terres 1980; Henny and Wight 1972). However, habitat destruction, mainly in lowland riparian areas, due to urbanization and development is probably the main current threat, although direct or indirect human disturbance at nest sites may also be a factor (Remsen 1978; Boal and Mannan 1998).

Cooper's hawk appear to be somewhat tolerant of human activity in fairly urbanized areas and nest in suitable habitat within 30 m (100 ft) of residences, but their reproductive success in natural settings is substantially higher than in urban settings. Boal and Mannan (1999) recorded 50 percent nestling mortality in urban settings in southeastern Arizona compared to less than five percent in natural settings. Nestlings in urban settings primarily died from trichomoniasis (a parasitic protozoan that occurs in the digestive and urogenital tracts in many animals and humans) and adult hawks died from collisions, most often with windows.

Indirect effects on breeding success in urban settings also may have a behavioral component. The type of response and intensity of the Cooper's hawk aggressive response to human intrusion near a nest site varies among individuals and probably also varies with the stage of nesting. Many breeding birds respond to human activity by remaining inconspicuous, neither vocalizing nor behaving aggressively in the presence of humans, but some individuals may leave the immediate vicinity of the nest, possibly leading to failure of the nest (Rosenfield *et al.* 1995). However, distance thresholds at which hawks abandon nest sites has not been determined.

Protection Recommendations

Recognizing that no single or a few *key location(s)* can be identified for the Cooper's hawk, the Protection Recommendations listed below reflect the broad distribution of the species in the planning area.

- Protect breeding habitat and, to the extent feasible, foraging habitat for the Cooper's hawk along Chiquita Creek and substantial riparian and woodland habitat in tributaries to the creek.
- Protect the riparian habitat in GERA that provides nesting habitat for Cooper's hawk.
- Protect breeding habitat, and to the extent feasible, foraging habitat for the Cooper's hawk along San Juan Creek, Cristianitos Creek, and lower Gabino Creek.
- Protect Cooper's hawk nest sites in the middle Gabino Canyon subunit and the Verdugo, Talega and La Paz canyons sub-basins.

Management Recommendations

- Protect downstream habitat in GERA for Cooper's hawk.
- Implement a management program for protected Cooper's hawk nesting habitat, including the minimization of human disturbance within 30 m (100 ft) of nest sites during the breeding season.

2.5 GRASSHOPPER SPARROW

Species: Grasshopper Sparrow (*Ammodramus savannarum*)
Federal Status: None
State Status: None
CNDDB Rank: None
Science Advisors Group: 2
Covered Species: Yes
Focal Monitoring Species: Yes
Planning Species: Yes

CONSERVATION GOAL

1. Manage habitat and populations of the grasshopper sparrow to maximize the likelihood that populations are sustained in the planning area, and in doing so "provide for recovery" on a subregional basis and "contribute to recovery" on a rangewide basis.

CONSERVATION STRATEGY

1. Create a permanent subregional Habitat Reserve that provides sufficient breeding habitat to support the identified *major* and *important populations* in *key locations* in Chiquita Canyon and Cristianitos Canyon to maximize the likelihood of the species' persistence within the planning area.
2. Formulate a HRMP to provide for long-term protection and management of the grasshopper sparrow and its habitat and provide for restoration of native grasslands to enhance the amount and quality of existing habitat.

HABITAT AND SPECIES CONSERVATION AND IMPACTS ANALYSIS

The conservation analysis for the grasshopper sparrow is based both on site-specific information (*i.e.,* documented occurrences and identified *major* and *important populations/key locations*) and landscape-level habitat factors including amount of habitat conserved and habitat patch size and within-patch contiguity. Connectivity between large habitat patches was not considered to be a crucial issue for this mobile migratory species.

Table 2-12 provides a summary of the existing conditions, proposed conservation, and permanent and temporary impacts of grasshopper sparrow locations and grassland and agricultural (barley field) habitat in the planning area and within the Subarea 1 permit area. The

description of impacts and conservation below is limited to Subarea 1 which is the permit action area. The planning area conservation and impact estimates reported in *Table 2-12* include SOS and potential impact areas in Subareas 2, 3 and 4 and do not reflect future planning within those Subareas that may result in changes to the SOS and impact estimates.

TABLE 2-12
GRASSHOPPER SPARROW CONSERVATION AND IMPACT SUMMARY

	Acres	Percent	Locations	Percent
Planning Area				
Existing Total	19,090		730	
Habitat Reserve	7,568	40%	382	52%
Supplemental Open Space	3,816	20%	31	4%
Total Protected	11,384	60%	413	56%
Total Permanent Impact	4,780	25%	267	37%
Subarea 1				
Existing Total	12,626		658	
Habitat Reserve	7,568	60%	382	58%
Supplemental Open Space	957	8%	8	1%
Total Protected	8,525	68%	390	59%
Total Permanent Impact	4,199	33%	267	41%
Total Temporary Impact	212		15	

Subarea 1 Impacts

The proposed Covered Activities would result in permanent impacts to 4,199 acres (33 percent) of grassland (2,669 acres including 3 acres of alkali meadow; 29 percent) and barley field agriculture (1,503 acres; 45 percent) and 267 grasshopper sparrow locations (41 percent) (*Table 2-12* and *Figures 194-M* and *174-M*). The proposed Covered Activities would also result in temporary impacts to 212 acres of habitat and 15 locations (*Table 2-12*).

The following impacts would occur within *major/important populations*:

- a total of 137 of 362 locations (38 percent) in the Chiquita Ridge/Chiquadora Ridge/Gobernadora *major population/key location*, including 123 locations in PA 2 and 14 locations impacted by infrastructure construction, operation, maintenance/repair;
- 63 of 141 locations (45 percent) in the Cristianitos, Lower Gabino/Blind Canyons *important population/key location*, including 25 locations in PA 8, 34 locations in proposed orchard in PAs 6 and 7 (of which ultimately the number impacted would be substantially less), and four locations impacted by infrastructure construction, operation, maintenance/repair; and

- 52 of 118 locations (44 percent) in the Radio Tower Road/Prima Deshecha *important population/key location,* of which 28 are in the conceptual Avenida La Pata Improvement Project footprint, which ultimately should be much smaller.

Overall, of 621 locations in *major/important populations,* a total of 252 locations (40 percent) would be potentially impacted by the proposed Covered Activities. However, ultimately this impact level will be reduced with more refined impact footprints for PAs 6 and 7 and possibly for the Avenida La Pata Improvement Project.

Subarea 1 Conservation

A total of 7,568 acres (60 percent) of suitable grassland/alkali meadow (5,726 acres) and agricultural (1,842 acres) habitat for the grasshopper sparrow and 382 locations (58 percent) would be conserved in the Habitat Reserve (*Table 2-12*). An additional 957 acres (8 percent) and eight locations (1 percent) are in Subarea 1 SOS, bringing the total conservation to 8,525 acres (68 percent) and 390 locations (59 percent). Notably, all of the Chiquita Canyon bottom north of the treatment plant and grasslands on the Radio Tower Road mesa south of San Juan Creek that support large grasshopper sparrow populations would be conserved. In addition, the vast majority of grasslands in Cristianitos Canyon would be conserved and managed because the proposed orchards in PAs 6 and 7, which under the conservation analysis encompass 431 acres, would be limited to 50 acres, resulting in a minimum of 300 acres of additional grassland conservation. Thirty-four locations occur in the proposed orchards in PAs 6 and 7. With conservation of an additional 381 acres in this area a substantial portion of these 34 locations will also be conserved, resulting in ultimate conservation of grasshopper sparrows over 60 percent (*e.g.*, a conservative estimate of 20 additional locations would bring the total conservation to 62 percent).

Overall, 368 (94 percent) of the 390 conserved locations are in *major/important populations,* as follows:

- 222 of 362 locations (61 percent) of the *major population/key location* in Chiquita sub-basin/Chiquadora Ridge/Gobernadora;
- 59 of 118 locations (50 percent) of the *important population* on the Radio Tower Road mesa (assumes 28 locations impacted by the large, conceptual footprint for Avenida La Pata); and

- 87 of 141 locations (62 percent) of the Cristianitos, Lower Gabino/Blind Canyons *important population* (assumes impacts of 34 locations in PAs 6 and 7 targeted for orchards).

Habitat patch size and contiguity appears to be important for the grasshopper sparrow. For example, predation rates are highest in patch sizes less than about 37 acres and in one study nesting was avoided within about 165 feet of habitat edges (Delisle and Savidge 1996). Using the refined habitat block analysis (see *Part I, Chapter 13*, *Table 13-9* and *Figure 193-M*), about 331 of the 390 conserved grasshopper sparrow locations (85 percent) are in large habitat blocks, including about 170 locations in the Chiquita Ridge block, 32 locations in the Wagon Wheel block, 73 locations in the Southeastern block (this number will be increased with conservation of 381 of 431 acres targeted for new orchards and refined development area in PA 8), and 56 locations in the Radio Tower Road mesa block. The refined habitat block analysis also shows that substantial grassland and agriculture habitat for the grasshopper sparrow is conserved in habitat blocks, ranging from 477 acres in the Wagon Wheel block to 2,722 acres in the Southeastern block, which includes Cristianitos Canyon. The Chiquita Ridge block contains 1,331 acres of suitable habitat.

ADAPTIVE MANAGEMENT PROGRAM

Management of the grasshopper sparrow and its habitat will consider a number of environmental stressors identified for the species, including:

- Habitat fragmentation, roads and trails
- Cattle-related impacts
- Exotic plants
- Too frequent fire
- Mowing
- Pesticides
- Urban-related predators (*e.g.*, cats)

Human-related threats to the species apparently include habitat loss, degradation, and fragmentation. Habitat fragmentation and associated edge effects appear to be significant threats to grasshopper sparrows. Adaptive management for the grasshopper sparrow and its habitat will focus on maintaining habitat heterogeneity, characterized by a mix of grasses and forbs and open areas for foraging. Habitat heterogeneity appears to be important for supporting breeding populations of grasshopper sparrows.

Management will also focus on stressors that may have direct impacts on sparrows and their reproductive success. For example, predation appears to be a major cause of nest failure (Perkins *et al.* 1998) and predation rates appear to be highest for nests placed in grassland areas less than about 15 ha (37 ac) and for areas adjacent to wooded areas (Burger *et al.* 1994). Road effects also appear to be related to reduced grasshopper sparrow densities within several hundred meters of a roadway in suburbs near Boston, Massachusetts (Forman and Deblinger 2000).

Extensive and intensive grazing in western North America has had a negative impact on this species, although light to moderate grazing in more lush grasslands appears to be beneficial (Vickery 1996). Garrett and Dunn (1981) concluded that the grasshopper sparrow has declined as a breeder in recent decades due to the development of open hilly areas that make up the grasshopper sparrow's preferred habitat. Brown-headed cowbird parasitism does occur but is generally considered low (Vickery 1996).

Goals

Goals for protecting and managing the grasshopper sparrow and its habitat including the following:

1. Protect and manage grassland in the Habitat Reserve to support the grasshopper sparrow.
2. Continue current agricultural practice for the production of barley that supplements protected grasslands for grasshopper sparrow breeding habitat.
3. Restore native grassland and enhance the quality of existing native grassland in the Habitat Reserve.
4. Manage grassland fire regimes to sustain and enhance native grassland habitat quality in the Habitat Reserve.
5. Protect and manage the grasshopper sparrow populations, particularly identified *major* and *important populations* in *key locations* to maximize the likelihood of long-term persistence of the species in the Habitat Reserve.

Management and Monitoring Objectives (number of goal met by objective in parentheses)

Objective 1: Implement Conservation Strategy to protect and manage approximately 5,726 acres of grassland and approximately 1,842 acres of barley field agriculture habitat in the Habitat Reserve (Goals 1, 2 & 5).

Objective 2: Remap vegetation communities in Habitat Reserve within two (2) years of executing IA to establish a baseline for long-term tracking of the Reserve (Goals 1, 3 & 4).

Objective 3: Update vegetation community map at 5-year intervals (Goals 1, 3 & 4).

Objective 4: Collect regional climate, weather and air quality information to examine potential correlations between vegetation and environmental variables (Goals 1 & 6).

Objective 5: Conduct annual botanical and wildlife field studies within predesignated sample plots to monitor fine-grained changes in grasslands and other focal grassland species (Goals 1, 4 & 6).

Objective 6: Implement Habitat Restoration Plan to restore (including revegetation and enhancement) native grassland (Goals 1, 3 & 6).

Objective 7: Implement Wildland Fire Management Plan to manage native grassland fire regimes such that existing habitat values are maintained and enhanced (Goals 1, 3, 4 & 6).

Objective 8: Implement Invasive Species Control Plan to manage invasive exotic plant species native and annual grasslands, focusing on artichoke thistle control (Goals 1, 3 & 5).

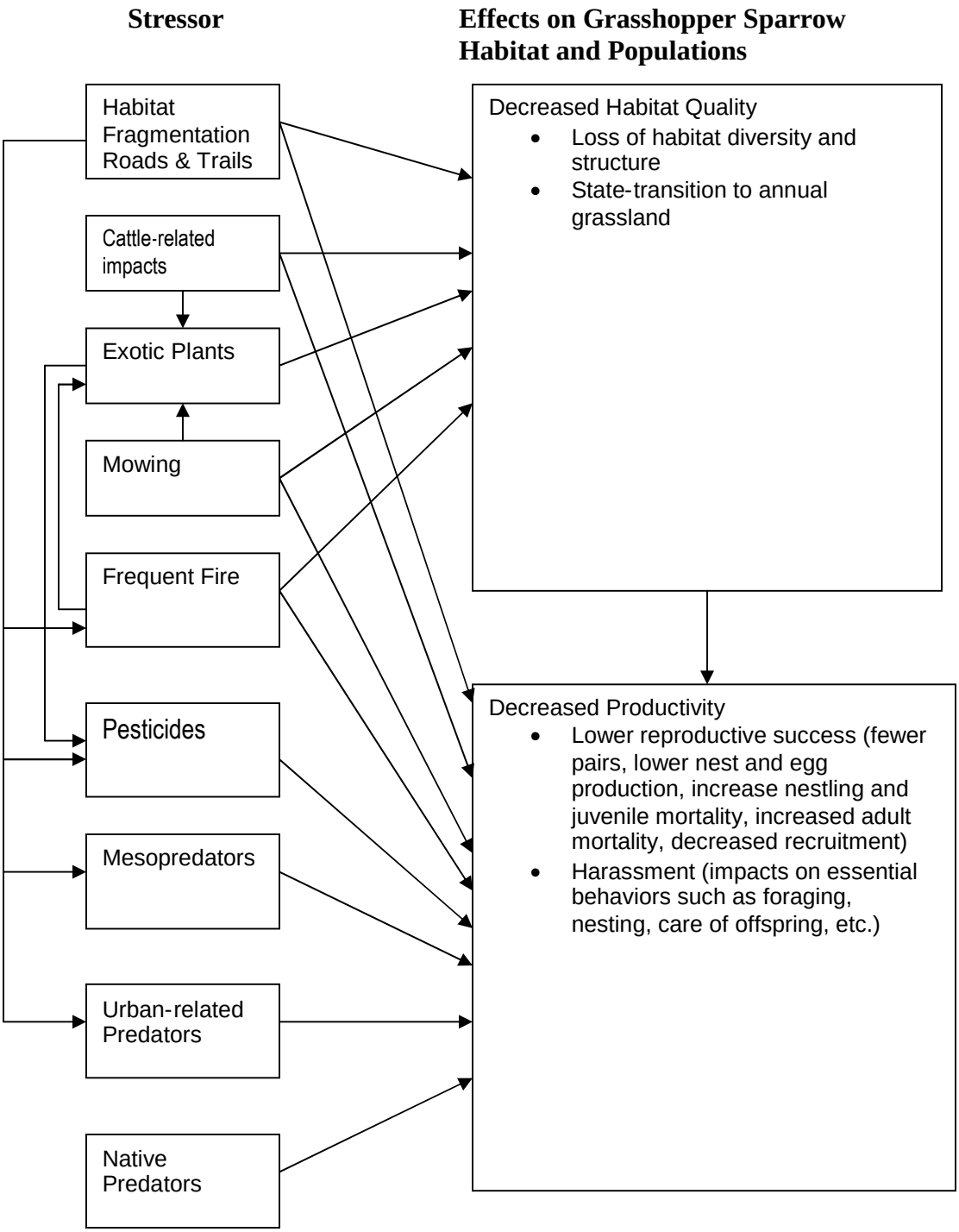
Conceptual Model

Yes – see figure below.

Regional and Subregional Management Information Needs

- The year-to-year variability in populations. Populations appear to fluctuate widely in spite of available suitable habitat, possibly due to low reproductive success rate and low return rates of birds to previous nesting areas (Smith 1963). Alternatively, variations in detection rates related to survey method differences, etc. may account for at least some of the variability in observed population variability.
- Dispersal behavior of juveniles.
- Grasshopper sparrow densities and/or breeding success appear to be lower along the reserve-urban interface (including roads). If so, what are the causal factors?

Grasshopper Sparrow Conceptual Stressor Model



- Whether the grasshopper sparrow, as a candidate focal species, is a useful indicator of native grassland habitat quality and therefore a valuable tool for management and monitoring of the grasslands in the Habitat Reserve.
- Whether the grasshopper sparrow population in the subregion represents residents, migrants or a combination of residents and migrants (winter residents may be hard to detect before the breeding season begins). Knowing whether the population is primarily residents or migrants is significant for management and monitoring; *e.g.,* if a migrant, declines may be unrelated to Habitat Reserve conditions.
- The response of grasshopper sparrows to habitat management, particularly native grassland enhancement.
- Whether the grasshopper sparrow is sensitive to grazing and fire management regimes. Some evidence in Kansas grasslands suggests that moderate grazing of grasslands does not significantly affect grassland bird species (Klute *et al.* 1997).
- Whether brown-headed cowbird nest parasitism a significant factor in the subregion.
- Whether predation by urban-related predators such as cats is a significant factor in the subregion. Are predation impacts related to edge? Studies have shown that rates of nest predation and parasitism are higher along edges of grassland fragments and that these impacts may be sufficient to produce local and possibly regional declines in some grassland species.
- Whether noise from roads adjacent to grasshopper sparrow habitat has a significant adverse effect on population densities and/or nesting success.

Level of Management and Monitoring Priority - Medium

The Habitat Reserve would protect over 7,500 acres of habitat and 380 locations of the grasshopper sparrow. The grasshopper sparrow occupies a large portion of grassland and agricultural habitat in the Habitat Reserve. Based on the distribution of the grasshopper sparrow in the Habitat Reserve, this species appears to be relatively secure in the Subregion at this time. However, there are management information needs about conserving this species in relation to edge effects, and particularly the effects of urban-related predators. Also, habitat management such as prescribed fire, may have significant effects on this species. It is recommended that this species have at least a medium priority for management and monitoring, and possibly higher where prescribed burning or other management (*e.g.*, mowing) of grasslands is used to control non-native invasives. Monitoring of habitat use in restored grassland areas, and particularly upper Gabino where there is a lack of observations, would be desirable.

At current light to moderate grazing levels and based on the fact that grasshopper sparrow populations co-occur with grazed areas on RMV, cattle should not be a significant concern and specific monitoring the effects or grazing are not recommended at this time.

Level of Monitoring (*e.g.*, Species-specific, habitat, landscape, combination)

Monitoring will be conducted at both a species-specific and habitat landscape level.

Monitoring Variables

Listed below are suggested species- and habitat-based monitoring variables. The detailed monitoring program for the grasshopper sparrow will be developed by the Reserve Manager and Science Panel.

Species-specific Monitoring Variables

1. Number of grasshopper sparrow locations
2. Proportion of occupied habitat

Habitat-based Monitoring Variables

1. Vegetation communities long-term status
2. Relative cover of different native plant species
3. Proportion of exotic plant species/native plant species
4. Evidence of urban-related predators (tracks, scat, direct observations)
5. Evidence of urban run-off, erosion, pollutants
6. Evidence of unauthorized public activities (trespass, trampling, illegal trails, trash, shooting)

Abiotic Monitoring Variables

1. Climate
2. Weather
3. Air quality

Management Actions

The following management actions implemented as part of the HRMP will directly benefit the grasshopper sparrow and its habitat:

- Habitat Restoration Plan
- Wildland Fire Management Plan

Habitat restoration activities in the Habitat Reserve to benefit the grasshopper sparrow include discretionary implementation by the Reserve Manager and Science Panel of the CSS/VGL restoration program designed to enhance habitat value, carrying capacity and connectivity. Areas identified for restoration that would benefit the grasshopper sparrow include Chiquita Ridge, Chiquadora Ridge, Sulphur Canyon, Cristianitos Canyon and upper Gabino Canyon. In addition, the Reserve Manager and Science Panel may recommend case-by-case restoration of native grasslands, such as in areas of degraded or low quality grassland that are not naturally recovering through passive management, areas that are degraded or disturbed by future natural events, and it is determined that they are not likely to recover naturally (*e.g.*, an area that has burned too frequently), and areas that have been temporarily disturbed by either authorized (*e.g.*, infrastructure) or unauthorized (*e.g.*, illegal trails) activities.

The Wildland Fire Management Plan has the potential to provide substantial benefit to the grasshopper sparrow in regard to enhancing native grasslands (see Vickery 1996 for example). However, prescribed burning of grasslands should be conducted in a manner that leaves suitable unburned areas adjacent to burns to provide habitat for grasshopper sparrows while the burned areas recover to a level suitable for the species, which for grasshopper sparrows in southern California may be at least 1-2 years post-burn (see Reynolds and Krausman 1998).

Although brown-headed cowbird nest parasitism appears to be a lower level threat (Vickery 1996), cowbird trapping also will be conducted in the Habitat Reserve as part of the Invasive Species Control Plan as needed as a general management tool to benefit native passerines such as the grasshopper sparrow, as well as the California gnatcatcher and least Bell's vireo. In addition, artichoke thistle control will continue in the RMV portion of the Habitat Reserve.

The Grazing Management Plan, as a Coordinated Management Plan, will also benefit the grasshopper sparrow helping to maintain and enhance the habitat value of grasslands. Appropriately timed grazing can increase the vigor of native grasslands, and therefore its value as grasshopper sparrow habitat, by removal of thatch and litter, recycling of nutrients, stimulation of tillering (sprouting of new stalks), removal and control of alien species, and reduced transpiration (loss of water) by alien species, making more water available for native grasses.

Potential Target Studies

Several management information needs relevant to management of the grasshopper sparrow were listed above, some of which could be addressed at the subregional scale and would help inform management of the Habitat Reserve. Other management information needs, particularly those related to rangewide persistence of the species (*e.g.*, landscape habitat fragmentation and dispersal behavior) are best studied at a rangewide scale. The following are potential target studies that could be implemented at the subregional scale:

- Relationship between grasshopper sparrow presence and other grassland species to assess value of grasshopper sparrow as a focal indicator species.
- Fall/winter surveys to determine grasshopper sparrow status in the subregion during the non-breeding season.
- Monitoring of year-to-year variation in grasshopper sparrow populations and breeding activities (would best be coordinated within larger-scale monitoring program).
- Response of grasshopper sparrow to habitat manipulations such as native grassland enhancement, grazing, mowing and prescribed fire.
- Grasshopper sparrow densities and reproductive success in relation to edge versus interior habitat (would best be coordinated within larger-scale research program).
- Sources of mortality and/or nest failure, including mesopredators, urban-related predators, other native predators and nest parasitism

SPECIES ACCOUNT

Rangewide and Regional Status

The grasshopper sparrow breeds from eastern Washington south to southern California and northernmost Mexico, and eastward to Virginia. The species has a disjunct distribution through the western portion of the United States and is not present within the mountainous and desert regions. It occurs in the areas east of the Rocky Mountains from Canada to the southern states as a breeding resident. It is a year round resident in the western states and in the southern portions of the southeastern states (Vickery 1996). Grasshopper sparrows winter from California to North Carolina, south through Middle America to Costa Rica (AOU 1998). In southern California, the species occurs locally in appropriate habitats west of the deserts and has nested at elevations up to 1,500 m (4,920 ft) in the San Jacinto Mountains in western Riverside County (Garrett and Dunn 1981). It is an uncommon and local summer resident and breeder in foothills and lowlands

west of the Cascade-Sierra Nevada crest from Mendocino and Trinity counties south to San Diego County, as well as Lassen County and Siskiyou County (Zeiner *et al.* 1990).

Information for the distribution and breeding status of the grasshopper sparrow in southern California is poor. The grasshopper sparrow has been characterized as secretive in the winter and may occur more regularly than indicated by infrequent records (Grinnell and Miller 1944; McCaskie *et al.* 1979; Garrett and Dunn 1981). However, documented observations of this species in most areas primarily are anecdotal, and because the species has no state status, records generally are not available in the CNDDB – only two records from Mendocino County are in the 2003 CNDDB. General locations for the species in San Diego, western Riverside and Orange counties, based on conservation program databases and regional accounts (Hamilton and Willick 1996; Unitt 1984), are summarized in *Table 2-13*. The Southern Subregion database is relatively complete because of the extensive surveys conducted for the SOCTIIP. While there are 730 locations in the Southern Subregion database, there are only 13 locations for the San Diego MHCP, 91 locations for the San Diego MSCP, and 20 "precision" records (*i.e.*, records with a specific x- and y-coordinate) for the Western Riverside County MSHCP. Because of the lack of comparable survey efforts, the disparity in the number of locations in the different conservation planning areas cannot be interpreted as southern Orange County supporting the vast majority of the grasshopper sparrow population in southern California.

TABLE 2-13
DISTRIBUTION OF GRASSHOPPER SPARROW
IN SELECTED CONSERVATION PLANNING AREAS IN SOUTHERN CALIFORNIA

Area	Specific Locations
San Diego MSCP	Otay River Valley, Sweetwater Reservoir, Rancho San Miguel to Proctor Valley, Penasquitos Canyon-Carmel Mountain, Santa Fe Valley, north of Black Mountain
San Diego MHCP	Buena Vista Lagoon, north Carlsbad, north and south San Marcos, south and east Encinitas, south Escondido
San Diego – Other Locations (Unitt 1984)	Lake Henshaw, Warner Springs, Dyche Valley-Palomar Mountain
Western Riverside County MSHCP	Prado Basin, Santa Rosa Plateau, Kabian Park, Lake Mathews-Estelle Mountain, Wasson Canyon-Lake Elsinore, Murrieta, Temecula Mystic Lake-San Jacinto Wildlife Area-Lake Perris
Orange County Southern Subregion	Chiquita Canyon, Chiquadora Ridge, Gobernadora, Radio Tower Road area, Cristianitos Canyon, lower Gabino and Blind Canyons
Orange County – Other Locations	San Joaquin Hills, Mile Square Regional Park, Upper Newport Bay, Huntington Central Park

Migration information for the grasshopper sparrow is scarce because the species is very secretive in the winter. Winter migrants are rare, but probably reliable in California (*i.e.*, they typically occur but in small numbers), chiefly along the southern coast. It migrates from breeding grounds to weedy fields with scattered trees or abandoned crop fields dominated by grassy plant species. Summer residents arrive in March to May, and most migrate south in August or September.

Although the grasshopper sparrow has no official state or federal sensitivity status, it has been treated as a sensitive species characteristic of grasslands by the Wildlife Agencies and multi-species planning efforts in southern California. It does not have a CNDDB rank, but is a U.S. Forest Service Species of Special Management Concern. This species is being proposed for regulatory coverage because it could be listed in the future because of the cumulative loss, degradation and fragmentation of grassland habitat and because most conservation programs in southern California to date conserve relatively low percentages of grasslands. Garrett and Dunn (1981) concluded that the grasshopper sparrow has declined as a breeder in recent decades due to the development of open hilly areas that make up the grasshopper sparrow's preferred habitat. Extensive and intensive grazing in western North America also has had a negative impact on this species (Vickery 1996). Brown-headed cowbird parasitism does occur but is generally considered a low threat (Vickery 1996).

Subregional Status

The Southern Subregion planning area includes about 730 documented occurrences for the grasshopper sparrow, of which 658 locations are in Subarea 1, concentrated in grassland and agricultural areas (fallow barley fields) (*Figure 174-M*). It should be noted that these observations are not documented nest sites and do not distinguish breeding pairs and single individuals, but they do reflect concentrations of habitat use in the planning area by the species. The planning area appears to support one *major population* and two *important populations* of the grasshopper sparrow that account for about 92 percent of the documented locations in the subregion.

- Middle and lower Chiquita Canyon (*i.e.*, south of Oso Parkway), Chiquadora Ridge and Gobernadora support approximately 380 locations (No. 1 on *Figure 174-M*). These areas comprise a single *major population* because the farthest distance between any two locations is about 1,000 feet. This *major population* is also considered a *key location* because it supports approximately 52 percent of the total grasshopper sparrow locations in the planning area.

- Grasslands in the Radio Tower Road area and extending south through the grasslands of Prima Deshecha to Avenida Pico support approximately 150 locations (No. 2 on *Figure 174-M*). These locations comprise an *important population* in a *key location.*

- The grasslands within Cristianitos Canyon and lower Gabino and Blind canyons support approximately 148 locations (No. 3 on *Figure 174-M*). These locations comprise an *important population* in a *key location.*

Biological Considerations

During the breeding season in California, grasshopper sparrows occur on mesas and slopes in dense, dry or well-drained grasslands, especially native grassland with a mix of grasses and forbs for foraging and nesting (Grinnell and Miller 1944; Garrett and Dunn 1981). Apparently, thick cover of grasses and forbs is essential for concealment. They require fairly continuous native grassland areas with occasional taller stems for breeding areas (Garrett and Dunn 1981). They especially occur in grasslands composed of a variety of grasses and tall forbs with scattered shrubs for singing perches (Zeiner *et al.* 1990). Grasshopper sparrows use a variety of forb species for perches and choose them predominantly on the basis of their height rather than the specific plant species (Payne *et al.* 1998). Although shrub and forb species are used for perching, they tend to avoid grassland areas with extensive shrub cover and the presence of native grasses is less important than the absence of trees (Smith 1963; Vickery 1996). Grasshopper sparrows typically forage on the ground and in low foliage for insects (especially Orthoptera), other invertebrates, and grass and forbs seeds, with grass seeds a large percentage of winter diet. Because the species is a visual predator, bare ground is important for foraging.

Grasshopper sparrows build distinctive ground nests that are well concealed. They are constructed of grasses and forbs in a slight depression in the ground or hidden at the base of an overhanging clump of grasses or forbs. Nests usually are domed or concealed with overhanging grasses and accessed from a side entrance (Bent 1968; Zeiner *et al.* 1990; Vickery 1996). Territory sizes outside of California vary from 0.3 to 1.7 ha (0.8 to 4.3 ac), but no data are available for California nesting populations.

Grasshopper sparrows breed from early April to mid-July, with a peak in May and June. Clutch sizes usually are four or five eggs, but sometimes three or six. They may raise two or three broods per year, but additional clutches usually are smaller (Vickery 1996). The female incubates the eggs for approximately 11-12 days and then tends the young, which leave the nest at about nine days, although they are still unable to fly at this point (Harrison 1978). The male's role includes responding to predators near the nest and providing food for the young. Adult and

juvenile non-parental attendants also are known to feed the young, and may make up to half the provisioning visits to the nests (Vickery 1996). The young of the first brood have usually dispersed from the natal territories when the adults are feeding the nestlings of the second brood (Vickery 1996). One study showed that predation was a major cause of nest failure (Perkins *et al.* 1998). Predation rates also appear to be highest for nests placed in grassland areas less than about 15 ha (37 ac) and for areas adjacent to wooded areas (Burger *et al.* 1994).

Human-related threats to the species apparently include habitat loss, degradation, and fragmentation. Extensive and intensive grazing in western North America has had a negative impact on this species (Vickery 1996). Garrett and Dunn (1981) concluded that the grasshopper sparrow has declined as a breeder in recent decades due to the development of open hilly areas that make up the grasshopper sparrow's preferred habitat. Brown-headed cowbird parasitism does occur but is generally considered low (Vickery 1996).

Protection Recommendations

- Protect at least 60 percent of the mapped grasshopper sparrow locations of the *major population* in a *key location* in the Chiquita and Gobernadora sub-basins.
- Protect at least 60 percent of the mapped grasshopper sparrow locations of the *important population* in a *key location* in the Cristianitos and Gabino and Blind Canyons sub-basins, and extending into the unnamed sub-basin south of the Cristianitos sub-basin.
- Protect at least 90 percent of the mapped grasshopper sparrow locations of the *important population* in a *key location* along Radio Tower Road on RMV property.
- Protect the majority of native grasslands and annual grasslands to the extent feasible supporting the *important population* in a *key location* in the southern Trampas Canyon and Cristianitos sub-basins. Minimize impacts to native grasslands elsewhere in the planning area.

Management Recommendations

- Implement a cowbird trapping program to mitigate for impacts to existing habitat within the Chiquita and Gobernadora sub-basins and for potential impacts associated with future development. The cowbird trapping program will be evaluated on an annual basis and trap locations and trapping effort will be adjusted as part of the overall Adaptive Management Program (*e.g.*, if the number of trapped cowbirds drops to a prescribed threshold, the trapping program may be terminated or otherwise modified).

- Pursuant to the Grazing Management Plan, implement grazing management techniques to help protect the grasshopper sparrow and its habitat, promote perennial grasses including native grasses, allow for continued cattle grazing sufficient to support cattle ranching operations, and, where appropriate reduce fuel loads for fire. Note, under the Grazing Management Plan, it is likely that grasslands in upper Gabino Canyon will provide additional suitable habitat for the grasshopper sparrow.

- Pursuant to the Fire Management Plan, implement prescribed burning techniques to promote native perennial grasses.

Restoration Recommendations

- Implement a CSS/VGL restoration program to enhance habitat carrying capacity and connectivity. Restoration areas that would benefit the grasshopper sparrow include Chiquita Ridge, Sulphur Canyon, Chiquadora Ridge, upper Cristianitos and upper Gabino Canyon.

2.6 LEAST BELL'S VIREO

Species: Least Bell's Vireo (*Vireo bellii pusillus*)
Federal Status: Endangered, BCC (full species)
State Status: Endangered
CNDDB Rank: G5T2S2
Science Advisors Group: 3
Covered Species: Yes
Focal Monitoring Species: Yes
Planning Species: Yes

CONSERVATION GOALS

1. Manage habitat and populations of the least Bell's vireo to maximize the likelihood that populations are sustained in the planning area, and in doing so "provide for recovery" on a subregional basis and "contribute to recovery" on a rangewide basis.

CONSERVATION STRATEGY

1. Create a permanent subregional Habitat Reserve that provides sufficient breeding habitat to support the identified *important populations* in *key locations* in GERA and lower Arroyo Trabuco to maximize the likelihood of the species' persistence within the planning area.
2. Formulate a HRMP to provide for long-term protection and management of the least Bell's vireo and its habitat and provide for restoration of riparian habitat to enhance the amount and quality of existing habitat.

HABITAT AND SPECIES CONSERVATION AND IMPACTS ANALYSIS

The conservation analysis for the least Bell's vireo is based both on site-specific information (*i.e.*, documented nest occurrences and identified *important populations/key locations*) and amount of suitable nesting habitat conserved, defined as southern willow scrub, arroyo willow riparian forest and black willow riparian forest. Least Bell's vireos are not particularly impacted by habitat patch connectivity within the subregion as long as discrete habitat patches within riparian systems are large enough to support a breeding population.

Table 2-14 provides a summary of the existing conditions, proposed conservation, and permanent and temporary impacts of least Bell's vireo nest locations and willow riparian habitat

in the planning area and within the Subarea 1 permit area. The description of impacts and conservation below is limited to Subarea 1 which is the permit action area. The planning area conservation and impact estimates reported in *Table 2-14* include SOS and potential impact areas in Subareas 2, 3 and 4 and do not reflect future planning within those Subareas that may result in changes to the SOS and impact estimates.

TABLE 2-14
LEAST BELL'S VIREO CONSERVATION AND IMPACT SUMMARY

	Acres	Percent	Locations	Percent
Planning Area				
Existing Total	1,124		60	
Habitat Reserve	615	55%	43	72%
Supplemental Open Space	209	19%	6	10%
Total Protected	824	74%	50	82%
Total Permanent Impact	75	7%	7	12%
Subarea 1				
Existing Total	698		53	
Habitat Reserve	615	88%	43	81%
Supplemental Open Space	10	1%	3	6%
Total Protected	625	89%	46	87%
Total Permanent Impact	72	10%	7	13%
Total Temporary Impact	36		2	

Subarea 1 Impacts

The proposed Covered Activities would result in direct, permanent impacts to 72 acres (10 percent) of willow riparian habitat (southern willow scrub, arroyo willow riparian forest and black willow riparian forest) and seven least Bell's vireo nest sites (13 percent) (*Table 2-14* and *Figure 172-M*). The proposed Covered Activities also would result in temporary direct impacts to 36 acres of habitat and two nest sites (*Table 2-14*). Of the seven direct nest impacts, six would occur as a result of the Prima Deshecha Landfill GDP (*Figure 172*-M) and one would occur from construction of a pump station by RMV

Subarea 1 Conservation

A total of 43 least Bell's vireo nest locations (81 percent) and 615 acres (88 percent) of suitable riparian habitat (southern willow scrub and arroyo willow riparian forest) would be conserved in the Habitat Reserve (*Table 2-14* and *Figure 173-M*). An additional three nest locations (6 percent) and 10 acres (1 percent) are in Subarea 1 SOS, bringing the total conservation to 46 nest locations (87 percent) and 625 acres (89 percent). Both *important populations* in the planning area (lower Arroyo Trabuco and GERA) would be in the Habitat Reserve.

ADAPTIVE MANAGEMENT PROGRAM

Stressors

Management of the least Bell's vireo and its habitat will consider a number of environmental stressors that have been identified for this species, including:

- Altered fire regime
- Too frequent flood regime
- Too infrequent flood regime
- Precipitation
- Urbanization adjacent to Reserve
- Exotic plant invasion
- Exotic animals
- Cattle-related impacts
- Upstream diversion
- Groundwater extraction
- Roads and trails

Maintaining and enhancing habitat quality for the least Bell's vireo is paramount for conservation of this species in the Habitat Reserve, particularly for the important *populations/key locations* in GERA and lower Arroyo Trabuco. Least Bell's vireos primarily occupy riverine riparian habitats that typically feature dense cover within three to six feet of the ground and a dense, stratified canopy. It inhabits low, dense riparian growth along water or along dry parts of intermittent streams. Cover surrounding nests is moderately open midstory with an overstory of willow, cottonwood, sycamore, or oak. Crown cover is usually more than 50 percent and contains occasional small openings. The most critical structural component to least Bell's vireo breeding habitat is a dense shrub layer at two to ten feet above the ground (Goldwasser 1981; Franzreb 1989). Stressors that reduce habitat quality, in terms of extent and structure, therefore are important management considerations. Well-documented stressors of vireo habitat quality include: **(1)** impoundments of water and diverting water to canals and agriculture thus reducing water supplies to riparian systems; **(2)** flood control projects and river channelization; **(3)** over-grazing; **(4)** exposure to road noise and pollutants; and **(5)** invasion by invasive species such as giant reed, tamarisk, and pampas grass (Brown 1993; USFWS 1998b). Of these potential stressors, invasive species have been identified as the main stressor on vireo in the planning area. Invasive species mapping conducted by PCR (2002) within the Habitat Reserve shows that lower Arroyo Trabuco, which supports an *important population/key location,* and San Juan Creek have fairly extensive infestations of giant reed. Pampas grass is a significant invasive in Arroyo Trabuco and occurs in smaller patches in San Juan Creek. Although GERA is relatively free of

invasive species, there are isolated small patches of giant reed. GERA is most vulnerable to perennialized streamflow impacts to the natural meandering of the mainstream and poor water quality from the altered sediment regime stemming from upstream urban land uses. Although not identified as an immediate stressor requiring management, fire also is a potential stressor that directly destroys riparian vegetation and also can result in extensive erosion that directly impacts riparian systems through increased sediments.

Direct stressors on least Bell's vireos include brown-headed cowbird parasitism and mesopredators associated with habitat fragmentation and urbanization. The USFWS Draft Recovery Plan for the least Bell's vireo (1998b) provides an extensive review of the impact of the brown-headed cowbird. In southern California cowbird parasitism rates were as high as 80 percent in the 1980s in the San Luis Rey, Sweetwater, San Diego and Santa Ana rivers. Cowbird control efforts are considered to be a significant factor in the rebound of the vireo in southern California and are probably a key, at least in the short-term, for managing populations (*e.g.,* Pike *et al.* 1996; Kus 1999). Habitat fragmentation favors mesopredators (*e.g.,* weasels, raccoons, striped skunks, opossums, and foxes) that may be predators of least Bell's vireos. Interestingly, Peterson *et al.* (2004) found that the yellow-breasted chat (a NCCP/MSAA/HCP Covered Species) was the most common avian predator of vireos in San Diego County, followed by western scrub jay. In addition, Argentine ants, which are abundant in riparian areas adjacent to urban landscapes are a threat to vireos and other nesting birds in riparian habitats (*e.g.*, Suarez *et al.* 1998; Peterson *et al.* 2004). The extent to which brown-headed cowbird parasitism, mesopredators, and Argentine ants pose a threat to vireos in the planning area, however, is unknown, and thus is a key uncertainty for management of the species. Development, roads and trails adjacent to or within riparian areas introduce potential edge effects such as noise, human activity, urban-related predators (*e.g.,* cats), etc. that can potentially directly disrupt breeding and nesting activities of vireos.

Goals

Goals for protecting and managing the least Bell's vireo and its habitat include the following:

1. Maximize the likelihood of the persistence of the physiographic diversity of riparian/wetland habitats and associated focal species in the Habitat Reserve.
2. Restore riparian/wetland habitats and enhance the quality of degraded riparian/wetland habitats in the Habitat Reserve such that the net habitat value of the existing riparian/wetland habitat system is preserved.
3. Manage fire regimes to sustain and enhance riparian/wetland quality in the Habitat Reserve.

4. Manage exotic invasions of riparian/wetland habitats such as giant reed, pampas grass, tamarisk, and castor bean.

5. Protect and manage the least Bell's vireo nesting population in the Habitat Reserve.

Management and Monitoring Objectives (number of goal met by objective in parentheses)

Objective 1: Implement Conservation Strategy to protect and manage approximately 615 acres of southern willow scrub and arroyo willow riparian forest in the Habitat Reserve (actual acreage will vary in relation to natural and anthropogenic environmental effects such as floods, wildfires and drought) (Goals 1 & 2).

Objective 2: Remap vegetation communities in Habitat Reserve within two (2) years of executing IA to establish a baseline for long-term tracking of the Reserve (Goals 1, 2 & 4).

Objective 3: Update vegetation community map at 5-year intervals (Goals 1, 2 & 4).

Objective 4: Collect regional climate, weather and air quality information to examine potential correlations between vegetation and population changes and environmental variables (Goals 1, 2 & 5)

Objective 5: Provide for no net loss of acreage and function of the waters of the U.S./State (Goals 1 & 2).

- Implement riparian/wetland restoration component of Habitat Restoration Plan.

Objective 6: Maintain/restore riparian/wetland ecosystem integrity and maintain and/or restore floodplain connection (Goals 1 & 2).

- Address historic meander conditions and excessive sediment input from upstream land uses in Gobernadora Creek, including construction of a detention/water quality basin below Coto de Caza.
- Conduct riparian/wetland restoration on a case-by-case basis over the long-term management and monitoring of the Habitat Reserve.

Objective 7: Conduct annual botanical and wildlife field studies within predesignated sample plots to monitor fine-grained changes in riparian/wetland habitat for the least Bell's vireo (Goals 1, 2, 4 & 5).

Objective 8: Implement Wildland Fire Management Plan such that sub-basin watersheds and a riparian/wetlands habitats and least Bell's vireo nesting areas are protected to the extent feasible (Goals 1, 2, 3 & 5).

Objective 9: Implement Invasive Species Control Plan to manage invasive exotic species in riparian/wetland habitats (Goals 1, 2, 4 & 5).

- Control major infestations of giant reed in San Juan Creek and Arroyo Trabuco, and smaller infestations in GERA and Cristianitos Creek.
- Control major infestations of tamarisk in Cristianitos Creek and isolated clusters in Gabino and San Juan creeks.
- Control pampas grass infestation in Arroyo Trabuco, San Juan Creek and Cristianitos Creek.
- Control substantial castor bean infestation Cristianitos Creek and scattered occurrences in Arroyo Trabuco and San Juan Creek.
- Control Spanish sunflower occurrences Gobernadora Creek (GERA) and monitor/conduct early eradication in Arroyo Trabuco, Chiquita Creek, San Juan Creek and Cristianitos Creek as needed.
- Assess brown-headed cowbird parasitism risk and conduct cowbird trapping or some equivalent form of cowbird control such as mist netting as needed.
- Assess and control Argentine ants where determined to pose a risk to least Bell's vireo nestlings and fledglings and/or to native prey.

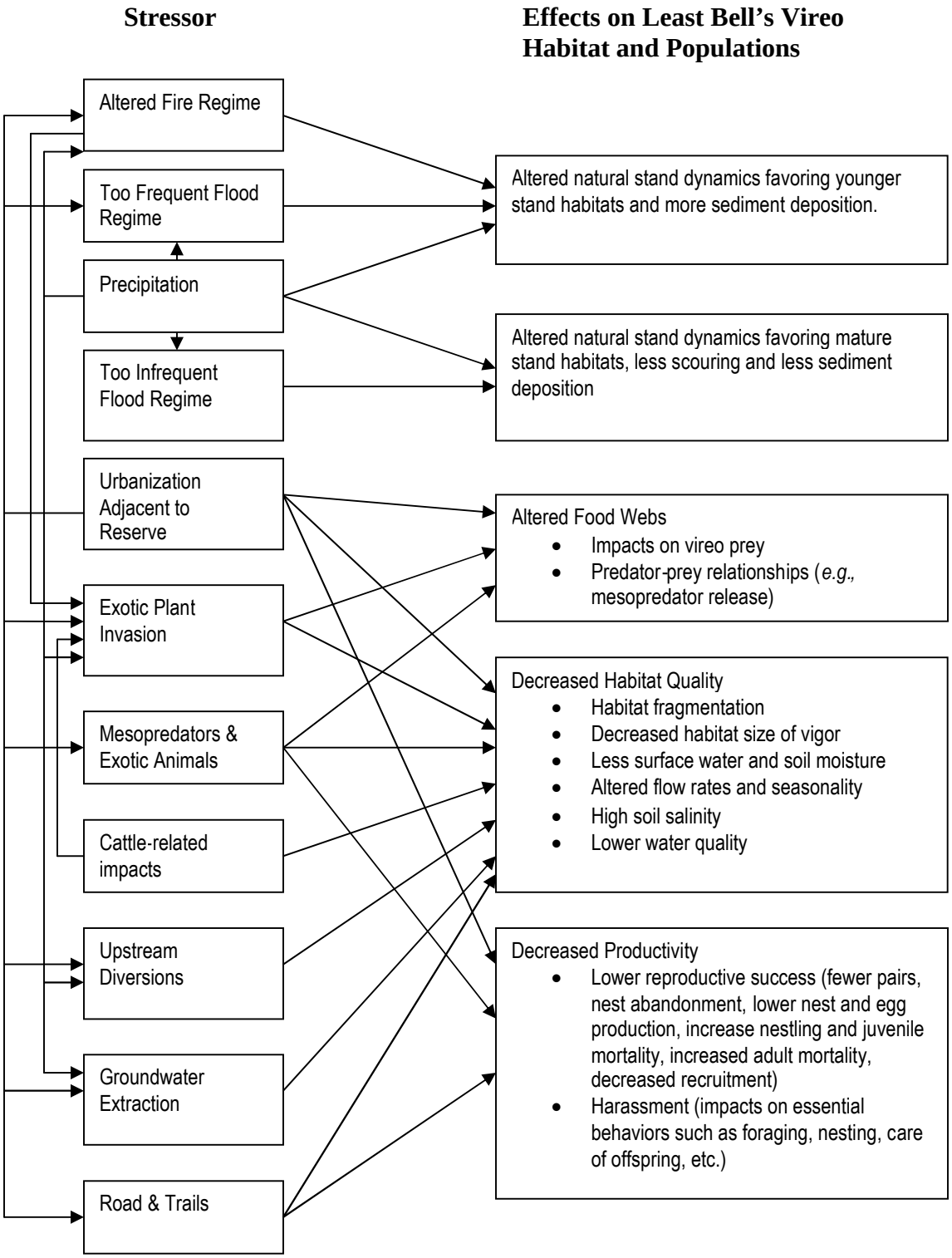
Conceptual Model

Yes – See figure below.

Regional and Subregional Management Information Needs

- The appropriate stand age to maintain high quality breeding habitat; *i.e.*, such that a robust understory of willows and other species is present.
- Whether the apparent increase in vireo breeding in the subregion is a result of increased local habitat suitability or due to overall increased populations in southern California.
- The effectiveness of habitat restoration, including revegetation and enhancement in supporting nesting populations of vireos (*e.g.*, Kus 1998).

Least Bell's Vireo Conceptual Stressor Model



- Dispersal behavior. The literature is equivocal concerning the level of breeding site tenacity exhibited by this species, with early studies suggesting a high level of tenacity (*e.g.*, Salata 1983, 1984; Greaves 1987, 1989; Greaves and Labinger 1997) and more recent data suggesting that vireos may change breeding areas (unpublished data from B. Kus cited in USFWS 1998b).
- Whether brown-headed cowbird parasitism poses a significant risk to nesting least Bell's vireos in the Habitat Reserve.
- Whether Argentine ants pose a significant direct risk to least Bell's vireo nestlings and fledglings in the Habitat Reserve and indirectly to vireos through impacts on the native insect prey population.
- Whether urban-related predators (*e.g.*, cats) pose a significant risk to nesting least Bell's vireos in the Habitat Reserve.
- Whether certain land uses adjacent to occupied vireo breeding in the Habitat Reserve have adverse effects on breeding success, such as noise, human activity, etc.
- Whether the extent and quality of least Bell's vireo habitat in the Habitat Reserve is limited by available groundwater?
- Whether cattle-related impacts in riparian areas has an adverse effect on least Bell's vireo habitat in the Habitat Reserve.

Level of Management and Monitoring Priority - Medium

Recent surveys indicate that the vireo population in the planning area is gradually increasing, likely in relation to the ongoing recovery of the species in southern California. For example, the number of vireos nesting in the Prima Deshecha Landfill area has increased from four pairs in 1998 surveys, to nine pairs in 2001 and 2005 surveys. At this time there are no identified imminent threats to the vireo in the Habitat Reserve that require immediate action, although invasive species controls in Arroyo Trabuco and San Juan Creek will be a priority management action that will benefit the vireo. In particular, the County will provide funding for invasives controls, including giant reed, in San Juan Creek within Caspers Wilderness Park as mitigation for impacts to vireos on the Prima Deshecha Landfill. Brown-head cowbird parasitism and Argentine ants will be management issues that will be addressed as buildout of the project area progresses. Cowbird trapping has been and will continue to be conducted in lower Arroyo Trabuco in conjunction with the Golf Course. It is anticipated that initiation of cowbird trapping and Argentine ant assessment and potential management actions in GERA will occur with construction in PA 3.

Level of Monitoring (*e.g.*, Species-specific, habitat, landscape, combination)

Monitoring will be conducted both at a species-specific and habitat landscape level.

Monitoring Variables

Listed below are suggested species- and habitat-based monitoring variables. The detailed monitoring program for the least Bell's vireo will be developed by the Reserve Manager and Science Panel.

Species-specific Monitoring Variables

1. Status of breeding population
2. Proportion of "suitable" habitat occupied
3. Brown-headed cowbird nest parasitism
4. Argentine ant impacts
5. Urban-related predator impacts

Habitat-based Monitoring Variables

1. Vegetation communities long-term status
2. Relative cover of different native plant species
3. Proportion of exotic plant species/native plant species
4. Results of habitat restoration activities, including invasive species controls, riparian/wetland restoration, and creek and soils stabilization programs

Abiotic Monitoring Variables

1. Climate
2. Weather
3. Air quality
4. Water quality and runoff

Management Actions

The following management actions implemented as part of the HRMP will directly benefit the least Bell's vireo and its habitat:

- Habitat Restoration Plan
- Invasive Species Control Plan
- Wildland Fire Management Plan

The Habitat Restoration and Invasive Species Control plans are key to management of the least Bell's vireo. The Arroyo Trabuco population is affected by giant reed and pampas grass proliferation and the GERA population by stream perennialization and erosion/sediment impacts resulting from excessive surface and subsurface flows from upstream development. The smaller population in San Juan Creek also is being affected by giant reed infestation. Management actions designed to address these stressors and enhance net habitat value for the least Bell's vireo include: **(1)** subject to the discretion by the Reserve Manager and Science Panel, revegetation in Sulphur Canyon to reduce the generation of fine sediments currently affecting downstream areas within Gobernadora Creek; **(2)** management of excessive surface and subsurface flows from Coto de Caza through the Gobernadora Multi-purpose Basin to protect existing riparian habitat downstream of the knickpoint in GERA and potential new habitat upstream of the knickpoint; **(3)** potential restoration of the historic meander and associated habitat above the knickpoint and potential restoration in the "fertile crescent" area near the mouth of Gobernadora Creek to provide additional vireo habitat; **(4)** addressing upstream land use-induced channel incision and erosion through the Gobernadora Multi-purpose Basin; **(5)** invasive plant species control, including giant reed in San Juan Creek and Arroyo Trabuco and pampas grass in Arroyo Trabuco, to provide for additional native riparian vegetation and increased water supplies; **(6)** conservation of upstream sources of coarse sediments and maintenance/repair of episodic flood events to help maintain natural succession of southern willow scrub habitat; **(7)** implementation of the coordinated WQMP to address hydrologic conditions of concern and pollutants of concern; (**8)** control of Argentine ants; and **(9)** brown-headed cowbird trapping where needed. Habitat restoration also would address erosion and localized headcuts in Chiquita Creek, which supports a small vireo population.

"Coordinated Management Plans" that are not formal elements of the HRMP but will also benefit the least Bell's vireo are:

- Grazing Management Plan
- Water Quality Management Plan (as noted above)

The reader is referred to the individual management plans for more details.

Cattle normally are excluded from GERA. However, grazing would occur in GERA once every three years for fuel modification outside the vireo breeding season (February 15-July 15). This periodic grazing in GERA will not affect the vireo.

Potential Target Studies

Several management information needs relevant to management of the least Bell's vireo were listed above, some of which could be addressed at the subregional scale and would help inform management of the Habitat Reserve. Other management information needs, particularly those related to rangewide persistence of the species (*e.g.*, landscape habitat fragmentation) are best studied at a rangewide scale. The following are potential target studies that could be implemented at the subregional scale:

- Assessment of impacts of brown-headed cowbirds and evaluation of the effects of cowbird controls
- Assessment of impacts of Argentine ants and evaluation of the effects of ant controls related to:
    - Direct impacts on nestlings and fledglings
    - Indirect impacts on prey
- Evaluation of impacts of urban-related predators on least Bell's vireos (although native species such as yellow-breasted chat and western scrub jay have been found to be significant predators of vireos in San Diego County [Peterson *et al.* 2004], control of native predator of vireos is not recommended).
- Evaluation of restoration effects on breeding populations, including invasive species controls, active revegetation and upstream restoration in Gobernadora to reestablish natural creek meander and control fine sediments
- Evaluation of adverse edge effects on occupation and/or breeding success

SPECIES ACCOUNT

Rangewide and Regional Status

The Bell's vireo, consisting of four subspecies, is widespread as a breeding species in the central and southwestern U.S. and northern Mexico. Its breeding range includes southern California, southern Nevada, southwestern Utah, northwestern and southern Arizona, southern New Mexico, central and southwestern Texas, eastern Colorado, central Nebraska, central South Dakota, south central North Dakota, southeastern Minnesota, southern Wisconsin, northeastern Illinois, and northwestern Indiana south to northern Baja, southern Sonora, southern Durango, Zacatecas, southern Nuevo Leon, southern Tamalpais, southern and eastern Texas, northwestern Louisiana, Arkansas, southwestern Tennessee, southwestern Kentucky, southern Indiana, and western Ohio

(Brown 1993). Although the winter range of Bell's vireo is not well known, generally it appears to winter from southern Baja and southern Sonora south along the west coast of Mexico and Central America to Honduras and casually to northern Nicaragua. It is also reported from the eastern coast of Central America from Veracruz south to Honduras (Brown 1993).

Zeiner *et al.* (1990) summarized the distribution, abundance, and seasonality of the subspecies least Bell's vireo (*V. b. pusillus*) within California. Least Bell's vireo formerly was a common and widespread summer resident below about 600 m (2,000 ft) in the western Sierra Nevada, throughout the Sacramento and San Joaquin valleys, and in the coastal valleys and foothills from Santa Clara County south. Least Bell's vireo also was common in coastal southern California from Santa Barbara County south, east of the Sierra Nevada below about 1,200 m (4,000 ft), in the Owens and Benton valleys, along the Mojave River and other streams at the western edge of southeastern deserts, and along the entire length of the Colorado River (Grinnell and Miller 1944). Two subspecies occur in California: *V. b. pusillus* (the least Bell's vireo described below) and *V. b. arizonae*, which is now a rare summer resident along the Colorado River from Needles, San Bernardino County, south to Blythe, Riverside County. Bell's vireo (subspecies uncertain) also breeds in at least two sites along the Amargosa River near Tecopa, Inyo County (Garrett and Dunn 1981).

As summarized in *Table 2-15*, the year 2001 distribution of confirmed territories (not necessarily confirmed breeding pairs) of the least Bell's vireo in California includes the counties of San Diego, Orange, Riverside, San Bernardino, Los Angeles, Ventura, Santa Barbara, Inyo, and Santa Clara (USFWS, pers. comm. 2002).

Most of the current populations of least Bell's vireo have undergone tremendous growth over the last decade. Census data collected over the past 16 years indicate that the population in southern California has increased from an estimated 300 pairs in 1986, an estimated 1,346 pairs in 1996 (USFWS 1998b) and in 2001 an estimated 2,443 confirmed territories (USFWS, pers. comm. 2002).

The two largest concentrations of confirmed territories in the 2001 data base are in the Prado Basin in western Riverside County (444 territories) and on Camp Pendleton (785 territories). San Diego County, excluding Camp Pendleton, has the greatest total number of confirmed territories, with relatively large concentrations in the San Luis Rey River between College Avenue and Interstate 15 (132 territories), the Sweetwater River with 102 territories, the San Dieguito River with 45 territories, and various drainages in Anza Borrego with 105 territories. The Santa Clara River in Los Angeles and Ventura counties also supports a large concentration of territories, with 123 total territories in 2001.

TABLE 2-15
REGIONWIDE SUMMARY: 2001 STATUS OF LEAST BELL'S VIREO WITHIN KNOWN BREEDING RANGE OF SOUTHERN CALIFORNIA

County	Confirmed Territories[1]
San Diego – excluding Camp Pendleton	883
San Diego – Camp Pendleton	783
Orange	111[2]
Riverside	500
San Bernardino	14
Los Angeles	24
Ventura	124
Santa Barbara	12
Inyo	3
TOTAL CONFIRMED TERRITORIES	**2,443**

Notes:

1 The number of confirmed territories in 2001 is based on unpublished data provided by the USFWS in December 2002 (Terp, pers. comm. December 2002).

2 The 2001 USFWS data base included about 100 confirmed territories in Orange County but does not include the 11 breeding pairs documented in lower Arroyo Trabuco in 2000. Also, Gobernadora Creek within GERA was estimated to support about 12-15 nesting locations based on 1998 and 2001 surveys, but the USFWS 2001 data base indicates 8 confirmed territories based on surveys in 2001 by P&D. The number cited in the table reflects the additional Arroyo Trabuco data and the 2001 P&D Gobernadora survey data.

Subregional Status

Sixty vireo nesting locations have been documented within the planning area (about 2 percent of the total in California). Fifty-three locations are documented in Subarea 1, including locations in Gobernadora Creek, middle San Juan Creek (between the Ortega Highway bridge and Caspers Wilderness Park), lower Arroyo Trabuco, Chiquita Creek, lower Cristianitos Creek, and in isolated patches of willow scrub in Prima Deshecha. Two *important populations* of the least Bell's vireo were identified in the planning area: lower Arroyo Trabuco and in GERA in lower Gobernadora Creek. These two areas combined support about 50 percent of the documented nesting locations in the planning area.

- Lower Arroyo Trabuco between Crown Valley Parkway and Avery Parkway supported 12 locations of the vireo in year 2000 surveys, of which 11 were documented breeding pairs (No. 1 on *Figure 172-M*). About the same number of nesting sites had been documented in the area in 1998 surveys (Dudek 1998). This area, which supports a well-

developed stand of southern willow scrub, is included in the 223 acres added to O'Neill Regional Park as mitigation for the Arroyo Trabuco Golf Course.

- Lower Canada Gobernadora within GERA supports about 12-15 nesting locations based on 1998 and 2001 surveys (No. 2 on *Figure 172-M*).

It should be noted that recent observations include nine confirmed breeding pairs in the Prima Deshecha area (BonTerra 2005), but this area does not have a major, well-defined riparian system similar to Arroyo Trabuco or Canada Gobernadora. These observations suggest that vireos are opportunistic in selecting breeding sites, but whether this area should be considered an *important population* is uncertain because of the lack of a well-defined riparian system. It also should be noted that the three nesting locations in lower Cristianitos are contiguous with numerous nest sites in lower Cristianitos and San Mateo Creek on Camp Pendleton, which should be considered a *major population* outside the planning area.

Notably, planning area-wide surveys in 1998 failed to observe vireos in the remainder of riparian habitat in the planning area, including Gabino Canyon, La Paz Canyon, Blind Canyon, San Juan Creek above the Caspers Wilderness Park boundary, Bell Canyon, Verdugo Canyon, Lucas Canyon, Oso Creek, Tijeras Creek, upper Arroyo Trabuco, and Wagon Wheel Canyon. Much of the habitat in these areas consists of southern coast live oak riparian forest, which generally is unsuitable for the vireo. However, with the continued expansion of the breeding population of this species in southern California and changes in local habitat conditions, the future occurrence of the vireo in some of these areas is possible.

Biological Considerations

The least Bell's vireo occupies a more restricted nesting habitat than the other subspecies of Bell's vireo, as summarized in USFWS (1986). Least Bell's vireos primarily occupy riverine riparian habitats that typically feature dense cover within one to two meters of the ground and a dense, stratified canopy. It inhabits low, dense riparian growth along water or along dry parts of intermittent streams. Typically it is associated with southern willow scrub, cottonwood forest, mule fat scrub, sycamore alluvial woodland, coast live oak riparian forest, arroyo willow riparian forest, wild blackberry, or mesquite in desert localities. It uses habitat that is limited to the immediate vicinity of watercourses below about 457 m (1,500 ft) elevation in the interior (USFWS 1986; Small 1994). In the coastal portions of southern California, the least Bell's vireo occurs in willows and other low, dense valley foothill riparian habitat and lower portions of canyons and along the western edge of the deserts in desert riparian habitat.

The breeding season for least Bell's vireo is typically mid-March to September (USFWS 1986). Males arrive a few days before females to establish breeding territories. Nests are typically built within 1 m (3.3 ft) of the ground in the fork of willows, wild rose (*Rosa californica*), mule fat (*Baccharis salicifolia*), or other understory vegetation (Franzreb 1989). Cover surrounding nests is moderately open midstory with an overstory of willow, cottonwood, sycamore, or oak. Crown cover is usually more than 50 percent and contains occasional small openings. The most critical structural component to least Bell's vireo breeding habitat is a dense shrub layer at two to ten feet above the ground (Goldwasser 1981; Franzreb 1989). The birds typically forage in riparian habitat, but also use adjoining chaparral or scrub habitat (Salata 1983). These adjacent upland foraging habitats become relatively more important late in the breeding season.

Clutch sizes of the least Bell's vireo are between two to five eggs (typically three or four) that are laid shortly after nest construction (Salata 1984; Kus 1994; USFWS 1998b). Incubation is about 14 days and young fledge about 12-14 days after hatching (Zeiner *et al.* 1990). Fledglings may range from established breeding territories, but remain under parental care for several more weeks (USFWS 1998b). Least Bell's vireo usually produce only one brood per season, but additional broods up to four or five have also been reported (Franzreb 1989; USFWS 1998b). Vireos typically depart by mid-September, but stragglers have been observed as late as November (Zeiner *et al.* 1990).

During the spring and fall migration, the Bell's vireo occupies a wider range of habitats including coastal sage scrub, riparian and woodland habitats. The winter range of habitats of the Bell's vireo include thornscrub vegetation adjacent to watercourses or in riparian gallery forests along the west coast of north and central Mexico. In southern Mexico and Honduras, tropical deciduous forest and arid tropical scrub along the coast is used (Brown 1993).

Bell's vireos are known to feed primarily on insects and spiders (Chapin 1925; Bent 1950; Terres 1980). The least Bell's vireo primarily forages in willow (*Salix* spp.) stands or associated riparian vegetation, with forays into upland vegetation including chaparral, sage scrub and oak woodlands later in the breeding season (Gray and Greaves 1984; Salata 1983; Kus and Miner 1989). Least Bell's vireos forage in a variety of tree and shrub species, with a preference for black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), and mule fat (*Baccharis salicifolia*). Individuals are known to travel between 3 and 61 m (9.8 and 200 ft) (mean of 15.5 m [50.8 ft]) while foraging, with the majority of these destinations occurring within 30 m (98 ft) of the edge of riparian vegetation (Kus and Miner 1989). Least Bell's vireo are known to forage in all vertical vegetation layers from ground level to 20 m (66 ft), but most feeding is concentrated above the ground surface in the lower vegetation layers from ground level to 6 m (20 ft) (Kus and Miner 1989; Salata 1983). The least Bell's vireo exhibits year-round diurnal activity and is known to be a nocturnal migrant (Brown 1993).

The literature on the dispersal and status remains unclear. Early data suggested that least Bell's vireos are strongly site tenacious, returning to the same site in close proximity to previously occupied territories (Salata 1983; Greaves 1987, 1989). More recent data suggest that least Bell's vireo may change breeding sites, but that additional study is needed (data from Kus cited in USFWS 1998b).

Least Bell's vireo breeding territory sizes range from 0.2 to 3.0 hectares (ha) (0.5 acre [ac] to 7.4 ac) (Gray and Greaves 1984; Collins *et al.* 1989; Newman 1992) with most averaging between 0.3 to 1 ha (1 to 3 ac) (USFWS 1998b). Territories in Bell's vireo are maintained by threat and physical confrontation early in the breeding season, tapering to vocal warnings later in the season (Barlow 1964).

Protection Recommendations

- Protect breeding and foraging habitat for the least Bell's vireo along Chiquita Creek.
- Protect southern willow scrub in GERA that provides nesting and foraging habitat for least Bell's vireo.
- Maintain and manage riparian habitats along San Juan Creek that provides nesting and foraging habitat for the least Bell's vireo.
- Protect breeding and foraging habitat for least Bell's vireo in lower Cristianitos Creek between the RMV boundary and the confluence with Gabino Creek.

Management Recommendations

- Implement a cowbird trapping program to mitigate for impacts to existing habitat within the Chiquita, Gobernadora sub-basins, as well as the "other" planning area in lower Cristianitos, and for potential impacts associated with future development. The cowbird trapping program will be evaluated on an annual basis and trap locations and trapping effort will be adjusted as part of the overall Adaptive Management Program (*e.g.*, if the number of trapped cowbirds drops to a prescribed threshold, the trapping program may be terminated or otherwise modified).
- Protect downstream habitat in GERA, San Juan Creek, lower Cristianitos and San Mateo creeks for the least Bell's vireo by maintaining hydrology, water quality and sediment delivery and minimizing additional loadings of nutrients or toxics.

Restoration Recommendations

- Implement restoration efforts to address localized headcuts within Chiquita Creek, as further described in the Watershed and Sub-basin Planning Principles – Chiquita Sub-basin.
- Implement a restoration program in Gobernadora Creek which addresses **(1)** the historic creek meander above the knickpoint; and **(2)** upstream land use induced channel incision and erosion, including potentially excessive surface and groundwater originating upstream.
- Identify likely causes of erosion and potential measures to rectify causes of headcutting in the lower portion of Gobernadora Creek.

2.7 LONG-EARED OWL

Species: Long-eared Owl (*Asio otus*)
Federal Status: None
State Status: CSC
CNDDB Rank: G5S3
Science Advisors Group: 3
Covered Species: Yes
Focal Monitoring Species: No
Planning Species: No

CONSERVATION GOAL

1. Manage habitat and populations of the long-eared owl to maximize the likelihood that populations are sustained in the planning area, and in doing so "provide for recovery" on a subregional basis and "contribute to recovery" on a rangewide basis.

CONSERVATION STRATEGY

1. Create a permanent subregional Habitat Reserve that provides sufficient breeding and foraging habitat in large, contiguous patches to support historic nesting areas of the long-eared owl.
2. Formulate a HRMP to provide for long-term protection and management of the long-eared owl and its habitat.

HABITAT AND SPECIES CONSERVATION AND IMPACTS ANALYSIS

The conservation analysis for the long-eared owl focuses on documented historic nest sites rather than a landscape habitat-based analysis because of its relative rarity in the planning area compared to other raptors (only eight historic nest sites are located in Subarea 1 and only nine are in the NCCP raptor database) and because it is highly sensitive to urban development (Bloom 1994).[1] A habitat-based analysis likely would grossly overestimate the potential suitable habitat for this species in the planning area. The Science Advisors designated the long-eared owl as a "Group 3" species that is "Best conserved at a species-specific level" because it has an extremely low population and, as Bloom (1994) demonstrated, it is highly sensitive to small changes in landscape or habitat.

[1] Bloom (1994) found that in coastal southern California no active long-eared owl nest sites occurred within 1 kilometer (3,280 feet) of a residential street and concluded that the owl is extremely sensitive to urban development.

In order to assess potential direct and indirect impacts to historic nest sites, in addition to the GIS analysis of the nest locations directly impacted by the proposed Covered Activities, a buffer analysis was conducted to analyze the distance of historic nest sites to proposed development, including new roads. Using Bloom's observation that long-eared owls appeared to be sensitive to residential development and roads within 3,280 feet (1 km) of nest sites as a guideline, the distance between each "conserved" nest site and proposed development and new roads was determined and evaluated.

Subarea 1 Impacts

Of the eight historic nest sites in Subarea 1, five would be in the Habitat Reserve and three are in SOS on NAS Starr Ranch (*Figure 197-M*). A ninth location in Talega Canyon is on MCB Camp Pendleton. However, two locations—Nos. 1 and 4 on *Figure 197-M*—are in close proximity to proposed development. Site 1 is located only 97 feet from existing development in Talega and 304 feet from proposed development in PA 8. If this site is not already extirpated due to its proximity to Talega, it would be considered impacted by PA 8, even under a circumstance where development in PA 8 was shifted to the east to provide additional buffer to Cristianitos Creek. Likewise Site 4 is located only 97 feet from the proposed alignment of Cristianitos Road/"F" Street and only 655 feet from PA 2 development. This site is considered to be impacted (although it may already be impacted by existing development in Coto de Caza about 2,000 feet to the north). In summary, at least two of the historic nest sites, if not already extirpated due to close proximity to existing development, likely would be impacted by the proposed Covered Activities.

Subarea 1 Conservation

The remaining three sites in the Habitat Reserve and three sites in Subarea 1 SOS are considered conserved. Site 2 in La Paz Canyon, while only 1,730 feet from the eastern edge of PA 8 likely will remain viable because it is physically isolated from PA 8 by rugged terrain. Conserved grasslands in Cristianitos and upper Gabino canyons would provide substantial foraging habitat for this location. Site 3 is located in middle Gabino Canyon and is 4,650 feet from the nearest development in PA 4. Conserved grasslands in Cristianitos and upper Gabino Canyon also would provide substantial foraging habitat for this location. Sites 5, 6 and 7 are located on NAS Starr Ranch and are 2,640, 1,800 and 5,900 feet from existing development in Coto de Caza and Dove Canyon. These sites are considered conserved because of the rugged topography separating Bell and Fox canyons and Starr Ranch from development to the west. Site 8 is located in O'Neill Regional Park in Arroyo Trabuco. Although only 270 feet from existing development above the arroyo this site is considered conserved for this analyses because no

additional indirect impacts to this site would occur from the proposed Covered Activities and it is afforded some additional physical buffer from development by the arroyo.

ADAPTIVE MANAGEMENT PROGRAM

Stressors

Environmental stressors identified for the long-eared owl that will be considered for management are primarily habitat-based, including:

- Urbanization adjacent to Habitat Reserve
- Altered hydrology
- Altered geomorphology
- Prolonged drought
- Exotic plant invasions (*e.g.*, giant reed)
- Frequent and/or high intensity wildfires
- Cattle-related impacts
- Disease affecting oak woodlands
- Predation on acorns, seedlings, saplings
- Human harassment

The long-eared owl is an uncommon breeding resident in southern California and there has been a marked decline of this species in southern California since the 1940's attributed to habitat destruction and fragmentation, and possibly inadvertent disturbance of nest sites due to urban development in close proximity to historic nesting areas (Grinnell and Miller 1944; Remsen 1978; Bloom 1994).

Because of the few number of historic nest locations for the long-eared owl in the Habitat Reserve, management for the long-eared owl will focus on maintaining the habitat quality of riparian and woodland habitats in the Habitat Reserve and minimizing human disturbance of the two historic nesting sites in La Paz and Gabino canyons. The management of riparian and woodland habitats also is addressed by the HRMP as described in *Part I, Chapter 7.*

As noted above, four long-eared owl breeding territories were observed along the CP alignment of the FTC; one located north of Ortega Highway in Cañada Gobernadora and three located in Cristianitos Canyon. All four territories were active in 1992 but were inactive in 1994 and 1995. Nest sites for these four territories were not documented, but it is possible that owls could nest in GERA in the future; although based on Bloom's (1994) observations that active nest sites do not occur within about 1 km (3,280 feet) of a residential street, future nesting in GERA seems

unlikely. If new long-eared owl nest sites are documented in the future, however, measures to minimize human disturbance to active nest sites include minimizing human activities in proximity to any future active nest sites during the breeding season, including by public education, signage and restricted access where feasible. To control for potential indirect effects during construction and maintenance/repair activities within the Habitat Reserve (*e.g.*, infrastructure construction and maintenance), activities within 300 feet of active nest sites during the breeding season will be minimized per MMs 4.9-26 and 4.9-30 of the Ranch Plan GPA/ZC EIR for raptor-related construction monitoring and preparation of a BRCP.

Assuming that GERA is a potential future nesting location, restoration activities in the Habitat Reserve that potentially would benefit the long-eared owl include implementing a restoration program in Gobernadora Creek which addresses: **(1)** the historic creek meander above the knickpoint; and **(2)** upstream land use-induced channel incision and erosion through the Gobernadora Multi-purpose Basin, including potentially excessive surface and groundwater originating upstream.

Goals

Goals for protecting and managing the long-eared owl and its habitat include the following:

1. Maximize the likelihood of the persistence of the physiographic diversity of riparian and woodland habitats and associated focal species in the Habitat Reserve.
2. Restore riparian and woodland habitats and enhance the quality of degraded habitats in the Habitat Reserve such that the net habitat values of the existing riparian and woodland habitat systems are preserved.
3. Restore grasslands in proximity to protected nest sites in the Habitat Reserve to enhance prey productivity.
4. Manage fire regimes to sustain and enhance riparian and woodland habitat quality in the Habitat Reserve.
5. Manage exotic invasions of riparian and woodland habitats such as giant reed, pampas
6. Protect and manage the long-eared owl nesting population in the Habitat Reserve.
7. Avoid and minimize impacts to long-eared owl active nest sites during construction-related Covered Activities.

Management and Monitoring Objectives (number of goal met by objective in parentheses)

Objective 1: Implement Conservation Strategy to protect and manage 4,537 acres of riparian and woodland in the Habitat Reserve (actual acreage will vary in relation to natural and anthropogenic environmental effects such as floods, wildfires and drought) (Goals 1 & 2).

Objective 2: Remap vegetation communities in Habitat Reserve within two (2) years of executing IA to establish a baseline for long-term tracking of the Reserve (Goals 1, 2 & 5).

Objective 3: Update vegetation community map at 5-year intervals (Goals 1, 2, & 5).

Objective 4: Collect regional climate, weather and air quality information to examine potential correlations between vegetation and population changes and environmental variables (Goals 1, 2 & 6)

Objective 5: Provide for no net loss of acreage and function of the waters of the U.S./State (Goals 1 & 2).

Objective 6: Maintain/restore riparian ecosystem integrity and maintain and/or restore floodplain connection (Goals 1 & 2).

- Address historic meander conditions and excessive sediment input from upstream land uses in Gobernadora Creek, including construction of the Gobernadora Multi-purpose Basin below Coto de Caza.
- Conduct riparian/wetland restoration on a case-by-case basis over the long-term management and monitoring of the Habitat Reserve, with an initial focus on San Juan Creek and Arroyo Trabuco.

Objective 7: Conduct annual botanical and wildlife field studies 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 (Goals 1, 2, 4 & 5).

Objective 8: Implement upland component of the Habitat Restoration Plan in Cristianitos and upper Gabino canyons to enhance native grasslands and improve prey productivity (Goal 3).

Objective 9: Implement Wildland Fire Management Plan such that riparian and woodland habitats and long-eared owl nesting areas and nearby grasslands (*e.g.*, Cristianitos and upper Gabino canyons) are protected to the extent feasible (Goals 1, 2, 3, 4 & 6).

Objective 10: Implement Invasive Species Control Plan to manage invasive exotic species in riparian and woodland habitats, particularly giant reed, pampas grass, tamarisk and castor bean in riparian areas and artichoke thistle in woodland and grassland areas (Goals 1, 2 & 5).

- Control major infestations of giant reed in San Juan Creek and Arroyo Trabuco, and smaller infestations in GERA and Cristianitos Creek.
- Control major infestations of tamarisk in Cristianitos Creek and isolated clusters in Gabino and San Juan creeks.
- Control pampas grass infestation in Arroyo Trabuco, San Juan Creek and Cristianitos Creek.
- Control substantial castor bean infestation Cristianitos Creek and scattered occurrences in Arroyo Trabuco and San Juan Creek.
- Control Spanish sunflower occurrences Gobernadora Creek (GERA) and monitor/conduct early eradication in Arroyo Trabuco, San Juan Creek and Cristianitos Creek as needed.
- Continue artichoke thistle control program in upland areas of RMV.

Objective 11: Implement Biological Resources Construction Plan (BRCP) to avoid and minimize potential indirect impacts to active nest sites during construction or maintenance/repair activities (*e.g.,* infrastructure construction and maintenance) (Goal 7).

Conceptual Model

No – insufficient information to generate conceptual model at this time.

Regional and Subregional Management Information Needs

- Relationship between urban development and recreational activities, such as ORVs, and owl productivity (reproductive success and recruitment).
- Role of potential predators such as great-horned owl, common raven, and raccoon, all species associated with development.
- Role of human impacts on primary prey productivity, such as clean farming techniques, over-grazing and pesticides.

Level of Management and Monitoring Priority - Low

As noted above, there are few historic nest sites in the Habitat Reserve that are considered to be potentially viable – nest sites 2 and 3 in La Paz and Gabino canyons, respectively. The Talega Canyon nest site is on Camp Pendleton. GERA also has the potential to support nesting owls, with foraging habitat available in middle and upper Chiquita Canyon, Sulphur Canyon, and Gobernadora above GERA. Management and monitoring to benefit this species should focus on habitat management, including riparian and woodland nesting habitat and grassland and agricultural foraging habitat in Cristianitos, upper Gabino canyons, and Chiquita canyons. Focused surveys in the Habitat Reserve for the long-eared owl are not recommended at this time, but general wildlife surveys in riparian and woodland habitats should consider this species in documenting any active raptor nest sites and habitat use territories. As an example, MBA (1996) noted that four active "breeding territories" of the long-eared owl existed along the CP Alignment in 1992, but were inactive in 1994 and 1995 (based on pers. comm. with P. Bloom). Such observations in the future should be pursued to document, if possible, any active nest sites and monitor the nests sites to determine breeding activity.

Level of Monitoring (*e.g.*, Species-specific, habitat, landscape, combination)

Monitoring will be conducted at both a species-specific and habitat landscape level.

Monitoring Variables

Listed below are suggested species- and habitat-based monitoring variables. The detailed monitoring program for the long-eared owl will be developed by the Reserve Manager and Science Panel.

Species-specific Monitoring Variables

1. Status of active nesting and foraging areas in Habitat Reserve (anecdotal observations to be followed by focused surveys to the extent feasible).

Habitat-based Monitoring Variables

1. Vegetation communities long-term status
2. Relative cover of different native plant species
3. Proportion of exotic plant species/native plant species
4. Results of habitat restoration activities, including invasive species controls, riparian/wetland restoration, grassland restoration, and creek and soils stabilization programs.

Abiotic Monitoring Variables

1. Climate
2. Weather
3. Air quality
4. Water quality, surface water and groundwater
5. Stream channel morphology, sediment transport and deposition

Management Actions

The following management actions implemented as part of the HRMP will directly benefit the long-eared owl and its habitat:

- Habitat Restoration Plan
- Wildland Fire Management Plan
- Invasive Species Control Plan

Both the riparian/wetland and upland elements of the Habitat Restoration Plan potentially would benefit the long-eared owl. The riparian/wetland element, particularly in the Gobernadora sub-basin and upper Gabino Canyon, would benefit nesting habitat quality and the grassland restoration element would enhance primary prey availability by providing more forage (forbs and seeds) and cover for rodent prey species in Cristianitos and upper Gabino canyons.

Generally, the Wildland Fire Management Plan will be beneficial to long-eared owl in terms of protecting riparian and woodland nesting habitats, as well as enhancing native grassland habitat quality by increasing forbs and seeds that attract rodents. However, prescribed burning will need to be carefully implemented to maintain prey populations in grasslands. Unburned plots adjacent to burned grassland areas should be maintained to support prey populations.

Management of oak woodlands, as described in *Part I, Chapter 7,* also would potentially enhance nesting habitat quality for the long-eared owl.

"Coordinated Management Plans" that are not formal elements of the HRMP but will also benefit the long-eared owl are the:

- Grazing Management Plan
- Water Quality Management Plan

The GMP describes the light to moderate grazing regimes that will be employed by RMV in the Habitat Reserve. These regimes will prevent over-grazing and help sustain habitat quality in the

grassland and agricultural areas (*i.e.*, barley fields) that support primary prey for the owl. The WQMP addresses urban runoff, altered geomorphology, and pollutants that can adversely affect riparian habitats.

The reader is referred to the individual management plans for more details.

In addition to the management plans listed above, minimization of human disturbance in close proximity to active nest sites will be implemented to the extent feasible. Potential indirect impacts to active nest sites during construction or maintenance/repair activities (*e.g.*, infrastructure construction and maintenance) will be addressed by minimizing activities within 300 feet of nest sites if activities occur during the breeding season through implementation of MMs 4.9-26 and 4.9-30 of the Ranch Plan GPA/ZC EIR for raptor-related construction monitoring and preparation of a BRCP.

Potential Target Studies

Because of the few number of historic nest sites in the Habitat Reserve, no direct target studies of the long-eared owl to be undertaken by the Reserve Manager are identified at this time. However, as mentioned above, studies encompassing a broader regional area that could include the Habitat Reserve should be considered if the opportunity arises.

One target study related to long-eared owl habitat management, as well as other raptor species such as the white-tailed kite, is an assessment of prey productivity in restored grasslands. A rodent trapping study before and after restoration would help establish whether grassland restoration affect rodent populations.

SPECIES ACCOUNT

Rangewide and Regional Status

The long-eared owl breeds from British Columbia, east across Canada, and south to southern California, southern Arizona and northern Mexico. It winters from the northern U.S. and south to Baja California. Within California, the long-eared owl is an uncommon resident or winter visitor throughout most of the northern part of the state, with the exception of the humid North Coast Range, Cascade Range, and higher elevations of the Sierra Nevada. It is a winter visitor in the Mojave Desert, and a very rare winter migrant along the southern coastline.

The long-eared owl is an uncommon breeding resident in southern California and there has been a marked decline of this species in southern California since the 1940's attributed to habitat

destruction and fragmentation, and possibly inadvertent disturbance of nest sites due to urban development in close proximity to historic nesting areas (Grinnell and Miller 1944; Remsen 1978; Bloom 1994). The long-eared owl is a CDFG CSC and has a CNDDB rank of G5S3, indicating that it is secure throughout its range, but has a restricted range or is rare in California.

Subregional Status

The NCCP raptor database includes nine historic nest sites for long-eared owl, of which eight are in the NCCP planning area (*Figure 197-M*). The ninth site is located in upper Talega Canyon mapped on Camp Pendleton just south of the RMV boundary. The eight historic nest sites in the NCCP planning area are located in the following locations: lower Talega Canyon near the confluence with Cristianitos Creek; lower La Paz Canyon; middle Gabino Canyon; Bell Canyon (two locations in NAS Starr Ranch); Fox Canyon (east of upper Bell in NAS Starr Ranch); Sulphur Canyon; and Arroyo Trabuco north of Santa Margarita Parkway. The long-eared owl also has been observed foraging in Chiquita Canyon approximately one mile north of San Juan Creek and farther north in the canyon (MBA 1996). Four long-eared owl breeding territories were observed along the CP alignment of the FTC; one located north of Ortega Highway in Cañada Gobernadora and three located in Cristianitos Canyon. These breeding territories are not included in the NCCP raptor database because they do not have documented nest site locations as do the database sites. All four territories were active in 1992 but were inactive in 1994 and 1995.

Biological Considerations

The long-eared owl typically occurs in dense riparian and live oak thickets near meadow edges, and nearby woodland and forest habitats, and occasionally in dense conifer stands at higher elevations. Riparian and other thickets with small, densely canopied trees appear to be a requirement for roosting and nesting. It utilizes vacant crow, raven, magpie, hawk, heron, and squirrel nests in a variety of trees with dense canopies. Long-eared owls have not been observed building their own nests. Nests are usually 10-50 feet above ground, and rarely in a snag cavity or on the ground (Karulus and Eckert 1974).

Long-eared owls usually hunt in open grassland areas, and occasionally in adjacent woodland and riparian habitats. It feeds predominately on voles (*Microtis* sp.) and other small rodents, occasionally other birds, including smaller owls, and small vertebrates. It forages by hunting for prey in low, gliding flight, then pouncing onto prey on ground.

Long-eared owls breed from valley foothill hardwoods up to ponderosa pine elevations from early March to late July. They typically produce one brood a year with a clutch size ranging

from 2 to 8 eggs, with 5 being average. Eggs are typically laid in April and May following an incubation period of 21-28 days by the female. Males do the feeding. Nestlings fledge in less than 50 days.

2.8 SOUTHWESTERN WILLOW FLYCATCHER

Species: Southwestern Willow Flycatcher (*Empidonax traillii extimus*)
Federal Status: Endangered
State Status: Endangered (full species)
CNDDB Rank: G5T1T2S1
Science Advisors Group: 3
Covered Species: Yes
Focal Monitoring Species: Yes
Planning Species: Yes

CONSERVATION GOAL

1. Manage habitat and populations of the southwestern willow flycatcher to maximize the likelihood that populations are sustained in the planning area, and in doing so "provide for recovery" on a subregional basis and "contribute to recovery" on a rangewide basis.

CONSERVATION STRATEGY

1. Create a permanent subregional Habitat Reserve that provides sufficient breeding habitat to support the identified *important population* in a *key location* in GERA to maximize the likelihood the species' persistence within the planning area.
2. Formulate a HRMP to provide for long-term protection and management of the southwestern willow flycatcher and its habitat and provide for restoration of riparian habitat to enhance the amount and quality of existing habitat.

HABITAT AND SPECIES CONSERVATION AND IMPACT ANALYSIS

The conservation analysis for the southwestern willow flycatcher is based both on site-specific information (*i.e.,* documented occurrences and the single identified *important population/key location*) and amount of suitable nesting habitat conserved, defined as southern willow scrub, arroyo willow riparian forest and black willow riparian forest. Similar to the vireo, habitat connectivity within the Subregion is not crucial for the willow flycatcher as long as discrete habitat patches within riparian systems support the necessary habitat features.

Table 2-16 provides a summary of the existing conditions, proposed conservation, and permanent and temporary impacts of southwestern willow flycatcher nest locations and willow riparian habitat in the planning area and within the Subarea 1 permit area. The description of

impacts and conservation below is limited to Subarea 1 which is the permit action area. The planning area conservation and impact estimates reported in *Table 2-16* include SOS and potential impact areas in Subareas 2, 3 and 4 and do not reflect future planning within those Subareas that may result in changes to the SOS and impact estimates.

TABLE 2-16
SOUTHWESTERN WILLOW FLYCATCHER
CONSERVATION AND IMPACT SUMMARY

	Acres	Percent	Locations	Percent
Planning Area				
Existing Total	1,124		7	
Habitat Reserve	615	55%	6	86%
Supplemental Open Space	209	19%	1	14%
Total Protected	824	74%	7	100%
Total Permanent Impact	75	7%	0	0%
Subarea 1				
Existing Total	698			
Habitat Reserve	615	88%	6	100%
Supplemental Open Space	10	1%	0	0%
Total Protected	625	89%	6	100%
Total Permanent Impact	72	10%	0	0%
Total Temporary Impact	36		0	

Subarea 1 Impacts

The proposed Covered Activities would result in direct, permanent impacts to 72 acres (10 percent) of willow riparian habitat (southern willow scrub, arroyo willow riparian forest and black willow riparian forest) but no direct impacts to documented southwestern willow flycatcher nest locations (*Table 2-16* and *Figure 172-M*). The proposed Covered Activities also would result in temporary direct impacts to 36 acres of habitat, but no nest sites (*Table 2-16*).

Subarea 1 Conservation

All six southwestern willow flycatcher nest locations and 615 acres (88 percent) of suitable riparian habitat (southern willow scrub and arroyo willow riparian forest) would be conserved in the Habitat Reserve (*Table 2-16* and *Figure 172-M*). An additional 10 acres (1 percent) of habitat are in Subarea 1 SOS, bringing the total conservation to all six nest locations and 625 acres (89 percent). The single *important population/key location* in GERA would be in the Habitat Reserve.

ADAPTIVE MANAGEMENT PROGRAM

Management of the southwestern willow flycatcher and its habitat will consider a number of environmental stressors that have been identified for this species, including:

- Altered fire regime
- Too frequent flood regime
- Too infrequent flood regime
- Precipitation
- Urbanization adjacent to Reserve
- Exotic plant invasion
- Exotic animals
- Cattle-related impacts
- Upstream diversion
- Groundwater extraction
- Roads and trails

The USFWS's proposed critical habitat designation (2004b), and incorporated by reference into the final critical habitat designation (USFWS 2005a), states that the primary cause of the flycatcher's decline is loss and modification of habitat. Stressors within breeding areas that reduce habitat quality, in terms of extent and structure, therefore are important management considerations. According to the USFWS (2004b) threats (stressors) to willow flycatcher habitat quality include: **(1)** reductions in water flows; **(2)** interruption of natural hydrological events and cycles; **(3)** physical modifications to streams; **(4)** modifications of native plant communities by invasion of exotic species; and **(5)** direct removal of riparian vegetation. The mechanisms that cause the loss and modification of suitable riparian habitat include "water-management and land-use practices such as dam operations, water diversion and groundwater pumping, river channelization and bank stabilization, control of phreatophytes (plants whose roots are associated with the water table), livestock grazing, recreation, fire, agricultural development, urbanization, and changes in riparian plant communities." (69 Federal Register, 60709-60710, 10/12/04)

The main identified stressor of the southwestern willow flycatcher in the Habitat Reserve is invasive plant species such as giant reed and pampas grass. Although GERA, which supports the single *important population/key location* in the planning area, is relatively free of invasive species, there are small patches of giant reed that will need to be controlled to prevent them from spreading. Altered hydrology in GERA also may be a significant issue for this species. GERA is vulnerable to perennialized streamflow impacts to the natural meandering of the mainstream and poor water quality from the altered sediment regime stemming from upstream urban land uses. Maintaining and enhancing habitat quality for the southwestern willow flycatcher in

GERA thus is paramount for conservation of this species in the Habitat Reserve. The willow flycatcher nests in riparian woodlands along streams and rivers with mature, dense stands of willows (*Salix* spp.), cottonwoods (*Populus* spp.) or smaller spring fed or boggy areas with willows or alders (*Alnus* spp.) (Sedgwick and Knopf 1992). It uses nests from ground level to about 13 feet above ground in thickets of trees and shrubs approximately 13-23 feet high with a high percentage of canopy cover and dense foliage. The nest site plant community typically is even-aged, structurally homogeneous and dense (Brown 1988; Whitfield 1990; Sedgwick and Knopf 1992). Historically, the willow flycatcher nested primarily in willows and mule fat with a scattered overstory of cottonwood (Grinnell and Miller 1944). Although the species still nests in willows where available, with recent non-native invasions of riparian plant communities in the region, the flycatcher also is known to nest in thickets dominated by tamarisk and Russian olive (Hubbard 1987; Brown 1988). Regardless of the plant species composition or height, occupied sites always have dense vegetation in the patch interior and in most cases this dense vegetation occurs within the first 9-13 feet above ground (USFWS 2001b). This species usually nests in the upright fork of a shrub but occasionally nests on horizontal limbs within trees and shrubs (Terres 1980). Typically, sites selected as song perches by male willow flycatchers show higher variability in shrub size than do nest sites and often include large central shrubs. Nest sites are distinguished by high willow density and low variability in willow patch size and bush height. Habitats avoided for either nesting or singing typically are riparian zones with greater distances between willow patches and individual willow plants (Sedgwick and Knopf 1992). Nesting willow flycatchers invariably prefer areas with surface water nearby (Phillips *et al.* 1966). In almost all cases, slow-moving or still surface water and or saturated soils are present at or near the breeding sites during normal precipitation years (USFWS 2001b). Suitable flycatcher habitat is most likely to develop in more extensive patches along lower gradient streams with wider floodplains, although there are exceptions to this habitat characterization (*e.g.*, San Luis Rey River) (USFWS 2001b). Suitable habitat is less likely to occur in steep, confined streams characteristic of narrow canyons (USFWS 2001b).

Brown-headed cowbird nest parasitism also is a documented stressor on the willow flycatcher in California and the Grand Canyon area Arizona where parasitism rates of 50 to 80 percent have been observed (Sogge *et al.* 1997; USFWS 1995; Verner and Ritter 1983). Habitat fragmentation favors mesopredators (*e.g.,* weasels, raccoons, striped skunks opossums and foxes) that may be predators of willow flycatchers. Urban-related predator such as cats also may pose a threat to willow flycatchers. In addition, Argentine ants, which are abundant in riparian areas adjacent to urban landscapes are a potential threat to willow flycatchers and other nesting birds in riparian habitats (*e.g.*, Suarez *et al.* 1998). The extent to which brown-headed cowbird parasitism, mesopredators and urban-related predators, and Argentine ants pose a threat to willow flycatchers in the planning area, however, is unknown. Development, roads and trails adjacent to or within riparian areas introduce potential edge effects such as noise, human activity,

pets, etc. that can potentially directly disrupt breeding and nesting activities of willow flycatchers.

Although not a current problem in the Habitat Reserve, fire is a potential stressor that directly destroys riparian vegetation and also can result in extensive erosion that directly impacts riparian systems through increased sediments.

Goals

1. Maximize the likelihood of the persistence of the physiographic diversity of riparian/wetland habitats and associated focal species in the Habitat Reserve.
2. Restore riparian/wetland habitats and enhance the quality of degraded riparian/wetland habitats in the Habitat Reserve such that the net habitat value of the existing riparian/wetland habitat system is preserved.
3. Manage fire regimes to sustain and enhance riparian/wetland quality in the Habitat Reserve.
4. Manage exotic invasions of riparian/wetland habitats such as giant reed, pampas grass, tamarisk, and castor bean.
5. Protect and manage the southwestern willow flycatcher nesting population in the Habitat Reserve.

Management and Monitoring Objectives (number of goal met by objective in parentheses)

The Conservation Strategy objectives for the willow flycatcher listed below include actions and measures that address areas beyond the GERA *important population/key location*. Riparian protection, management and enhancement will provide the opportunity for willow flycatchers to expand their local occupation to other riparian areas.

Objective 1: Implement Conservation Strategy to protect and manage approximately 615 acres of riparian/wetlands in the Habitat Reserve (actual acreage will vary in relation to natural and anthropogenic environmental effects such as floods, wildfires and drought) (Goals 1 & 2).

Objective 2: Remap vegetation communities in Habitat Reserve within two (2) years of executing IA to establish a baseline for long-term tracking of the Reserve (Goals 1, 2 & 4).

Objective 3: Update vegetation community map at 5-year intervals (Goals 1, 2 & 4).

Objective 4: Collect regional climate, weather and air quality information to examine potential correlations between vegetation and population changes and environmental variables (Goals 1, 2 & 5).

Objective 5: Provide for no net loss of acreage and function of the waters of the U.S./State (Goals 1 & 2).

- Implement riparian/wetland restoration component of Habitat Restoration Plan.

Objective 6: Maintain/restore riparian/wetland ecosystem integrity and maintain and/or restore floodplain connection (Goals 1 & 2).

- Address historic meander conditions and excessive sediment input from upstream land uses in Gobernadora Creek, including construction of a detention/water quality basin below Coto de Caza.
- Conduct riparian/wetland restoration on a case-by-case basis over the long-term management and monitoring of the Habitat Reserve.

Objective 7: Maintain and/or restore sediment sources and transport equilibrium (Goals 1 & 2).

- Monitor channel morphology using transect lines for measuring cross-sectional profiles to monitor sediment movement (transport and deposition), peak discharges and changes in stream morphology.

Objective 8: Conduct annual botanical and wildlife field studies within predesignated sample plots to monitor fine-grained changes in riparian/wetland habitat for the southwestern willow flycatcher and other focal riparian and wetland species (Goals 1, 2, 4 & 5).

Objective 9: Implement Wildland Fire Management Plan such that a sub-basin watershed and riparian/wetlands habitats and southwestern willow flycatcher nesting areas are protected to the extent feasible (Goals 1, 2, 3 & 5).

Objective 10: Implement Invasive Species Control Plan to manage invasive exotic species in riparian/wetland habitats (Goals 1, 2, 4 & 5).

- Control major infestations of giant reed in San Juan Creek and Arroyo Trabuco, and smaller infestations in GERA and Cristianitos Creek.
- Control major infestations of tamarisk in Cristianitos Creek and isolated clusters in Gabino and San Juan creeks.
- Control pampas grass infestation in Arroyo Trabuco, San Juan Creek and Cristianitos Creek.

- Control substantial castor bean infestation Cristianitos Creek and scattered occurrences in Arroyo Trabuco and San Juan Creek.
- Control Spanish sunflower occurrences Gobernadora Creek (GERA) and monitor/conduct early eradication in Arroyo Trabuco, Chiquita Creek, San Juan Creek and Cristianitos Creek as needed.
- Assess brown-headed cowbird parasitism risk and conduct cowbird trapping or some equivalent form of cowbird control such as mist netting as needed.
- Assess and control Argentine ants where determined to pose a risk to southwestern willow flycatcher nestlings and fledglings and/or to native prey.

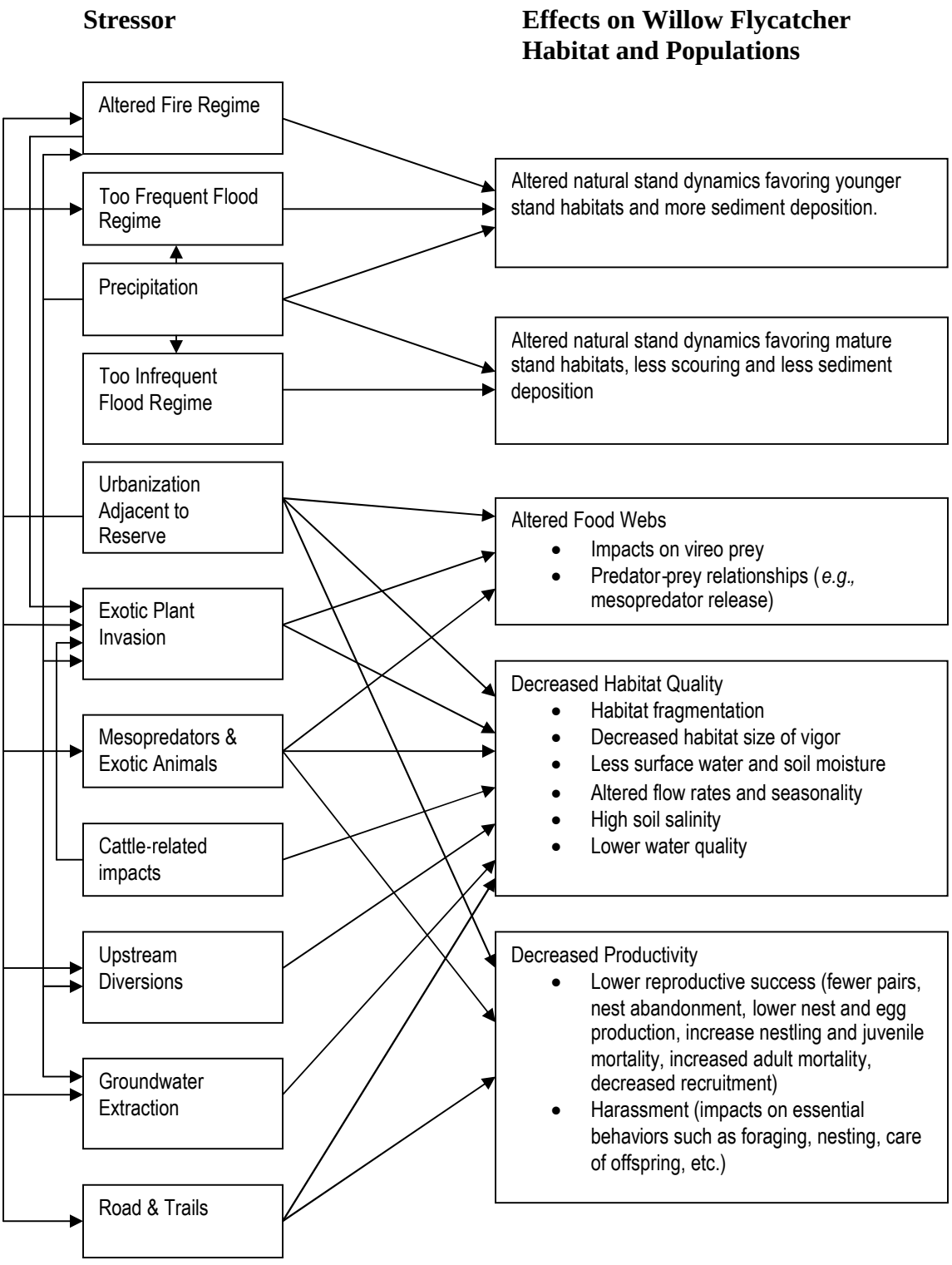
Conceptual Model

Yes – See figure below.

Regional and Subregional Management Information Needs

- The appropriate stand age to maintain high quality breeding habitat; *i.e.*, such that a robust understory of willows and other species is present.
- Whether the apparent increase in willow flycatcher breeding in the subregion is a result of increased local habitat suitability or due to overall increased populations in southern California.
- The effectiveness of habitat restoration, including revegetation and enhancement, in supporting nesting populations of willow flycatchers.
- Understanding of the metapopulation dynamics of the species.
- Function and importance of migration stopover sites that may not themselves provide breeding habitat.
- Impact of human activities (*e.g.*, noise, roads, public recreation activities, etc.).
- Whether the lack of surface water is a natural/artificial limitation on flycatcher occupation of riparian habitat in the planning area.
- Whether brown-headed cowbird parasitism poses a significant risk to nesting willow flycatchers in the Habitat Reserve.

Southwestern Willow Flycatcher Conceptual Stressor Model



- Whether Argentine ants pose a significant direct risk to willow flycatcher nestlings and fledglings in the Habitat Reserve and indirectly to flycatchers through impacts on the native insect prey population.
- Whether urban-related predators pose a significant risk to nesting willow flycatchers in the Habitat Reserve.
- Whether certain land uses adjacent to occupied willow flycatcher breeding habitat have adverse effects on breeding success, such as noise, human activity, etc.

Level of Management and Monitoring Priority - Medium

Although the breeding population of the southwestem willow flycatcher is small and essentially limited to GERA, at this time there are no identified imminent threats to the willow flycatcher in the Habitat Reserve that require immediate action. However, the small patches of giant reed in GERA need to be controlled. The perennialized streamflow impacts to the natural meandering of the mainstream in Gobernadora and poor water quality from the altered sediment regime stemming from upstream urban land uses also needs to be addressed. Brown-head cowbird parasitism and Argentine ants also will be management issues that will be addressed as buildout of the project area progresses. It is anticipated that initiation of cowbird trapping and Argentine ant assessment and potential management actions in GERA will occur with construction in PA 3.

Level of Monitoring (*e.g.*, Species-specific, habitat, landscape, combination)

Monitoring will be conducted both at a species-specific and habitat landscape level.

Monitoring Variables

Listed below are suggested species- and habitat-based monitoring variables. The detailed monitoring program for the southwestern willow flycatcher will be developed by the Reserve Manager and Science Panel.

Species-specific Monitoring Variables

1. Status of breeding population
2. Proportion of "suitable" habitat occupied
3. Brown-headed cowbird nest parasitism
4. Argentine ant impacts
5. Urban-related predator impacts

Habitat-based Monitoring Variables

1. Vegetation communities long-term status
2. Relative cover of different native plant species
3. Proportion of exotic plant species/native plant species
4. Results of habitat restoration activities, including invasive species controls, riparian/wetland restoration, and creek and soils stabilization programs

Abiotic Monitoring Variables

1. Climate
2. Weather
3. Air quality
4. Water quality and runoff

Management Actions

The following management actions implemented as part of the HRMP will directly benefit the southwestern willow flycatcher and its habitat:

- Habitat Restoration Plan
- Wildland Fire Management Plan
- Invasive Species Control Plan

The Habitat Restoration and Invasive Species Control plans are key to management of the southwestern willow flycatcher. The GERA population may be potentially affect by stream perennialization and erosion/sediment impacts resulting from excessive surface and subsurface flows from upstream development. Management actions designed to address these stressors and enhance net habitat value for the southwestern willow flycatcher include: **(1)** subject to the discretion by the Reserve Manager and Science Panel, revegetation in Sulphur Canyon to reduce the generation of fine sediments currently affecting downstream areas within Gobernadora Creek; **(2)** management of excessive surface and subsurface flows from Coto de Caza through the Gobernadora Multi-purpose Basin to protect existing riparian habitat downstream of the knickpoint in GERA and potential new habitat upstream of the knickpoint; **(3)** potential restoration of the historic meander and associated habitat above the knickpoint and potential restoration in the "fertile crescent" area near the mouth of Gobernadora Creek to provide additional flycatcher habitat; **(4)** addressing upstream land use-induced channel incision and erosion through the Gobernadora Multi-purpose Basin; **(5)** invasive plant species control, including giant reed in GERA; **(6)** conservation of upstream sources of coarse sediments and maintenance/repair of episodic flood events to help maintain natural succession of southern willow scrub habitat; **(7)** implementation of the coordinated WQMP to address hydrologic

conditions of concern and pollutants of concern; (**8)** control of Argentine ants; and **(9)** brown-headed cowbird trapping where needed.

"Coordinated Management Plans" that are not formal elements of the HRMP but will also benefit the southwestern willow flycatcher are:

- Grazing Management Plan
- Water Quality Management Plan (as noted above)

The reader is referred to the individual management plans for more details.

Cattle normally are excluded from GERA. However, grazing would occur in GERA once every three years for fuel modification outside the flycatcher breeding season (February 15-July 15). This periodic grazing in GERA will not affect the flycatcher.

Potential Target Studies

Several management information needs relevant to management of the southwestern willow flycatcher were listed above, some of which could be addressed at the subregional scale and would help inform management of the Habitat Reserve. Other management information needs, particularly those related to rangewide persistence of the species (*e.g.,* landscape habitat fragmentation) are best studied at a rangewide scale. The following are potential target studies that could be implemented at the subregional scale:

- Assessment of impacts of brown-headed cowbirds and evaluation of the effects of cowbird controls
- Assessment of impacts of Argentine ants and evaluation of the effects of ant controls related to:
    - Direct impacts on nestlings and fledglings
    - Indirect impacts on prey
- Evaluation of impacts of urban-related predators on willow flycatchers
- Evaluation of restoration effects on breeding populations, including invasive species controls, active revegetation and upstream restoration in Gobernadora to reestablish natural creek meander and control fine sediments
- Evaluation of adverse edge effects on occupation and/or breeding success

SPECIES ACCOUNT

Rangewide and Regional Status

The full species willow flycatcher (*Empidonax traillii*) breeds throughout much of North America, absent only from the Central Plains and southeastern U.S. The breeding range of the subspecies southwestern willow flycatcher (*E. t. extimus*) includes southern California, Arizona, New Mexico, extreme southern portions of Nevada and Utah, far western Texas, southwestern Colorado, and extreme northwestern Mexico (USFWS 1993b). Within California, the specific breeding range for this subspecies includes the Owens Valley; the south fork of the Kern River; the Los Angeles Basin (Unitt 1987; Zeiner *et al.* 1990); the Santa Ynez River near Buellton; the Prado Basin riparian forest in Riverside County; the Santa Margarita and San Luis Rey rivers in San Diego County; Middle Peak in the Cuyamaca Mountains; near Imperial Beach (Small 1974); and most recently lower Gobernadora Creek in southern Orange County.

The migration routes and winter destinations of the southwestern willow flycatcher are not well understood. They most likely winter in Mexico, Central America, and perhaps northern South America; however, the habitats used by willow flycatchers on the wintering grounds are unknown (USFWS 1993b). The species has been reported to sing and defend winter territories in Mexico and Central America.

Based on survey data collected between 1993 and 1996, a total of 549 territories was estimated for the entire breeding range of the southwestern willow flycatcher. The most recent published estimate is for 2004 with 1,256 territories in 265 sites (Durst *et al.* 2005). Based on Durst *et al.* (2005), *w*ithin California, there was an estimated 200 breeding territories at 91 sites in 2004 which appear to be scattered around southern California. The estimate for California includes 24 territories in the Santa Margarita River and 36 territories in the Santa Ana River.

Subregional Status

The southwestern willow flycatcher is known to nest in two locations in the planning area; in GERA and in an isolated patch of riparian habitat in Talega development open space in the year 2000 (*Figure 172-M*). A calling male was detected in 1998 in lower Chiquita Canyon by Harmsworth Associates but there was no evidence of breeding activity (reported in Dudek 1998). The GERA location is the only *important population* of willow flycatcher in the planning area and also is considered a *key location* for the species (No. 1 on *Figure 172-M*). Planning area-wide surveys in 1998 failed to find the willow flycatcher elsewhere in the planning area and the habitat in these areas was judged to be generally unsuitable for the species (Dudek 1998). However, as with the vireo, there is a possibility that this species could

occur in other riparian areas, and the observation of a breeding pair in the isolated riparian area on Talega in 2000 suggests that occasional or sporadic breeding at other sites in the planning area is possible.

Biological Considerations

Southwestern willow flycatchers breed in relatively dense riparian habitats in all or parts of seven southwestern states from near sea level in California to over 2,600 m (8,500 ft) in Arizona and Colorado (USFWS 2001b). Suitable riparian breeding habitat occurs along streams and rivers with mature, dense stands of willows (*Salix* spp.), cottonwoods (*Populus* spp.) or smaller spring fed or boggy areas with willows or alders (*Alnus* spp.) (Sedgwick and Knopf 1992).

The southwestern willow flycatcher nests from ground level to 4 m (13 ft) above ground in thickets of trees and shrubs approximately 4-7 m (13-23 ft) with a high percentage of canopy cover and dense foliage. The nest site plant community typically is even-aged, structurally homogeneous and dense (Brown 1988; Whitfield 1990; Sedgwick and Knopf 1992). Historically, the willow flycatcher nested primarily in willows and mule fat with a scattered overstory of cottonwood (Grinnell and Miller 1944). Although the species still nests in willows where available, with recent non-native invasions of riparian plant communities in the region, the flycatcher also is known to nest in thickets dominated by tamarisk and Russian olive (Hubbard 1987; Brown 1988). Regardless of the plant species composition or height, occupied sites always have dense vegetation in the patch interior and in most cases this dense vegetation occurs within the first 3-4 m (9-13 ft) above ground (USFWS 2001b). This species usually nests in the upright fork of a shrub but occasionally nests on horizontal limbs within trees and shrubs (Terres 1980). Typically, sites selected as song perches by male willow flycatchers show higher variability in shrub size than do nest sites and often include large central shrubs. Nest sites are distinguished by high willow density and low variability in willow patch size and bush height. Habitats avoided for either nesting or singing typically are riparian zones with greater distances between willow patches and individual willow plants (Sedgwick and Knopf 1992). Nesting willow flycatchers invariably prefer areas with surface water nearby (Phillips *et al.* 1966). In almost all cases, slow-moving or still surface water and or saturated soils are present at or near the breeding sites during normal precipitation years (USFWS 2001b). Suitable flycatcher habitat is most likely to develop in more extensive patches along lower gradient streams with wider floodplains, although there are exceptions to this habitat characterization (*e.g.*, San Luis Rey River) (USFWS 2001b). Suitable habitat is less likely to occur in steep, confined streams characteristic of narrow canyons (USFWS 2001b).

Males typically arrive in southern California at the end of April and females arrive approximately one week later. They have a home range larger than the defended territory and

territorial defense begins in late May. Territory sizes range from 0.24 to 0.45 ha (0.6 to 1.1 ac) and territories can be dense in suitable habitat; the documented maximum is six females and five males in only 4.4 ha (10.9 ac) (San Diego Natural History Museum 1995). Sogge *et al.* (1997) found territorial flycatchers in habitat patches ranging from 0.5 to 1.2 ha (1.2 to 3.0 ac). Two habitat patches of 0.5 (1.2 ac) and 0.9 ha (2.2 ac) each supported two territories in this study (Sogge *et al.* 1997). Alternatively, southwestern willow flycatchers do not always pack their territories into all available space within a habitat (USFWS 2001b). Instead, some territories may be bordered by undefended riparian habitat that could be important in attracting flycatchers to the site or in providing post-nesting use and dispersal areas.

The southwestern willow flycatcher usually is monogamous within a nesting season, but not all territorial males are mated (San Diego Natural History Museum 1995). Pairs typically raise one brood per year (USFWS 1993b). Clutch sizes range from two to five, with an average of 3.4 eggs in coastal southern California. Southwestern willow flycatcher fledglings leave the nest at age 12-15 days post-hatching (usually in early July) and disperses from their natal territory at a minimum age of 26-30 days (USFWS 1993b). About 25 percent of adults return to their territory from the previous year. At least 20 percent of juveniles return to their "natal areas" which are usually within 2 to 4 km (1.6 to 2.5 mi) of their natal territory. Although nest reuse is not common by the southwestern willow flycatcher, recent studies have reported a low percentage of nest reuse by this species (Yard and Brown 1999). Adults usually depart from breeding territories between mid-August and early September (San Diego Natural History Museum 1995). It is an insectivore that forages within and above dense riparian vegetation, taking insects on the wing or gleaning them from foliage (USFWS 1993b). This species also forages in areas adjacent to nest sites which may be more open (USFWS 1995).

Protection Recommendations

- Protect southern willow scrub in GERA that provides nesting habitat for southwestern willow flycatcher.

Management Recommendations

- Implement a cowbird trapping program to mitigate for impacts to existing habitat within the Gobernadora sub-basin and for potential impacts associated with future development. The cowbird trapping program will be evaluated on an annual basis and trap locations and trapping effort will be adjusted as part of the overall Adaptive Management Program

(*e.g.*, if the number of trapped cowbirds drops to a prescribed threshold, the trapping program may be terminated or otherwise modified).

- Protect downstream habitat in GERA and lower Cristianitos and San Mateo creeks for the southwestern willow flycatcher by maintaining hydrology, water quality and sediment delivery and minimizing additional loadings of nutrients or toxics.

Restoration Recommendations

- Implement a restoration program in Gobernadora Creek which addresses (**1)** the historic creek meander above the knickpoint; and **(2)** upstream land use induced channel incision and erosion, including potentially excessive surface and groundwater originating upstream.

- Identify likely causes of erosion and potential measures to rectify causes of headcutting in the lower portion of Gobernadora Creek.

2.9 TRICOLORED BLACKBIRD

Species:	Tricolored Blackbird
Federal Status:	Federal Species of Concern, USFWS Bird of Conservation Concern
State Status:	Special Concern Species
CNDDB Rank:	G2G3S2
Other:	Science Advisors Group 3 Species
Covered Species:	Yes
Focal Monitoring Species:	No
Planning Species:	Yes

CONSERVATION GOAL

1. Manage habitat and nesting colonies of the tricolored blackbird to maximize the likelihood that colonies are sustained in the planning area, and in doing so "provide for recovery" on a subregional basis and "contribute to recovery" on a rangewide basis.

CONSERVATION STRATEGY

1. Create a permanent subregional Habitat Reserve that provides sufficient breeding and foraging habitat in large, contiguous patches to support identified nesting colonies and to maximize the likelihood of the species' persistence within the planning area.
2. Formulate a HRMP to provide for long-term protection and management of the tricolored blackbird and its nesting and foraging habitat.

HABITAT AND SPECIES CONSERVATION AND IMPACTS ANALYSIS

Conservation of the tricolored blackbird in the Habitat Reserve and SOS, in terms of conservation of viable nesting colonies and surrounding foraging habitat (grassland and agriculture), was analyzed by determining which historic and recent nest sites would be conserved and how much suitable foraging habitat would be conserved and developed within a four-mile radius of each of these sites, including SOS beyond Subarea 1 and foraging habitat on Camp Pendleton. Five recent nest sites were selected for the analysis: Middle Chiquita (formerly called the Upper Chiquita colony); Coto de Caza; Radio Tower Road; Verdugo; and Lower Gabino (aka Riverside Cement colony). It is difficult to predict where tricolored blackbirds will nest from year-to-year, so the conservation analysis presented here is somewhat limited in predicting the conservation of future nest sites. Also, restoration has been shown to be quite successful in attracting nesting colonies (*e.g.*, the San Jacinto ponds), so new nesting areas

conceivably could be created. However, the analysis of conserved foraging habitat in the area is more straightfoward and indicates whether adequate foraging habitat will be available to support nesting colonies. The four-mile radius for foraging habitat is based on Orians' (1961) finding that tricolored blackbirds tend to forage within about four miles of nesting sites. There is no available information on the minimum amount of foraging habitat needed to sustain a colony of tricolored blackbirds, and in southern Orange County, at least, the limit on nesting colonies in the planning area in the past probably has been available nesting areas, considering the 18,000+ acres of existing grassland and agriculture in the Subregion. For the purposes of this analysis it was assumed that at least 1,000 acres of foraging habitat within four miles of a nest site would be more than adequate to sustain the relatively small nesting colonies that occur in the study area (*e.g.*, at most a few thousand birds in southern Coto de Caza compared to colonies of 100,000+ birds in the Central Valley).[2]

The conservation analysis also incorporates the Ranch Plan GPA/ZC EIR MM 4.9-31 that requires avoidance of wetland/riparian habitat for the tricolored blackbird at the mouth or Verdugo Canyon.

Subarea 1 Impacts

Under the proposed Covered Activities, the only relatively recent documented nesting site that would be directly impacted by the proposed Covered Activities is the Trampas Canyon colony in PA 5. Documented recent and historic nesting areas would be conserved within the Narrows area of Chiquita Canyon, San Juan Creek (including at the mouth of Verdugo Canyon), and south of the Ranch residence south of Ortega Highway and the lower Gabino site. The Coto de Caza *important population/key location* is located in Subarea 3 and would not be affected by the proposed Covered Activities. For the purpose of this analysis, it is assumed that the Coto de Caza nesting area will remain viable.

Table 2-17 presents the analysis of foraging habitat within four miles of historic and recent nesting sites. *Figure 198-M* illustrates the potential foraging zones for each of the nest sites. The key columns in *Table 2-17* are those for Subarea 1 for each of the nesting sites. Impacts to suitable foraging habitat in Subarea 1 within four miles of nesting sites ranges from 1,382 acres (23 percent of suitable habitat in within four miles in Subarea 1) for the Middle Chiquita site to 3,168 acres (39 percent) for the Radio Tower site. Impacts to additional foraging habitat in

[2] Another way of considering "carrying capacity" of foraging habitat for the tricolored blackbird is to calculate the ratio of colony size to available habitat acres. For example, if colonies forage within a four-mile radius of the nesting site, a 32,000-acre foraging area should be adequate to sustain a colony of 100,000 birds (assuming that all 32,000 acres are suitable foraging habitat), yielding a ratio of birds to habitat of 3 birds/1 acre of foraging habitat. Assuming similar prey productivity as the Central Valley, a 3:1 ratio indicates that 333 acres would be adequate to support a colony of 1,000 birds in the study area. Thus the assumption that 1,000 acres of foraging habitat is adequate for colonies in the study area is conservative.

Subarea 1 are relatively small, within 16 acres (8 percent) for the Middle Chiquita site and 145 acres (9 percent) for the Radio Tower site. No impacts occur outside Subarea 1 in potential foraging zones for the other nesting sites.

Subarea 1 Conservation

The proposed Covered Activities would result in conservation of foraging habitat in the Habitat Reserve within four miles of nesting sites ranging from a low of 2,084 acres for the Lower Gabino Canyon site (43 percent of total existing foraging habitat in the four-mile radius within Subarea) to a high of 4,702 acres (66 percent) for the Coto de Caza (*Table 2-17*). All sites except the Lower Gabino site, at 2,084 acres, have at least 4,000 acres of potential foraging habitat in the Habitat Reserve within the four-mile zone. Each of the sites also has several hundred acres of potential foraging habitat in Subarea 1 SOS in Prima Deshecha and/or NAS Starr Ranch within the four-mile zone, ranging from 203 acres for the Verdugo Canyon site to 428 acres for the Radio Tower site. Additional SOS outside of Subarea 1 is variable, ranging from 106 acres for Verdugo Canyon to 1,571 acres for Radio Tower.

Under the assumption that at least 1,000 acres of suitable foraging habitat within four miles of a nesting site are needed to sustain the site, and based on this conservation analysis, it can be concluded that the availability of the suitable foraging habitat will not be a limit on the viability of historic and recent tricolored blackbird nest sites in the Habitat Reserve.

ADAPTIVE MANAGEMENT PROGRAM

Stressors

Management of the tricolored blackbird and its nesting and foraging habitat will consider a number of environmental stressors identified for this species, including:

- Water diversions and land conversion
- Changed agricultural practices (different crops or timing of harvesting)
- Predation by native and non-native/urban-related species
- Severe or extreme weather conditions (storms, cold)
- Non-native invasive species
- Pollutants and biocides

TABLE 2-17
CONSERVATION AND IMPACTS FOR TRICOLORED BLACKBIRD FORAGING HABITAT WITHIN A FOUR-MILE RADIUS OF NESTING AREAS

Habitat Reserve and SOS Acres

	Middle Chiquita				Coto de Caza				Radio Tower				Verdugo Canyon				Lower Gabino Canyon			
Subareas	**1**		**3**	**4**	**1**		**3**	**4**	**1**		**3**	**4**	**1**		**3**	**4**	**1**		**3**	**4**
	Habitat Reserve	**SOS**	**SOS**	**SOS**	**Habitat Reserve**	**SOS**	**SOS**	**SOS**	**Habitat Reserve**	**SOS**	**SOS**	**SOS**	**Habitat Reserve**	**SOS**	**SOS**	**SOS**	**Habitat Reserve**	**SOS**	**SOS**	**SOS**
Grassland	2,593	279	43	163	2,870	327	39	38	3,252	428	2	1,537	3,545	203	2	70	2,062	359	0	878
Agriculture	1,873	0	46	19	1,832	0	46	14	1,198	0	24	8	813	0	34	0	22	0	0	0
Total	**4,466**	**279**	**89**	**182**	**4,702**	**327**	**85**	**52**	**4,450**	**428**	**26**	**1,545**	**4,358**	**203**	**36**	**70**	**2,084**	**359**	**0**	**878**
% of Total	**73%**	**5%**	**100%**	**92%**	**66%**	**5%**	**100%**	**100%**	**55%**	**5%**	**100%**	**91%**	**62%**	**3%**	**100%**	**100%**	**43%**	**7%**	**100%**	**100%**

Development Acres

	Middle Chiquita		Coto de Caza	Radio Tower		Verdugo Canyon	Lower Gabino Canyon
Subareas	**1**	**4**	**1**	**1**	**4**	**1**	**1**
Grassland	323	16	649	1,746	92	1,272	2,010
Agriculture	1,059	0	1,415	1,422	53	1,246	450
Total	**1,382**	**16**	**2,064**	**3,168**	**145**	**2,518**	**2,460**
% of Total	**23%**	**8%**	**29%**	**39%**	**9%**	**36%**	**50%**

- Human disturbances

This discussion of environmental stressors is in large part summarized from Beedy and Hamilton (1997) *Tricolored Blackbird Status Update and Management Guidelines.*

The impact of water diversion and land conversion on tricolored blackbirds, resulting in the loss of suitable breeding and foraging habitat, is clear. Even in the absence of permanent conversion of foraging habitat to urban uses, changes in the types and/or timing of agricultural uses can affect tricolored blackbirds. For example, changing from grain or alfalfa fields to row crops can eliminate foraging habitat. Harvesting during the breeding season can directly disturb colonies and reduce foraging habitat during a critical season. Even the activity of scientific researchers has the potential to disrupt breeding activity and trails created by human observers can create trails that can be used by mammalian and avian predators.

Predation by native and non-native species appears to be a major cause of nest failures. Native predators such as black-crowned night apparently can devastate nesting efforts and eliminate almost all nests. Corvids such as ravens, crows and great-tailed grackles appear to be an increasing problem. Native and non-native mesopredators include skunks, opossums, raccoons and feral cats. Coyotes, which keep mesopredators in check, are also a significant predator.

Severe or prolonged storms may cause hypothermia and mortality of adults and nestlings.

Poisoning, either deliberate (to control crop depredation) or indirect, have been cited as contributing to the continued population decreases (Beedy *et al.* 1991). Contamination by trace elements (selenium) and pesticides are a potential cause of nesting failures (Beedy and Hayworth 1987). Loss of colonies and the failure of eggs to hatch also have been attributed to chemicals used for mosquito abatement and aerial herbicide applications. While contaminants can have direct effects on individuals and eggs, perhaps more importantly, they may also indirectly affect the food supply.

The proposed Covered Activities relating to long-term management do not include water diversions, and land conversions, beyond what was discussed in the impacts section above. Changed agricultural practices also should not be a future management issue for the tricolored blackbird. Current Ranch agricultural practices, such as cattle grazing and barley cultivation, will not change significantly in the future. The GMP addresses grazing management, which will be conducted much as it has been historically, including regular planting of barley fields. About 50 acres of new orchard will be planted in the PA 6 and 7 areas, but this will not have a significant impact on tricolored blackbirds.

The main focus of the management program will be on pollutants and predation by urban-related predators (*e.g.*, cats) that appear to have significantly contributed to the decline of this species. Poisoning, either deliberate (to control crop depredation) or indirect, and increased disturbance by humans from agriculture operations such as harvesting, have been cited as contributing to the continued population decreases (Beedy *et al.* 1991). Contamination by trace elements (selenium) and pesticides are a potential cause of nesting failures (Beedy and Hayworth 1987). Contaminants can have direct effects on individuals, but perhaps more importantly, may indirectly affect the food supply.

Goals

Goals for protecting and managing the tricolored blackbird and its habitat include the following:

1. Protect and manage historic nesting colony sites within the Habitat Reserve.
2. Protect and manage adequate foraging habitat within approximately 4 miles of historic breeding sites.

Management and Monitoring Objectives (number of goal met by objective in parentheses)

Objective 1: Implement Conservation Strategy to protect and manage five historic colony sites listed in *Table 2-17* and at least 2,000 acres suitable foraging habitat in the Habitat Reserve within four miles of the five historic colony sites (actual acreage will vary in relation to natural and anthropogenic environmental effects such as wildfires and drought) (Goals 1 & 2).

Objective 2: Remap vegetation communities in Habitat Reserve within two (2) years of executing IA to establish a baseline for long-term tracking of the Reserve (Goals 1 & 2).

Objective 3: Update vegetation community map at 5-year intervals (Goals 1 & 2).

Objective 4: Collect regional climate, weather and air quality information to examine potential correlations between vegetation and population changes and environmental variables (Goals 1 & 2).

Objective 5: Conduct periodic field studies of nesting colonies and foraging areas to assess population sizes and trends (Goals 1 & 2).

Objective 6: Implement Invasive Species Control Plan to manage invasive exotic plant species in wetland areas that have the potential to support nesting colonies (Goals 1 & 2).

Conceptual Model

Yes – see figure below.

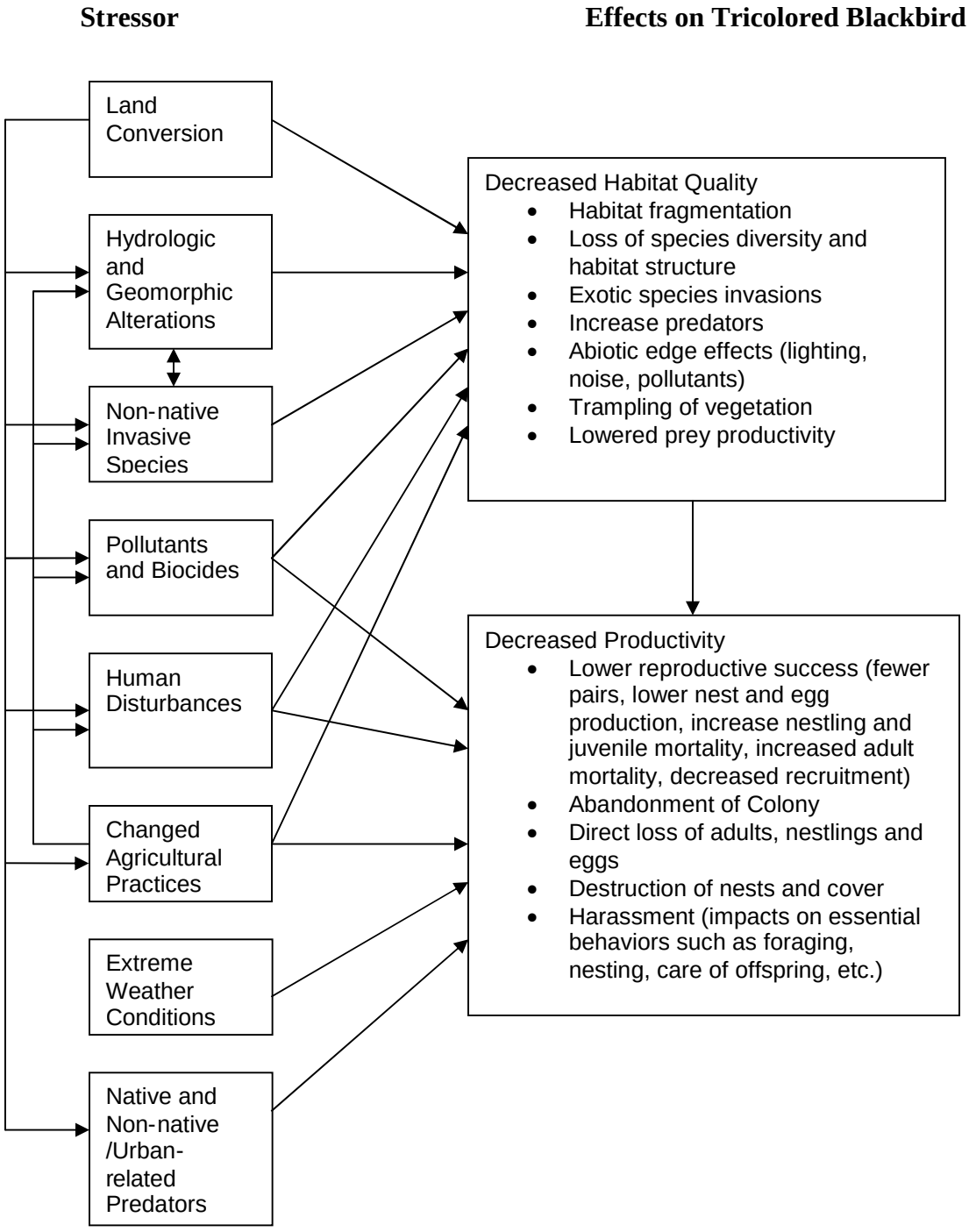
Regional and Subregional Management Information Needs

- The current population trends of the species in California.
- The nature of their itinerant breeding behavior; *e.g.,* habitat factors that attract colonies and those that cause the birds to abandon colonies.
- Whether the southern and central California tricolored blackbird populations represent separate metapopulations (*e.g.,* Beedy and Hamilton 1997). The nature of seasonal movements.
- The morphologic and genetic variation of the species and whether it relates to geographic variation/separation.
- Whether tricolored blackbirds produce multiple broods in a season, as suggested by their itinerant breeding activity (Hamilton 1998).
- The relationship between colony size and productivity (reproductive success).
- Predator-prey relationships and whether and/or how have they changed in a way that may affect tricolored blackbirds (*e.g.*, changes in agricultural practices).
- The effects of pollutants and biocides on tricolored blackbird productivity.
- The relationship between nesting colonies and adjacent land uses.
- Whether water amounts and/or quality are limiting factor for productive nesting colonies in the Subregion.
- Whether productive foraging habitat (*e.g.,* prey densities) in the Subregion is a limiting factor on tricolored blackbird.
- Whether local tricolored blackbirds suffer significant predation at nesting colonies. If so, what predators are causing the greatest impacts?

Level of Management and Monitoring Priority - Medium

The documented year-to-year populations of the tricolored blackbird in the planning area since 1989 are relatively small (a few thousand or fewer in any given year) compared to colonies in the Central Valley (10s of thousands to 100,000+). Nesting in the planning area has been sporadic and difficult to predict. During phase 1 (years 1-6) of the HRMP, management and monitoring

Tricolored Blackbird Conceptual Stressor Model



of this species should focus on monitoring potential nesting areas, and future potential nesting in natural treatment systems (NTS) and the Gobernadora Multi-purpose Basin once those facilities are constructed. Detection of nesting activities may warrant repeated observations to document breeding activity of the colony to determine whether breeding was successful at the site. Site conditions (*e.g.*, size of colony area, size of nesting colony, habitat and hydrology conditions, presence of potential predators, etc. should be noted. Observation of foraging activities in grassland and agricultural areas also should be noted in conjunction with standard wildlife surveys.

Level of Monitoring (*e.g.*, Species-specific, habitat, landscape, combination)

Monitoring will be conducted at both a species-specific and habitat landscape level.

Monitoring Variables

Listed below are suggested species- and habitat-based monitoring variables. The detailed monitoring program for the tricolored blackbird will be developed by the Reserve Manager and Science Panel.

Species-specific Monitoring Variables

1. Number, size and distribution of nesting colonies
2. Proportion of potential breeding areas utilized
3. Reproductive success of nesting colonies

Habitat-based Monitoring Variables

1. Number, size, and distribution of occupied and potential nesting colony sites
2. Relative cover of different native plant species in nesting colonies
3. Proportion of exotic plant species/native plant species
4. Source, amount, and quality of water at nesting colonies
5. Evidence of potential predators at nesting colonies (*e.g.*, tracks, scat, direct observations)
6. Evidence of unauthorized public activities at nesting colonies (*e.g.*, trespass, trampling, illegal trails, trash, shooting, etc.)

Abiotic Monitoring Variables

1. Climate
2. Weather
3. Air quality
4. Water quality and runoff

Management Actions

Based on these potential stressors, management actions to benefit the tricolored blackbird include: **(1)** maintaining hydrology and water quality and minimizing additional loadings of nutrients or pollutants at potential breeding sites pursuant to the WQMP; **(2)** protecting grassland foraging habitats in proximity to breeding areas by implementing Integrated Pest Management Practices (*e.g.*, minimizing the use of any pesticides on golf courses that could be toxic to tricolored blackbirds either directly or indirectly through prey); **(3)** controlling urban-related predators (*e.g.*, cats); and **(4)** managing and minimizing human disturbance of breeding areas.
Other activities that would benefit the tricolored blackbird include creation of suitable breeding habitat to be undertaken in association with construction of the Gobernadora Multi-purpose Basin. As noted above, this species appears to be amenable to nesting habitat restoration. Case-by-case restoration of native grassland, at the discretion of the Reserve Manager and Science Panel, also will be undertaken during the course of long-term adaptive management of the Habitat Reserve and will focus on: **(1)** existing areas of degraded or low quality native grasslands that are not naturally recovering through passive management; **(2)** areas that are degraded or disturbed by future natural events and it is determined that they will not, or are unlikely to, recover naturally; **(3)** areas that have been temporarily disturbed either by authorized uses (*e.g.*, approved infrastructure) or unauthorized uses (*e.g.*, illegal trails); and **(4)** specific adaptive management research involving restoration treatments. The general adaptive management activities for existing grasslands focus on the enhancement of habitat value of grasslands through various management actions such as prescribed burning through implementation of the Wildland Fire Management Plan (*Appendix N),* and artichoke thistle control through implementation of the Invasive Species Control Plan (*Appendix J*) to contribute to maintaining and enhancing long-term habitat value. Timed grazing through implementation of the coordinated GMP also will benefit the tricolored blackbird by retaining enough residual dry matter (25 percent) to provide habitat for potential prey such as grasshoppers (see GMP, *Appendix G*).

Potential Target Studies

Several management information needs relevant to management of the tricolored blackbird were listed above, some of which could be addressed at the subregional scale and would help inform management of the Habitat Reserve. Other management information needs, particularly those related to rangewide characterization and persistence of the species (*e.g.*, overall population trends) can only be studied at a rangewide scale because the largest populations of this species occur in Central California. The following are potential target studies that could be implemented at the subregional scale:

- Predator-prey relationships in the subregion; *e.g.,* are urban-related predators a significant stressor on tricolored blackbirds?

- Foraging habitat quality; *e.g.*, is prey availability a limiting factor?
- Water sources, amount and quality at occupied and potential nesting colonies
- Impacts of human activities nesting colonies

The Reserve Manager and Science Panel will determine and recommend to the RMVLC Board what target studies (possibly including studies not listed above) should be pursued, based on the identification and prioritization of management and monitoring issues and available funding.

SPECIES ACCOUNT

Rangewide and Regional Status

The tricolored blackbird has a relatively restricted breeding range that extends 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). It is estimated that 95 percent of the tricolored blackbird population is in California. The species is not migratory, but is nomadic and highly colonial, although the pattern of nomadism is poorly known (Orians 1961). Exhibiting a behavior called "itinerant breeding" (Collier 1968; Orians 1961), large flocks may appear suddenly in areas from which they have been absent for months, breed, and then quickly leave.

The tricolored blackbird is mostly a resident in California and locally common throughout the Central Valley and in coastal areas from Sonoma County south (Zeiner *et al.* 1990). Since 1980, active breeding colonies have been observed in 26 California counties and most of the largest colonies are 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). It is a summer resident in northeastern California, occurring regularly only at Tule Lake, but has bred some years as far south as Honey Lake and in the marshes of the Klamath Basin in Siskiyou and Modoc counties (Zeiner *et al.* 1990). In the southern deserts, it is found regularly only in 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).

The tricolored blackbird is a CDFG CSC and has a CNDDB rank of G2G3S3. Per the CNDDB ranking, it is considered endangered and restricted in its range. The global and state ranks are essentially the same because about 95 percent of the tricolored blackbird's global range is in California. The 2003 CNDDB contains 347 records for the tricolored blackbird, of which 211 are recent and 136 are historical. Of these records, 275 of the sites are considered extant, 58

possibly extirpated and 14 extirpated. The CNDDB suppresses the specific locations for the species because of its sensitivity.

The Point Reyes Bird Observatory coordinated a statewide survey for the tricolored blackbird in 2001 (Humple and Churchwell 2002). A total of 142,000 birds was observed at colony sites. This compared to 162,000 in 2000, 240,000 in 1997 and 370,000 in 1994, indicating a continued decline in the species. The ten largest colonies are located in the Central Valley in Merced, Tulare, Fresno, Colusa, and Kern counties and range in size from 5,000 to 30,000 birds and account for 118,000 (83 percent) of the birds observed in 2001 (Humple and Churchwell 2002). Of the 10 largest colonies, seven are on private lands and three are on public lands (Humple and Churchwell 2002). It is important to note that prior to 1992 at least two breeding colonies numbered 120,000 (Laguna Seca) and 150,000 (Grey Hill Duck Club).

Some general locational information for the tricolored blackbird in coastal southern California is available through the various conservation planning programs and is summarized in *Table 2-18*.

TABLE 2-18
DISTRIBUTION OF THE TRICOLORED BLACKBIRD IN SELECTED CONSERVATION PLANNING AREAS IN SOUTHERN CALIFORNIA

Area	Specific Locations
San Diego MSCP	Mother Miguel Mountain, Otay River Valley, Lindo Lakes, Sweetwater Reservoir, Tijuana River Valley, San Diego River, miscellaneous small populations in other drainages
San Diego MHCP	San Luis Rey River, Pilgrim Creek, Buena Vista Lagoon, Batiquitos Lagoon, San Elijo Lagoon, Kit Carson Park
Western Riverside MSHCP	Santa Ana River, Lake Mathews, Lake Elsinore, Alberhill, Lake Murrieta, Vail Lake, Wilson Creek, Lake Riverside, Hemet Lake, San Jacinto Sewage Ponds, San Jacinto, Lakeview, Mystic Lake, San Jacinto Wildlife Area, March Air Reserve Base, Sycamore Canyon Regional Park, the Badlands, San Timoteo Creek
Orange County Southern Subregion	Chiquita Canyon north and south of the "Narrows," lower Canada Gobernadora, grassland south of Ortega Highway, CalMat in San Juan Creek, Trampas Canyon, Riverside Cement north of Gabino Canyon, mouth of Verdugo Canyon
Orange County – Other Locations	San Diego Creek, Peters Canyon Regional Park; localized nesting colonies in Carr Park, Huntington Beach and Tewinkle Park, Costa Mesa

Subregional Status

Sporadic nesting by the tricolored blackbird has been observed in the planning area in the recent past. In 1989, Bontrager (1989), for example, observed approximately 1,510 birds in the "upper Chiquita" colony (about 3,000 feet north of the Narrows and south of Oso Parkway and now considered Middle Chiquita) in about 1 acre of wetland, approximately 260 birds in the

"Narrows" colony in a 0.7-acre wetland, approximately 420 birds in the CalMat settling basin in San Juan Creek, approximately 830 birds in the Trampas Canyon settling ponds, and approximately 380 birds in the Riverside Cement leaseholds in lower Gabino Canyon. Therefore, at least in 1989, about 3,400 tricolored blackbirds were documented nesting on RMV in five separate areas. More recent information suggests that the tricolored blackbird population declined in the 1990s, with the most consistently observed nesting location supporting several thousand birds in lower Coto de Caza from 1993 to 1996 (Ortega, pers. comm. 1996). Elsewhere breeding in the planning area has been sporadic over the last decade. Recent nesting has been observed in the stock pond south of a Ranch residence in the Radio Tower Road area. During FTC-S surveys in 1994 a small colony was presumed to have nested in Chiquita Canyon above the "Narrows." This nesting colony was not observed in 1995, although a small flock was observed foraging near the nest site in 1995 (MBA 1996). Recent breeding has not been observed in San Juan Creek or in lower Gabino Canyon. The CNDDB includes a 1992 record of a small breeding colony at the mouth of Verdugo Canyon under the Ortega Highway bridge. However, because of the itinerant behavior of this species, breeding sites and activity are difficult to predict.

Because of the nomadic behavior of this species, it is difficult to define *important populations* or *key locations.* However, at least one area seems to fit this definition. Breeding colonies of several thousand birds consistently were observed in the Gobernadora sub-basin ponds in south Coto de Caza from 1993 to 1996 (Ortega, pers. comm. 1996). This area thus should be considered to support an *important population* in a *key location.* Other locations listed above have only shown sporadic occupation by the tricolored blackbird.

Biological Considerations

Although the tricolored blackbird is not migratory over most of its range, it leaves Oregon, northeastern California, Santa Barbara County and eastern San Diego County in fall and winter, presumably migrating south (Zeiner *et al.* 1990; Beedy and Hamilton 1999). Flocks of the species become nomadic in fall, seeking food (Zeiner *et al.* 1990). In winter, flocks become more widespread from Marin to Santa Cruz counties and in the Sacramento River Delta (Zeiner *et al.* 1990).

The tricolored blackbird forms the largest breeding colonies of any North American passerine bird that relies on specific habitat requirements (*e.g.*, up to 150,000 as noted above). Large breeding colonies require nearby water, suitable nesting substrates, and open-range foraging habitat composed of grassland, woodland, or agricultural cropland. In winter, they often form single-species, and sometimes single-sex, flocks, but they also flock with other blackbird species. As a nomadic or "itinerant" breeding species, they often change their nesting locations from year to year. These changes may be an adaptation to exploit rapidly changing environments in

ephemeral habitats, provide secure nesting sites, and provide plentiful insect food supplies (Beedy and Hamilton 1999).

While the tricolored blackbird is frequently an itinerant and opportunistic breeder, it generally is associated with wetland habitat and prefers emergent vegetation and protected habitats near wetlands for nesting. Its preferred, or primary, habitat includes freshwater marsh and cismontane alkali marsh. It may use a wide variety of habitats, including flooded agriculture lands, pastures, and grasslands in a very nomadic and unpredictable manner for foraging (Garrett and Dunn 1981). The tricolored blackbird also has been documented to use riparian forest habitats occasionally for nesting.

Primary breeding habitats of the tricolored blackbird include freshwater marsh and cismontane alkali marsh, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, tall herbs and forages in grassland and cropland habitats (Ziener *et al.* 1990). The species seeks cover for roosting in emergent wetland vegetation, especially cattails and tules, and also in trees and shrubs (Zeiner *et al.* 1990). Although true marsh habitat with its growth of cattails and tules is favored, marshes are not necessary for the nesting of the species and it may nest in other protective vegetation, including shrubs (Neff 1937). Within the Central Valley, colonies generally are found in the rice lands of the Sacramento Valley and pasture lands of the lower Sacramento Valley and San Joaquin Valley. Colonies outside the Central Valley may occur in several different habitat types, including areas surrounded by chaparral-covered hills extending for miles, orchards, or sagebrush-grasslands adjacent to salt marsh (DeHaven *et al.* 1975).

An important finding for the management of this species is that it appears to respond very well to habitat manipulation. Humple and Churchwell (2002) report that a man-made bulrush wetland at the San Jacinto sewage treatment ponds in Riverside County immediately attracted a breeding colony of tricolored blackbirds in 1993 and was the largest colony (35,000 birds) in southern California in 1994. It also is important to note that these ponds are bordered by large alfalfa fields and pasture that provide substantial foraging habitat.

Nest sites usually are located a few feet over, or near, fresh water, but also may be hidden on the ground among low vegetation. The tricolored blackbird builds its nest of mud and plant materials (Zeiner *et al.* 1990). Because it is a highly colonial species, the nesting area must be large enough to support a minimum colony of about 50 pairs (Grinnell and Miller 1944). The breeding territory, which includes only the vicinity of nest, is usually about 3.3 sq m (11 sq ft), or less, in dense vegetation, but may be larger in less suitable cover (Orians 1961). The usual breeding season is mid-April into late July (Payne 1969). Orians (1961) also reported active breeding in October and November in Sacramento Valley, although nesting success was low. Individual pairs in breeding colonies may initiate nesting synchronously. Even in colonies of up

to 50,000 to 100,000 nests, all first eggs may be laid within one week (Orians 1961). The species is polygynous; each male may have several mates nesting in his small territory (Orians 1961). As described above, the tricolored blackbird is an "itinerant breeder." An example of this breeding strategy is a study in which in April all observed tricolored blackbirds were in the vicinity of one breeding colony, but in May and June populations declined in this area and increased in another as breeding birds moved to the new breeding area (Hamilton 1998).

Clutch size is typically three or four eggs, with clutches of two or five eggs observed occasionally (Emlen 1941). The first egg is usually laid the day after the nest is completed and even occasionally before completion. One egg is then laid per day for one to five days (Emlen 1941). The species may raise two broods per year (Terres 1980), which is consistent with the "itinerant breeding" behavior described above. Incubation lasts about 11 days and the young are tended by the female or by both parents (Lack and Emlen 1939). The young leave the nest at about 13 days (Zeiner *et al.* 1990). The species probably first breeds at one year (Harrison 1978).

Although percent nesting success and survival of young has not been determined in detail, the tricolored blackbird has been documented to suffer widespread nest failure. Frequently the entire colony abandons nests with eggs or nestlings (Orians 1961), often with no obvious destruction or predation of eggs (Lack and Emlen 1939). The abandonment leads to a departure of the entire colony, sometimes to an unknown area of unknown distance (Lack and Emlen 1939). Abandonment may occur for several reasons: a change in the food supply in the area due to drought; poor timing of nesting; or disturbance from harvest activities within the nesting area (Orians 1961).

Dispersal behavior of blackbirds is complex. While colonies have relatively high site fidelity (*i.e.*, breeding colonies regularly return to the same breeding site), individual birds show relatively low fidelity to their natal areas. For example, a study of banded fledglings showed that only 39 percent returned to areas with 16 km (10 mi) of their natal colony (DeHaven *et al.* 1975). Available foraging habitat within a few kilometers of the nesting area is a basic requirement of the species. Nests may be located up to 6.4 km (4 mi) from foraging areas (Orians 1961). The tricolored blackbird forages on the ground in crop lands, grassy fields, flooded land, irrigated pastures, lightly grazed rangelands, dry seasonal pools, mowed alfalfa fields, feedlots, dairies, and along edges of ponds (Zeiner *et al.* 1990; Beedy and Hamilton 1999). The diet of the tricolored blackbird in California is predominantly animal matter. Insects and spiders make up about 86-91 percent of the nestling and fledgling diet and 28-96 percent of the adult diet in spring and summer (Skorupa *et al.* 1980). Seeds and cultivated grains, such as rice and oats, are other major foods, and compose most of the fall and winter diet (Martin *et al.* 1961).

The decline of the tricolored blackbird has been attributed to several factors. Loss of breeding and foraging habitat are a key factor, but pollutants and predation by mesopredators (*e.g.,* opossum, feral cats) and native birds (*e.g.,* black-crowned night heron) appear also to have contributed to the decline of this species. Poisoning, either deliberate (to control crop depredation) or indirect, and increased disturbance by humans from agriculture operations such as harvesting, have been cited as contributing to the continued population decreases (Beedy *et al.* 1991). Contamination by trace elements (selenium) and pesticides are a potential cause of nesting failures (Beedy and Hayworth 1987). Contaminants can have direct effects on individuals, but perhaps more importantly, may indirectly affect the food supply.

Protection Recommendations

- Protect grassland habitat in the valley bottom in the northern portion of lower Gobernadora on RMV property to support a breeding colony of the tricolored blackbird. This colony is an *important population* in a *key location*. (The existing nesting ponds are located within Coto de Caza. Also note that tricolored blackbird nests may be up to 6.4 km [4 mi] from foraging areas [Orians 1961] so having grassland foraging habitat in immediately adjacent to breeding areas is not essential for maintaining a successful breeding population. (For the Irvine Ranch Water District Water Supply project analysis, suitable foraging habitat within a 5 km [3.1 mi] buffer area of nesting sites was determined. This buffer area was based on a species account for the tricolored blackbird prepared by K. Campbell [no date]).
- Maintain and manage aquatic habitats (bulrush and cattails) along San Juan Creek to support a breeding colony of the tricolored blackbird. The minimum size nesting area to support at least 50 pairs of the tricolored blackbird is 500-600 sq ft.
- Protect grasslands and wetland/riparian habitat at the mouth of Verdugo Canyon to provide potential breeding habitat for the tricolored blackbird colony observed in the past under the Ortega Highway bridge at this location.
- Protect additional areas where tricolored blackbirds have been observed in the past to the extent feasible, including freshwater and alkali marsh habitats and adjacent grasslands in the "Narrows" area of Chiquita Canyon, the area south of the Ranch residence south of Ortega Highway, and the "Riverside Cement" area north of Gabino Canyon.

Management Recommendations

- Protect potential breeding areas for the tricolored blackbird by maintaining hydrology and water quality and minimizing additional loadings of nutrients or toxics.

- Protect grassland foraging habitats adjacent to breeding areas by implementing Integrated Pest Management Practices (*e.g.*, minimizing the use of any pesticides on golf courses that could be toxic to tricolored blackbirds either directly or indirectly through prey).
- Implement a management program for breeding areas, including control of non-native predators (*e.g.*, feral cats and opossums), management of grazing and minimization of human access and disturbance as part of the Adaptive Management Program.

Restoration Recommendations

- Consider establishment of suitable breeding habitat for the tricolored blackbird in association with the creation of new natural treatment systems water quality wetlands.

2.10 WHITE-TAILED KITE

Species: White-tailed Kite (*Elanus leucurus*)
Federal Status: FSC, MNBMC
State Status: Fully Protected
CNDDB Rank: G5S3
Science Advisors Group: 3
Covered Species: Yes
Focal Monitoring Species: No
Planning Species: Yes

CONSERVATION GOAL

1. Manage habitat and populations of the white-tailed kite to maximize the likelihood that populations are sustained in the planning area, and in doing so "provide for recovery" on a subregional basis and "contribute to recovery" on a rangewide basis.

CONSERVATION STRATEGY

1. Create a permanent subregional Habitat Reserve that provides sufficient breeding and foraging habitat to maximize the likelihood of the species' persistence within the planning area, including the major riparian drainages and woodlands that support concentrations the species.

2. Formulate a HRMP to provide for long-term protection and management of the white-tailed kite and its habitat and provide for restoration of riparian habitat to enhance the amount and quality of existing habitat.

HABITAT AND SPECIES CONSERVATION AND IMPACT ANALYSIS

With regard to the impact analysis, proposed regulatory coverage for the white-tailed kite does not permit impacts to individuals or active nests. As a CDFG "Fully Protected" species, regulatory coverage for the white-tailed kite only extends to impacts to suitable nesting and foraging habitat.

Conservation of the white-tailed kite in the Habitat Reserve, in terms of conservation of potentially viable nest sites (based on the presence of an historic nest site), was analyzed by determining how much suitable nesting and foraging habitat would be conserved and developed within a 0.5-mile radius of historic nest sites (an approximately 500-acre circular area around the nest site) in the Habitat Reserve based on the GIS analysis Nesting and foraging habitat is defined as agriculture, coastal sage scrub, grassland, alkali meadow, riparian, woodland and

forest, marsh and stream courses. The 0.5-mile radius used for the analysis is based on the finding by Erichsen *et al.* (1996) that successful nest sites are surrounded by more natural vegetation and non-urban development (*e.g.*, agriculture) within a 0.5-mile radius of the nest site than failed nest sites. Furthermore, although foraging ranges can be quite large for this mobile species, kites seldom forage farther than 0.5 mile from the nest during the breeding season (Hawbecker 1942) and thus adequate foraging habitat within the 500 acres immediately surrounding the nest site is important for maintaining nesting territory viability. Distance of the nest site from existing and proposed development also was determined, under the assumption that nest sites with a buffer of at least 300 feet from development and sources of human disturbance will have a higher chance of remaining viable.[3] Finally, based on the recommendation of Faanes and Howard (1987), the minimum habitat area around a nest should be at least 50 acres; *i.e.*, within the 0.5-mile radius there should be at least 50 acres of foraging habitat to support a breeding pair of kites. However, kite territory size appears to ultimately be regulated by prey abundance (Dunk and Cooper 1994), so prey abundance, which will vary widely (see above discussion), would need to be estimated to precisely estimate the minimum habitat area around any given nest site. It should be noted that the nest sites in the database are historic sites documented since about 1990 and all are not used in all years; typically only a few kites nest on RMV in any given year. Therefore, it was assumed that kites would not be directly competing for foraging habitat with other kites in areas where there are several nest sites in close proximity to one another, such as in GERA or along San Juan Creek.

Table 2-19 provides an overall summary of the existing conditions, proposed conservation, and permanent and temporary impacts of the white-tailed kite and its riparian, forest and woodland nesting habitat in the planning area and within the Subarea 1 permit area.

Subarea 1 Impacts

The proposed Covered Activities would result in direct, permanent impacts to two historic nest sites and 750 acres (12 percent) of suitable riparian and woodland nesting habitat (*Table 2-19* and *Figure 199-M*). The proposed Covered Activities also would result in temporary impacts to 85 acres of riparian and woodland habitat but no nest sites. For nest sites within the Habitat Reserve and Subarea 1 SOS (sites 28, 32 and 33 shown in *Figure 199-M*), *Table 2-20* shows the amount of potential nesting and foraging habitat that would be impacted within 0.5 mile of each "conserved" nest site.[4] Impacts range from no impact to 251 acres (60 percent) of habitat. All but four nest sites would have less than 200 acres of impacts, and 20 of the sites would have no

[3] Erichsen (1995) found that successful kite nests were all more than 100 m (328 feet) from a road and were surrounded by natural vegetation and non-urban human development (MS Thesis cited by J. Moore in species account for white tailed kite, www.prbo.org/calpif/htmldocs./species/grassland/wtkiacct.html)

[4] For this analysis, infrastructure impacts within the 0.5 mile radius were not included because of the added complexity of the analysis and because the overlap of proposed infrastructure and the 0.5 mile zones would result in only minor additional impacts that would not change the overall conclusions of the analysis.

impacts to nesting and foraging habitat. The remaining sites have between 10 acres and 141 acres of impacts.

TABLE 2-19
WHITE-TAILED KITE NESTING HABITAT
CONSERVATION AND IMPACT SUMMARY

	Acres	Percent	Historic Nest Sites	Percent
Planning Area				
Existing Total	7,763		36	
Habitat Reserve	4,537	58%	26	72%
Supplemental Open Space	1,691	22%	4	11%
Total Protected	6,228	80%	30	83%
Total Permanent Impact	1,040	13%	2	6%
Subarea 1				
Existing Total	6,223		31	
Habitat Reserve	4,537	73%	26	84%
Supplemental Open Space	929	15%	3	10%
Total Protected	5,466	88%	29	94%
Total Permanent Impact	750	12%	2	6%
Total Temporary Impact	85		0	

Table 2-20 also shows the distances between "conserved" nest sites and existing and proposed development and roads. Five of the historic nest sites in the Habitat Reserve are within 300 feet of existing or proposed development and/or roads (*Table 2-20*). Site 5 located in GERA is 279 feet from proposed PA 3 development. Because of the substantial riparian habitat available in GERA it is likely that the kite will continue to nest in this area and this site is considered conserved. Site 11 located in the Arroyo Trabuco is 289 feet from existing development in Mission Viejo. Because the arroyo provides additional topographic buffer from existing development, and because the proposed Covered Activities would not introduce any new potential indirect impacts on this site, it is considered conserved. Site 21 is located in San Juan Creek 216 feet from the planned Cow Camp Road alignment. This site is considered conserved because of the topographic buffer between San Juan Creek and Cow Camp Road and the availability of substantial riparian habitat in San Juan Creek. Site 30 is also is located in Arroyo Trabuco 119 feet from existing development in Rancho Santa Margarita. Like site 11, the arroyo provides additional topographic buffer from existing development, and because the proposed Covered Activities would not introduce any new potential indirect impacts on this site, it is considered conserved. Site 54 is located in riparian habitat within 49 feet of the Arroyo Trabuco Golf Course. Because the golf course has a low level of indirect impact, this site is considered conserved. Based on this analysis, all historic nest sites within the Habitat Reserve are unlikely to be significantly indirectly impacted and thus are considered conserved.

TABLE 2-20
WHITE-TAILED KITE HISTORIC NEST SITE CONSERVATION ANALYSIS

Historic Nest Site in Habitat Reserve or SOS	Distance (ft) from Nearest New/Existing Development/ Road	Total Habitat Acres Within 0.5 Mile of Nest Site	Conserved Habitat Acres Within 0.5 Mile of Nest Site		Impacted Habitat Acres Within 0.5 Mile of Nest Site	% Conserved Habitat Acres Within 0.5 Mile of Nest Site	Nest Site Considered Conserved
			Habitat Reserve	SOS			
2	440	474	393	0	80	83%	Yes
3	612	422	185	0	237	44%	Yes
4	361	398	183	0	214	46%	Yes
5	279	414	164	0	251	40%	Yes
10	928	417	188	0	228	45%	Yes
11	289	174	174	0	0	100%	Yes
12	773	473	406	0	67	86%	Yes
13	2,466	448	448	0	0	100%	Yes
14	491	413	413	0	0	100%	Yes
18	3,898	348	348	0	0	100%	Yes
19	2,087	248	238	0	10	96%	Yes
20	3,371	192	192	0	0	100%	Yes
21	216	459	319	0	141	69%	Yes
22	1,042	398	334	0	65	84%	Yes
24	1,439	467	462	0	0	99%	Yes
25	2,757	421	421	0	0	100%	Yes
26	1,201	451	451	0	0	100%	Yes
27	846	347	347	0	0	100%	Yes
28[1]	2,572	463	8	455	0	100%	Yes
29	3,461	486	486	0	0	100%	Yes
30	119	185	185	0	0	100%	Yes
31	434	264	264	0	0	100%	Yes
32[1]	3,604	452	0	452	0	100%	Yes
33[1]	2,413	480	6	474	0	100%	Yes
34	387	310	310	0	0	100%	Yes
36	899	218	0	218	0	100%	Yes
37	510	166	164	0	0	99%	Yes
53	326	155	155	0	0	100%	Yes
54	49	218	218	0	0	100%	Yes

[1] Nest site in SOS on NAS Starr Ranch

Subarea 1 Conservation

A total of 26 historic nest sites (84 percent) and 4,537 acres (73 percent) of suitable nesting habitat (riparian and woodland) would be conserved in the Habitat Reserve (*Table 2-19* and *Figure 199-M*). An additional three nest sites (all in NAS Starr Ranch) and 929 acres (15 percent) of habitat are in Subarea 1 SOS, bringing the total conservation to 29 nest sites (94 percent) and 5,466 acres (88 percent) of habitat. The Habitat Reserve would meet the conservation recommendations of the Draft Southern Planning Guidelines, which include conservation of nesting and foraging habitat in GERA in lower Gobernadora Creek and in central San Juan Creek. In addition, nesting habitat in middle Chiquita would be conserved.

These conservation estimates are supported by the historic nest site-specific analysis for foraging and nesting habitat conservation and buffer distances from existing and proposed development and roads presented in *Table 2-20.* Conservation levels of habitat in the Habitat Reserve and Subarea 1 SOS range from a low of 155 acres for site 53 (located in the Arroyo Trabuco Golf Course area) to a high of 486 acres for site 29 located in Bell Canyon in Caspers Wilderness Park. All conserved sites easily meet the 50-acre nesting and foraging habitat criterion for sustaining a nest site.

As described in detail above in the impact analysis, five of the 29 conserved sites are within 300 feet of existing or proposed development or roads. However, it was determined in this analysis that all five sites have good potential to remain active because the smaller buffers are mitigated by topographic barriers that effectively increase the buffer function.

ADAPTIVE MANAGEMENT PROGRAM

Stressors

Management of the white-tailed kite will consider several environmental stressors generally identified for this species, including:

- Urbanization and altered agricultural practices (*i.e.*, "clean" farming)
- Altered hydrology
- Altered geomorphology
- Prolonged drought
- Exotic plant invasions (*e.g.*, giant reed)
- Frequent and/or high intensity wildfires
- Cattle-related impacts
- Disease affecting oak woodlands

- Predation on acorns, seedlings, saplings
- Human harassment/disturbance (*e.g.*, activity around nests, shooting, egg collecting)

The California population of the white-tailed kite originally was reduced by habitat loss, shooting and possibly egg collecting (Pickwell 1930). Although the population rebounded, current breeding bird surveys indicate that the population numbers are again declining in some areas (Dunk 1995). This apparent decline may be due to the conversion of natural or agricultural lands to urban or commercial property; clean farming techniques that leave few residual vegetation areas for the prey[5]; increased competition for nest sites and prey with other raptors and corvids; a relatively long-term drought throughout California during much of the time from 1982 to 1991; and increased disturbances at the nest (Dunk 1995). A significant threat to the species is the degradation of habitat, especially the loss of nest trees and foraging habitat (Dunk 1995). The above identified stressors of altered hydrology and geomorphology, prolonged drought, exotic plant invasions, frequent and/or high intensity fires, cattle-related impacts, oak woodland diseases, and predation on acorns, seedlings and saplings could all contribute to habitat degradation.

Within the Habitat Reserve, the kite likely is most sensitive to environmental stressors that degrade nesting habitat quality (*e.g.*, exotics, altered hydrology) and stressors that potentially disturb nesting behavior such as recreational activities. In addition, because this species is likely limited by prey abundance, management of foraging habitat also will be important.

Goals

Goals for protecting and managing the white-tailed kite and its habitat include the following:

1. Maximize the likelihood of the persistence of the physiographic diversity of riparian and woodland nesting habitats and agriculture, coastal sage scrub, and grassland foraging habitats in the Habitat Reserve.
2. Restore riparian and woodland habitats and enhance the quality of degraded nesting habitats in the Habitat Reserve such that the net habitat values of the existing riparian and woodland habitat systems are preserved.
3. Restore coastal sage scrub and grassland foraging habitats.
4. Manage fire regimes to sustain and enhance riparian, woodland, coastal sage scrub and grassland habitat quality in the Habitat Reserve.

[5] "Clean farming" generally refers to intensive agricultural practices typical of the large corporate farms in California's Central Valley where most, if not all, native vegetation is removed and little wildlife habitat remains, is not an issue in the Southern Subregion. RMV does not employ clean farming techniques.

5. Manage exotic invasions of giant reed, pampas grass, tamarisk, castor bean and artichoke thistle.

6. Protect and manage active nest sites in the Habitat Reserve.

7. Avoid and minimize impacts to white-tailed kite active nest sites during construction-related Covered Activities.

Management and Monitoring Objectives (number of goal met by objective in parentheses)

Objective 1: Implement Conservation Strategy to protect and manage approximately 4,537acres of riparian and woodland nesting habitat and approximately 19,759 acres of coastal sage scrub, grassland, alkali meadow and agriculture foraging habitats in the Habitat Reserve (actual acreage will vary in relation to natural and anthropogenic environmental effects such as floods, wildfires and drought) (Goals 1, 2 & 3).

Objective 2: Remap vegetation communities in Habitat Reserve within two (2) years of executing IA to establish a baseline for long-term tracking of the Reserve (Goals 1, 2, 3 & 5).

Objective 3: Update vegetation community map at 5-year intervals (Goals 1, 2, & 5).

Objective 4: Collect regional climate, weather and air quality information to examine potential correlations between vegetation and population changes and environmental variables (Goals 1, 2 & 7)

Objective 5: Provide for no net loss of acreage and function of the waters of the U.S./State (Goals 1 & 2).

Objective 6: Maintain/restore riparian ecosystem integrity and maintain and/or restore floodplain connection (Goals 1 & 2).

- Address historic meander conditions and excessive sediment input from upstream land uses in Gobernadora Creek, including construction of a detention/water quality basin below Coto de Caza.
- Conduct riparian/wetland restoration on a case-by-case basis over the long-term management and monitoring of the Habitat Reserve.

Objective 7: Conduct annual botanical and wildlife field studies within predesignated sample plots to monitor fine-grained changes in riparian and woodland nesting habitat and coastal sage scrub, grassland, alkali meadow and agricultural foraging habitats for the white-tailed kite (Goals 1, 2, 3 & 5).

Objective 8: Implement Wildland Fire Management Plan such that riparian and woodland nesting habitats are protected to the extent feasible and that coastal sage scrub and grassland foraging habitat prey productivity is sustained (Goals 1, 2, 3 & 4).

Objective 9: Implement Invasive Species Control Plan to manage invasive exotic species in riparian and woodland habitats, particularly giant reed, pampas grass, tamarisk and castor bean in riparian areas and artichoke thistle in woodland and other upland areas (Goals 1, 2, 3 & 5).

- Control major infestations of giant reed in San Juan Creek and Arroyo Trabuco, and smaller infestations in GERA and Cristianitos Creek.
- Control major infestations of tamarisk in Cristianitos Creek and isolated clusters in Gabino and San Juan creeks.
- Control pampas grass infestation in Arroyo Trabuco, San Juan Creek and Cristianitos Creek.
- Control substantial castor bean infestation Cristianitos Creek and scattered occurrences in Arroyo Trabuco and San Juan Creek.
- Control Spanish sunflower occurrences Gobernadora Creek (GERA) and monitor/conduct early eradication in Arroyo Trabuco, Chiquita Creek, San Juan Creek and Cristianitos Creek as needed.
- Continue artichoke thistle control program in upland areas of RMV.

Objective 10: Implement Biological Resources Construction Plan (BRCP) to avoid and minimize potential indirect impacts to active nest sites during construction or maintenance/repair activities (*e.g.*, infrastructure construction and maintenance) (Goal 7).

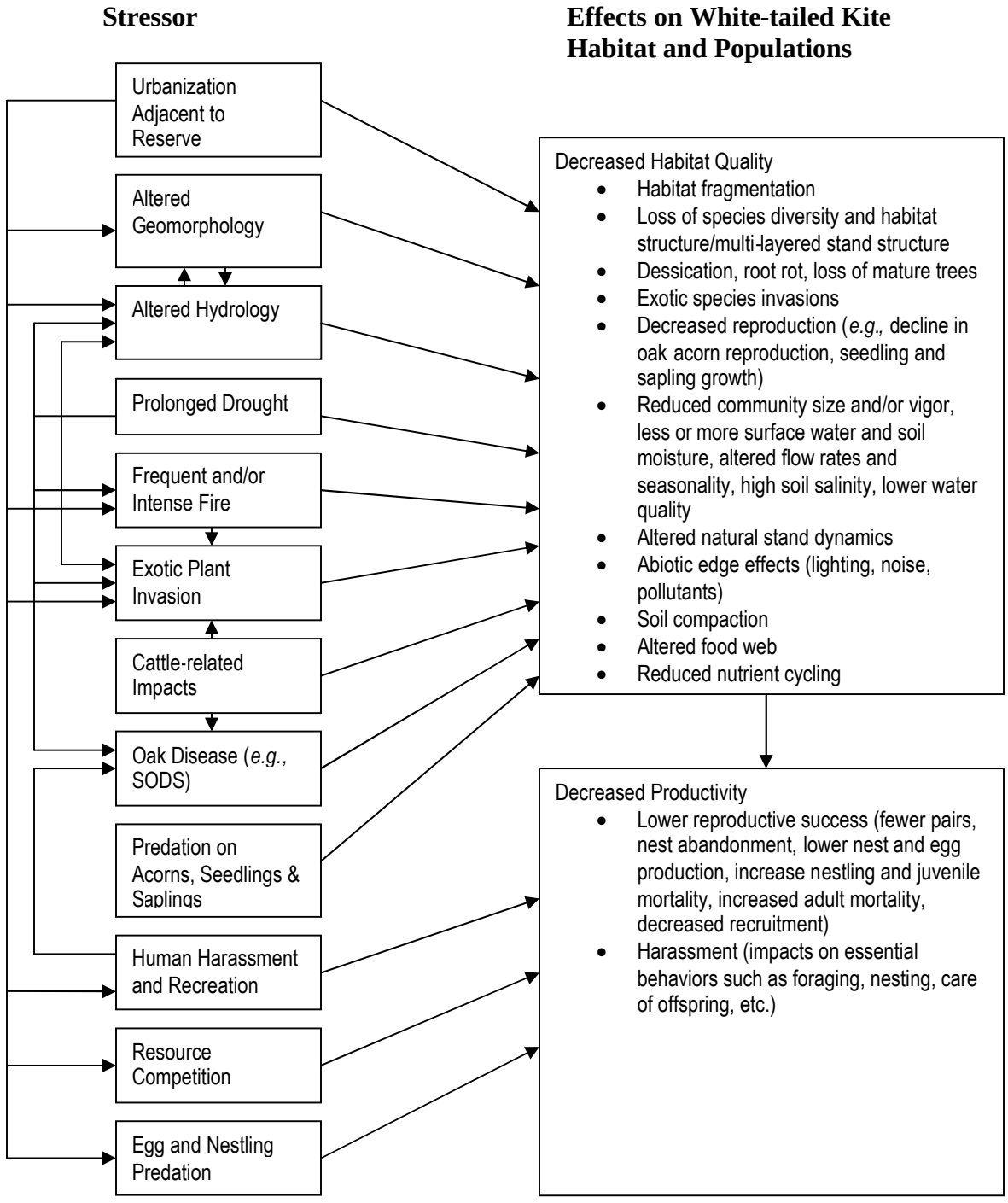
Conceptual Model

Yes - See figure below.

Regional and Subregional Management Information Needs

- Long-term state-wide population trends and their relationship to short-term population cycles.
- The life history and demography of the species (*e.g.*, sex ratio, age at first breeding, breeding frequency, lifetime reproductive success, survivorship and factors in egg, juvenile and adult mortality, juvenile dispersal, and philopatry).
- What are the habitat factors that affect nest site selection.
- Whether nesting white-tailed kites would be disturbed by public recreational and other activities (*e.g.*, ranching operations) in the Habitat Reserve.

White-tailed Kite Conceptual Stressor Model



- Predator-prey relationships in the Habitat Reserve and whether there ways to increase prey productivity.

Level of Management and Monitoring Priority - Medium

Based on existing information, riparian and woodland habitats in the Habitat Reserve generally are in good condition. There is no information indicating that the nesting white-tailed kite population in the Habitat Reserve is vulnerable to any imminent threats that require immediate intervention. Management and monitoring of this species should focus on the Habitat Reserve-urban development interface where risks from urban-related predators and human activities likely are greatest. Monitoring of "interior" nesting areas can be conducted in conjunction with standard wildlife surveys in sample transects.

Level of Monitoring (*e.g.*, Species-specific, habitat, landscape, combination)

Monitoring will be conducted at both a species-specific and habitat landscape level.

Monitoring Variables

Listed below are suggested species- and habitat-based monitoring variables. The detailed monitoring program for the white-tailed kite will be developed by the Reserve Manager and Science Panel.

Species-specific Monitoring Variables

1. Status of active nesting sites in Habitat Reserve

Habitat-based Monitoring Variables

1. Vegetation communities long-term status
2. Relative cover of different native plant species
3. Proportion of exotic plant species/native plant species
4. Results of habitat restoration activities, including invasive species controls, riparian/wetland and upland restoration, and creek and soils stabilization programs.
5. Prey productivity

Abiotic Monitoring Variables

1. Climate
2. Weather
3. Air quality
4. Water quality, surface water and groundwater
5. Stream channel morphology, sediment transport and deposition

Management Actions

The following management actions implemented as part of the HRMP will directly benefit the white-tailed kite and its habitat:

- Habitat Restoration Plan
- Wildland Fire Management Plan
- Invasive Species Control Plan

Both the riparian/wetland and upland elements of the Habitat Restoration Plan potentially would benefit the white-tailed kite. The riparian/wetland element, particularly in the Gobernadora sub-basin and upper Gabino Canyon, would benefit nesting habitat quality. Managing surface and subsurface flows from upstream development through the Gobernadora Multi-purpose Basin will protect existing riparian habitat downstream of the knickpoint in GERA.

The coastal sage scrub/valley needlegrass grassland (CSS/VGL) restoration element of the Habitat Restoration Plan would enhance primary prey availability by providing more forage (forbs and seeds) and cover for rodent prey species, and particularly voles (the kite's preferred prey) in grasslands.

Generally, the Wildland Fire Management Plan will be beneficial to white-tailed kite in terms of protecting riparian and woodland nesting habitats, as well as enhancing native grassland and coastal sage scrub habitat quality by increasing forbs and seeds that attract rodents. However, prescribed burning will need to be carefully implemented to maintain prey populations in grasslands. Unburned plots adjacent to burned grassland areas should be maintained to support prey populations.

Management of oak woodlands, as described in *Part I, Chapter 7,* also would potentially enhance nesting habitat quality for the white-tailed kite.

Another means of improving prey productivity is minimizing rodent controls in the Habitat Reserve, including the use of rodenticides in accordance with an Integrated Pest Management Program.

"Coordinated Management Plans" that are not formal elements of the HRMP but will also benefit the white-tailed kite are:

- Grazing Management Plan
- Water Quality Management Plan

The GMP describes the light to moderate grazing regimes that will be employed by RMV in the Habitat Reserve. These regimes will prevent over-grazing and help sustain habitat quality in the grassland and agricultural areas (*i.e.*, barley fields) that support primary prey for the kite. The WQMP addresses urban runoff, altered geomorphology, and pollutants that can adversely affect riparian habitats.

The reader is referred to the individual management plans for more details.

In addition to the management plans listed above, minimization of human disturbance in close proximity to active nest sites will be implemented to the extent feasible. Potential indirect impacts to active nest sites during construction or maintenance/repair activities (*e.g.*, infrastructure construction and maintenance) will be addressed by minimizing activities within 300 feet of nest sites if activities occur during the breeding season through implementation of MMs 4.9-26 and 4.9-30 of the Ranch Plan GPA/ZC EIR for raptor-related construction monitoring and preparation of a BRCP. The HRMP also includes measures to minimize public disturbance in close proximity to active nest sites within the Habitat Reserve during the breeding season such as public education, signage and access restrictions where feasible.

Potential Target Studies

Several management information needs relevant to management of the white-tailed kite were listed above. Although these management information needs apply at a state-wide scale for the species, they can also be addressed at the subregional scale and would help inform management of the Habitat Reserve.

- Effect of human activities in the Habitat Reserve on breeding activity and reproductive success

- Predator-prey relationships in the Habitat Reserve

SPECIES ACCOUNT

Rangewide and Regional Status

The current range of the white-tailed kite in North America includes California, Oregon, southern Washington, southern Texas and Florida. This species was threatened with extinction in North America during the early twentieth century, but since 1960 the population and range of this raptor in North America have improved markedly. It also has rapidly colonized habitats throughout much of Central America in regions previously uninhabited (Eisenmann 1971). The main breeding area of the kite in North America remains in California, with nearly all areas up to

the western Sierra Nevada foothills and southeast deserts occupied by the species (Small 1994; Dunk 1995). It is common in the Central Valley of California and along the entire length of the coast. Breeding also has been documented regularly in the western counties of Oregon, as well as recently in southern Washington. It is a common breeder in southern Texas and a small breeding population has established in southern Florida since at least 1986, with scattered reports elsewhere in the peninsula and in the eastern panhandle (Dunk 1995). Its breeding range continues south along the coast in Mexico, into Central America and in South America from Colombia south to Buenos Aires, Argentina (Dunk 1995).

In California, the white-tailed kite is a common to uncommon year-long resident in coastal and valley lowlands. It is rarely found away from agricultural areas (Grinnell and Miller 1944). It inhabits herbaceous and open stages of most habitats in cismontane California. It has extended its range and increased numbers in California in recent decades (Eisenmann 1971). *Table 2-21* provides a summary by county of white-tailed kite observations from the 2003 CNDDB (62 records) and other local sources, including Hamilton and Willick (1996) for Orange County, Unitt (1984) for San Diego County and Dudek (2002) for western Riverside County. It should be noted that the observations include both breeding and non-breeding records. Also, the information in *Table 2-21* should be considered only as representative of the kite's broad distribution in California and is not intended to reflect *major* or *important populations* or *key locations*. As explained below, kites appear to track prey populations and may be found almost anywhere adequate prey occur.

TABLE 2-21
DISTRIBUTION OF THE WHITE-TAILED KITE IN CALIFORNIA

County/Area	General Locations
Alameda County	Coyote Hills Regional Park, South San Francisco Bay, east of Bethany Reservoir, Berkeley Yacht Harbor area
Colusa County	Lurline Creek
Contra Costa County	Brooks Island, Wildcat Creek Marsh, Antioch
Del Norte County	Mouth of Jordan Creek
Marin County	Novato
Napa County	Napa River Ecological Reserve, Haystack Mountain
Orange County Southern Subregion	Arroyo Trabuco, Chiquita Canyon, Gobernadora, Wagon Wheel Canyon, San Juan Creek, Bell Canyon, Trampas Canyon, Cristianitos Canyon, Gabino Canyon, La Paz Canyon, and Talega Canyon
Orange County – Other Locations	San Joaquin Marsh, Bolsa Chica
Placer County	South Branch of Pleasant Grove Creek
Riverside County MSHCP	Prado Basin-Santa Ana River, Lake Mathews-Estelle Mountain, Temescal Wash, Wasson Canyon, Murrieta Creek, Temecula Creek, Santa Rosa Plateau (Mesa de Burrro, De Luz Creek, Mesa de Colorado, Rancho Santa Rosa), Vail Lake, Wilson Valley, Lake Skinner, Mystic Lake-San Jacinto Wildlife Area-Lake Perris, San Timoteo Creek, and Gavilan Peak
Sacramento County	Dillard Road/Hwy 99, Courtland, Cosumnes River, Hedge Ave., Mather Lake, Blodgett Reservoir, Coyote Creek south of Folsom, American River behind Rio Americano High School, Goethe Park, Elder Creek Road, McCoy Avenue,

TABLE 2-21
DISTRIBUTION OF THE WHITE-TAILED KITE IN CALIFORNIA

County/Area	General Locations
	Snipes/Pershing Ravine, Sailor Bar, Woodbridge Park, Sacramento Bar, Folsom Blvd. in Rancho Cordova, Don Julio Creek
San Diego County	Tule Canyon, French Canyon, Cockleburr Canyon and Las Flores Creek on Camp Pendleton; northwest Carlsbad, Batiquitos Lagoon, Sycamore Canyon, Tijuana River Valley, San Felipe Valley, Sentenac Canyon, Anza Borrego, San Luis Rey River, San Dieguito River
San Luis Obispo	Camp San Luis Obispo
San Mateo County	Bair Island
Santa Clara County	South San Francisco Bay
Solano County	Batavia Road, Midway and Buckley Roads, Road 104 south Tremont Road, north of Walnut Road east of Willow Road, Lewis Road Farmstead
Sonoma County	Russian River-Healdsburg
Tehama County	North and west of Gerber
Ventura County	Santa Clara River
Yolo County	County Road 96 west of Davis, County Road 113 northwest of Davis, El Macero Road, County Road 30B east of Davis, Putah Creek

Although the white-tailed kite is a resident bird throughout most of its breeding range, non-breeding season dispersal occurs, resulting in some range expansion during the winter. For example, Hamilton and Willick (1996) comment that although uncommon during the breeding season, kites are fairly common during fall and winter in Orange County and may occur in flocks of 30 or more birds at locations such as Bolsa Chica, San Joaquin Marsh and Gen. Thomas F. Riley Wilderness Park.

The California population of the white-tailed kite originally was reduced by habitat loss, shooting and possibly egg collecting (Pickwell 1930). Although the population rebounded, more recent breeding bird surveys indicated that the population numbers were again declining in some areas (Dunk 1995). This apparent decline may be due to the conversion of natural or agricultural lands to urban or commercial property; clean farming techniques that leave few residual vegetation areas for the prey; increased competition for nest-sites with other raptors and corvids; a relatively long-term drought throughout California during much of the time from 1982 to 1991; and increased disturbances at nest sites (Dunk 1995). A significant threat to the species is the degradation of habitat, especially the loss of nest trees and foraging habitat (Dunk 1995). The white-tailed kite is a CDFG Fully Protected Species and has a CNDDB rank of G5S3; it is secure in its global range but has a restricted range in California.

Subregional Status

There are 36 historic nest sites for the white-tailed kite scattered throughout the planning area, of which 31 are in Subarea 1. Because the nest sites are widely distributed, no single area appears

to support an *important population*. However, as listed below, several drainages appear to be important for this species in the planning area, including lower Gobernadora Creek (GERA), central San Juan Creek, Arroyo Trabuco (between Live Oak Canyon Road in the north and Avery Parkway in the south), Bell Canyon, middle Gabino Canyon, lower La Paz Canyon, Talega Canyon (including two sites south of the RMV property), and Cristianitos Canyon.

- GERA in lower Gobernadora Creek and central San Juan Creek supports nine historic nest sites.
- Arroyo Trabuco between Live Oak Canyon Road in the north and Avery Parkway in the south supports seven historic nest sites.
- Bell Canyon supports seven historic nest sites.
- Middle Gabino and lower La Paz canyons support three historic nest sites.
- Talega and lower Cristianitos canyons support five historic nest sites. All four nest sites in Talega Canyon are south of the RMV property boundary.

It is important to note that at any given time the number of breeding pairs in the planning area probably is only a small percentage of the historic nesting sites. For example, Bloom estimated that only three pairs of kites nested on RMV in 2001 (P. Bloom, pers. comm. 2002).

Biological Considerations

White-tailed kite foraging habitat includes grasslands, open shrub, agricultural areas, wetlands dominated by grasses, fence rows and irrigation ditches (with residual vegetation) adjacent to grazed lands, riparian, oak woodlands, coastal sage scrub, and saltmarsh. They forage in almost any habitat with a dense population of voles (*Microtus* spp.); its main prey in coastal Southern California is the California vole (*M. californicus*). It also preys on other small, diurnal mammals, and occasionally on birds, insects, reptiles, and amphibians. It takes small mammal prey approximately 95 percent of the time and can be considered a small mammal specialist (Dunk 1995). Kites forage from a central perch to an area as large as 1,200 acres. However, they seldom forage farther than 0.5 mile from the nest during the breeding season (Hawbecker 1942). Based on observations in coastal northwestern California, kites were observed to consume on average 3.1 prey/day, including California voles and harvest mice (*Reithrodontomys megalotis*), resulting in the assimilation of 113.1 kcal/day (Koplin *et al.* 1980). This caloric intake is within the range predicted by an energy expenditure model applied to the kite (Koplin *et al.* 1980). Assuming an average intake of 3.1 prey/day (Koplin *et al.* 1980), a pair of kites would require at least 2,260 prey per year. California vole densities vary cyclically and dramatically, with maximum peak densities of about 400 voles/acre, but with typical peaks of about 180 voles/acre. During low density periods, voles may be almost absent or restricted to only a few

high quality habitat patches (Wilson and Ruff 1999). Thus, during typical peak periods of about 180 voles/acre, a kite pair's annual energy needs could be met with an area as small as 12 acres of foraging habitat, but during low population density periods much more habitat would be needed to support a pair; *e.g.*, at just 10 voles/acre at least 220 acres would be needed to meet minimal annual energy requirements. Tall grasslands have the highest suitability because they provide good vole habitat (Faanes and Howard 1987).

Kites may become nomadic during low vole abundance, and the population fluctuations appear to track vole numbers. However, in northern California it is unclear whether fluctuations are normal migration movements or nomadic responses to changes in the prey densities (Dunk and Cooper 1994).

The breeding density of the white-tailed kite varies greatly, ranging from one pair per 26-472 ha (64-1,166 ac). Vole density at the onset of breeding appears to influence the kite density and it is likely that breeding densities vary even more dramatically than reported above (Dunk 1995). Where prey density is not the limiting factor, the availability of nesting and roosting sites becomes important (Dunk and Cooper 1994). Generally kites are not territorial, but nest sites may be defended against crows, other hawks, and eagles (Pickwell 1930; Dixon *et al.* 1957). They also have been observed to defend foraging territories of about 0.1 sq km. (0.04 sq mi) in winter against red-tailed hawks and northern harriers (Bammann 1975). The success of nesting appears to be related to surrounding land uses. Erichsen *et al.* (1996) documented that successful nests were surrounded by more natural vegetation and non-urban human development (*e.g.*, agriculture) within a 0.8-km (0.5 mi) radius circle centered on the nest site compared to failed nests.

The white-tailed kite breeding season is February to October, with the peak from May to August. Kites are monogamous through the breeding season, although some pairs remain together year-round (Dunk 1995). Nests of loosely piled sticks and twigs lined with grass, straw, or rootlets are placed near the tops of oaks, willows, or other tree stands (more than 20 species have been documented as nest sites) from 6-20 m (20-100 ft) above ground (Dixon *et al.* 1957). Nests are located near open foraging areas. Nest trees may be isolated or part of a contiguous forested area and tree structure apparently is the most important determinant of use for the nest site (Dunk 1995). Communal roosts are used in the non-breeding seasons (Waian and Stendell 1970).

The average kite clutch is four or five eggs, with a range of three to six eggs. The female is responsible for incubation, which lasts about 28 days. The young fledge in 35-40 days. During the incubation and nestling period, the male feeds the female, and supplies her with food to feed the young. Kites usually produce a single brood per breeding season, but may occasionally have two broods.

Dispersal information includes two white-tailed kites banded as nestlings that were recovered 19 km (11.8 mi) and 160 km (99 mi) from their nests (Dixon *et al.* 1957). Other anecdotal information indicates that kites are capable of dispersing long distances over inhospitable habitat. For example, a total of 26 kites dispersed from the California mainland over 80 km (50 mi) to San Clemente Island in 1984 over a two month period, formed a communal roost through December, and then departed the island by spring without nesting (Scott 1994).

The California population of the white-tailed kite originally was reduced by habitat loss, shooting and possibly egg collecting (Pickwell 1930). Although the population rebounded, current breeding bird surveys indicate that the population numbers are again declining in some areas (Dunk 1995). This apparent decline may be due to the conversion of natural or agricultural lands to urban or commercial property; clean farming techniques that leave few residual vegetation areas for the prey; increased competition for nest-sites with other raptors and corvids; a relatively long-term drought throughout California during much of the time from 1982 to 1991; and increased disturbances at the nest (Dunk 1995). A significant threat to the species is the degradation of habitat, especially the loss of nest trees and foraging habitat (Dunk 1995).

White-tailed kites appear to respond to habitat management. In northern California, CDFG purchased previously grazed grasslands and largely removed them from grazing. As of 1995 these areas supported large populations of voles and high densities of wintering white-tailed kites, approximately 10 times the raptor density they supported prior to the purchase (Dunk 1995).

Protection Recommendations

- Protect the southern willow scrub in GERA in lower Gobernadora Creek and in central San Juan Creek that provides nesting habitat, and adjacent foraging habitat to the extent feasible, for the white-tailed kite.

- Protect breeding habitat and, to the extent feasible, foraging habitat for the white-tailed kite in the Cristianitos Canyon sub-basin, along lower Cristianitos Creek and in the lower Gabino Canyon subunit.
- Protect breeding and foraging habitat for the white-tailed kite in Middle Gabino, La Paz , and Talega canyons.

Management Recommendations

- Protect existing riparian habitat downstream of the knickpoint in GERA for the white-tailed kite.

- Implement a management program for protected white-tailed kite nesting habitat, including the minimization of human disturbance during the breeding season.
- Pursuant to the Grazing Management Plan, implement grazing management techniques to help protect the white-tailed kite and its nesting and foraging habitat, promote perennial grasses including native grasses (to provide vole habitat), allow for continued cattle grazing sufficient to support cattle ranching operations, and, where appropriate reduce fuel loads for fire.
- Pursuant to the Fire Management Plan, implement prescribed burning techniques to promote native perennial grasses.

Restoration Recommendations

- Implement a CSS/VGL restoration program to enhance habitat carrying capacity for prey. Restoration areas that would benefit the white-tailed kite include Chiquita Ridge, Sulphur Canyon, Chiquadora Ridge, upper Cristianitos and upper Gabino Canyon.

2.11 YELLOW-BREASTED CHAT

Species: Yellow-breasted Chat (*Icteria virens*)
Federal Status: None
State Status: CSC
CNDDB Rank: G5S3
Science Advisors Group: 3
Covered Species: Yes
Focal Monitoring Species: No
Planning Species: Yes

CONSERVATION GOAL

1. Manage habitat and populations of the yellow-breasted chat to maximize the likelihood that populations are sustained in the planning area, and in doing so "provide for recovery" on a subregional basis and "contribute to recovery" on a rangewide basis.

CONSERVATION STRATEGY

1. Create a permanent subregional Habitat Reserve that provides sufficient breeding habitat to support the identified *important populations* in GERA, San Juan Creek, lower Cristianitos, and lower Arroyo Trabuco to maximize the likelihood of the species' persistence within the planning area.
2. Formulate a HRMP to provide for long-term protection and management of the yellow-breasted chat and its habitat and provide for restoration of riparian habitat to enhance the amount and quality of existing habitat.

HABITAT AND SPECIES CONSERVATION AND IMPACTS ANALYSIS

The conservation analysis for the yellow-breasted chat is based both on site-specific information (*i.e.,* documented occurrences and identified *important populations/key locations*) and amount of suitable riparian nesting habitat conserved. Similar to the vireo, chats are not particularly impacted by habitat patch connectivity within the subregion as long as discrete habitat patches within riparian systems are large enough and have the necessary habitat characteristics to support a breeding population.

Table 2-22 provides a summary of the existing conditions, and proposed conservation, and permanent and temporary impacts of the yellow-breasted chat and its riparian habitat in the planning area and within the Subarea 1 permit area.

TABLE 2-22
YELLOW-BREASTED CHAT CONSERVATION AND IMPACT SUMMARY

	Acres	Percent	Locations	Percent
Planning Area				
Existing Total	5,140		130	
Habitat Reserve	3,119	61%	99	76%
Supplemental Open Space	1,186	23%	4	3%
Total Protected	4,304	84%	103	79%
Total Permanent Impact	411	8%	14	11%
Subarea 1				
Existing Total	3,980		116	
Habitat Reserve	3,119	78%	99	85%
Supplemental Open Space	576	14%	0	0%
Total Protected	3,695	93%	99	85%
Total Permanent Impact	186	5%	14	12%
Total Temporary Impact	66		3	

SUBAREA 1 IMPACTS

The proposed Covered Activities would result in direct, permanent impacts to 186 acres (5 percent) of riparian habitat and 14 yellow-breasted chat historic nest sites (12 percent) (*Table 2-22* and *Figure 175-M*). The proposed Covered Activities also would result in temporary direct impacts to 66 acres of habitat and three nest sites (*Table 2-22*). Of the 14 direct nest impacts, eight would occur from RMV project impacts, two as a result of the Prima Deshecha Landfill GDP, one from the Avenida La Pata Improvement Project and three from SMWD projects.

Subarea 1 Conservation

A total of 99 yellow-breasted chat nest locations (85 percent) and 3,119 acres (78 percent) of riparian habitat would be conserved in the Habitat Reserve (*Table 2-22* and *Figure 175-M*). An additional 576 acres (14 percent) are in Subarea 1 SOS, bringing the total conservation to 99 nest locations (85 percent) and 3,695 acres (93 percent). All four of the identified *important populations* in Subarea 1 would be conserved in the Habitat Reserve. Furthermore, scattered locations in middle Chiquita, Bell Canyon, Verdugo Canyon and upper San Juan Creek would be conserved.

ADAPTIVE MANAGEMENT PROGRAM

Stressors

Management of the yellow-breasted chat will consider a number of environmental stressors with the potential to affect the chat, including:

- Altered fire regime
- Too frequent flood regime
- Too infrequent flood regime
- Precipitation
- Urbanization adjacent to Reserve
- Exotic plant invasion
- Exotic animals
- Cattle-related impacts
- Upstream diversion
- Groundwater extraction
- Roads and trails

It is assumed that loss and fragmentation of willow riparian vegetation communities in coastal lowlands to urban development and agriculture and flood control projects are primarily responsible for the decline of this species. Cowbird parasitism also appears to have affected the distribution and density of chats (Gaines 1974; Remsen 1978). However, a study by Burhans and Thompson (1999) demonstrated a tradeoff between nest parasitism and nest predation in relation to patch size. Nests in smaller habitat patches were more likely to be predated than parasitized and nests in large habitat patches suffered more parasitism that predation. Surprisingly, reproductive success (the number of offspring fledged) was similar in small and large habitat patches. Nest predation and parasitism impacts thus appear to effectively cancel each other out.

Compared to the vireo, relatively few studies have been carried out on the yellow-breasted chat to document environmental stressors. Because of the lack of species-specific studies, the stressors identified for the vireo are applied to the chat under the assumption that because the chat and vireo have similar habitat requirements, they are likely to be sensitive to the same types of stressors (*e.g.,* invasive species, cowbird parasitism, etc.). It is also assumed that the management actions implemented for the vireo will benefit the chat.

Goals

1. Maximize the likelihood of the persistence of the physiographic diversity of riparian/wetland habitats and associated focal species in the Habitat Reserve.
2. Restore riparian/wetland habitats and enhance the quality of degraded riparian/wetland habitats in the Habitat Reserve such that the net habitat value of the existing riparian/wetland habitat system is preserved.
3. Manage fire regimes to sustain and enhance riparian/wetland quality in the Habitat Reserve.

4. Manage exotic invasions of riparian/wetland habitats such as giant reed, pampas grass, tamarisk, and castor bean.

5. Protect and manage the yellow-breasted chat nesting population in the Habitat Reserve.

Management and Monitoring Objectives (number of goal met by objective in parentheses)

Objective 1: Implement Conservation Strategy to protect and manage approximately 3,119 acres of riparian habitat in the Habitat Reserve (actual acreage will vary in relation to natural and anthropogenic environmental effects such as floods, wildfires and drought) (Goals 1 & 2).

Objective 2: Remap vegetation communities in Habitat Reserve within two (2) years of executing IA to establish a baseline for long-term tracking of the Reserve (Goals 1, 2 & 4).

Objective 3: Update vegetation community map at 5-year intervals (Goals 1, 2 & 4).

Objective 4: Collect regional climate, weather and air quality information to examine potential correlations between vegetation and population changes and environmental variables (Goals 1, 2 & 5)

Objective 5: Provide for no net loss of acreage and function of the waters of the U.S./State (Goals 1 & 2).

- Implement riparian/wetland restoration component of Habitat Restoration Plan.

Objective 6: Maintain/restore riparian/wetland ecosystem integrity and maintain and/or restore floodplain connection (Goals 1 & 2).

- Address historic meander conditions and excessive sediment input from upstream land uses in Gobernadora Creek, including construction of a detention/water quality basin below Coto de Caza.
- Conduct riparian/wetland restoration on a case-by-case basis over the long-term management and monitoring of the Habitat Reserve.

Objective 7: Conduct annual botanical and wildlife field studies within predesignated sample plots to monitor fine-grained changes in riparian/wetland habitat for the yellow-breasted chat (Goals 1, 2, 4 & 5).

Objective 8: Implement Wildland Fire Management Plan such that sub-basin watersheds and a riparian/wetlands habitats and yellow-breasted chat nesting areas are protected to the extent feasible (Goals 1, 2, 3 & 5).

Objective 9: Implement Invasive Species Control Plan to manage invasive exotic species in riparian/wetland habitats (Goals 1, 2, 4 & 5).

- Control major infestations of giant reed in San Juan Creek and Arroyo Trabuco, and smaller infestations in GERA and Cristianitos Creek.
- Control major infestations of tamarisk in Cristianitos Creek and isolated clusters in Gabino and San Juan creeks.
- Control pampas grass infestation in Arroyo Trabuco, San Juan Creek and Cristianitos Creek.
- Control substantial castor bean infestation Cristianitos Creek and scattered occurrences in Arroyo Trabuco and San Juan Creek.
- Control Spanish sunflower occurrences Gobernadora Creek (GERA) and monitor/conduct early eradication in Arroyo Trabuco, Chiquita Creek, San Juan Creek and Cristianitos Creek as needed.
- Assess brown-headed cowbird parasitism risk and conduct cowbird trapping or some equivalent form of cowbird control such as mist netting as needed.
- Assess and control Argentine ants where determined to pose a risk to yellow-breasted chat nestlings and fledglings and/or to native prey.
- Assess and control urban-related predators (*e.g.*, cats) in riparian areas that pose a risk to yellow-breasted chat.

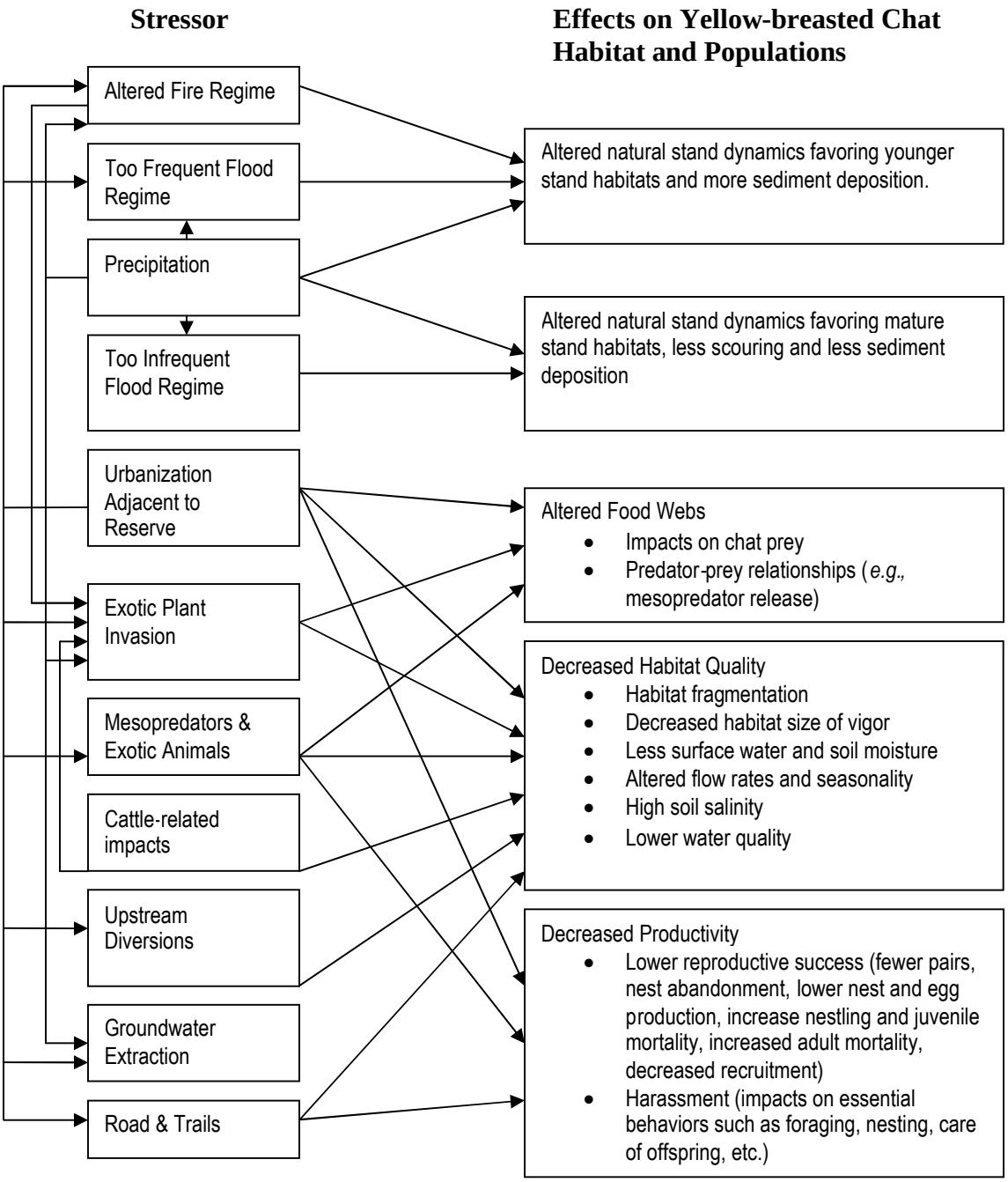
Conceptual Model

Yes – See figure below.

Regional and Subregional Management Information Needs

- The state-wide population trends of this species.
- Significant factors affecting population trends of this species in the state.
- Genetics
- Dispersal of juveniles and site tenacity
- Survival
- The appropriate stand age to maintain high quality breeding habitat; *i.e.*, such that a robust understory of willows and other species is present.

Yellow-breasted Chat Conceptual Stressor Model



- The effectiveness of habitat restoration, including revegetation and enhancement, in supporting nesting populations of chats.
- The nature of the interaction between site selection, nest parasitism and predation? (*e.g.*, see Burhans and Thompson 1999).
- The role of smaller patches of "non-breeding" riparian habitat as migration stopover sites.
- Whether brown-headed cowbird parasitism poses a significant risk to nesting yellow-breasted chats in the Habitat Reserve.
- Whether Argentine ants pose a significant direct risk to chat nestlings and fledglings in the Habitat Reserve and indirectly to chats through impacts on the native insect prey population.
- Whether urban-related predators such as cats pose a significant risk to nesting yellow-breasted chats in the Habitat Reserve, particularly at the Habitat Reserve-urban development interface.
- Whether certain land uses adjacent to occupied yellow-breasted chat breeding habitat in the Habitat Reserve have adverse effects on breeding success, such as noise, human activity, etc.
- Whether the extent and quality of yellow-breasted chat habitat in the Habitat Reserve is limited by available groundwater.
- Whether cattle-related impacts in riparian areas have an adverse effect on yellow-breasted chat habitat in the Habitat Reserve.

Level of Management and Monitoring Priority - Medium

With 116 documented locations in Subarea 1 and 130 locations in the larger planning area, the Subregion supports a relatively large population of this species. At this time there are no identified imminent threats to the chat in the Habitat Reserve that require immediate action, although invasive species controls in Arroyo Trabuco and San Juan Creek will be a priority management action that will benefit the species. In particular, the County will provide funding for invasive species controls, including giant reed, in San Juan Creek within Caspers Wilderness Park as mitigation for impacts to vireos on the Prima Deshecha Landfill that will also benefit the chat. Brown-head cowbird parasitism and Argentine ants will be management issues that will be addressed as buildout of the project area progresses. Cowbird trapping has been and will continue to be conducted in lower Arroyo Trabuco in conjunction with the Golf Course. It is anticipated that initiation of cowbird trapping and Argentine ant assessment and potential management actions in GERA will occur with construction in PA 3.

Level of Monitoring (*e.g.*, Species-specific, habitat, landscape, combination)

Monitoring will be conducted both at a species-specific and habitat landscape level.

Monitoring Variables

Listed below are suggested species- and habitat-based monitoring variables. The detailed monitoring program for the yellow-breasted chat will be developed by the Reserve Manager and Science Panel.

Species-specific Monitoring Variables

1. Status of breeding population
2. Proportion of "suitable" habitat occupied
3. Brown-headed cowbird nest parasitism
4. Argentine ant impacts
5. Urban-related predator impacts

Habitat-based Monitoring Variables

1. Vegetation communities long-term status
2. Relative cover of different native plant species
3. Proportion of exotic plant species/native plant species
4. Results of habitat restoration activities, including invasive species controls, riparian/wetland restoration, and creek and soils stabilization programs

Abiotic Monitoring Variables

1. Climate
2. Weather
3. Air quality
4. Water quality and runoff

Management Actions

The following management actions implemented as part of the HRMP will directly benefit the yellow-breasted chat and its habitat:

- Habitat Restoration Plan
- Invasive Species Control Plan
- Wildland Fire Management Plan

The Habitat Restoration and Invasive Species Control plans are key to management of the yellow-breasted chat. The Arroyo Trabuco *important population* is affected by giant reed and pampas grass proliferation and the GERA *important population* by stream perennialization and erosion/sediment impacts resulting from excessive surface and subsurface flows from upstream development. The *important populations* in San Juan Creek also are being affected by giant reed infestation. Management actions designed to address these stressors and enhance net habitat value for the yellow-breasted chat include: **(1)** subject to the discretion by the Reserve Manager and Science Panel, revegetation in Sulphur Canyon to reduce the generation of fine sediments currently affecting downstream areas within Gobernadora Creek; **(2)** management of excessive surface and subsurface flows from Coto de Caza through the Gobernadora Multi-purpose Basin to protect existing riparian habitat downstream of the knickpoint in GERA and potential new habitat upstream of the knickpoint; **(3)** potential restoration of the historic meander and associated habitat above the knickpoint and potential restoration in the "fertile crescent" area near the mouth of Gobernadora Creek to provide additional chat habitat; **(4)** addressing upstream land use-induced channel incision and erosion through the Gobernadora Multi-purpose Basin; **(5)** invasive plant species control, including giant reed in San Juan Creek and Arroyo Trabuco and pampas grass in Arroyo Trabuco, to provide for additional native riparian vegetation and increased water supplies; **(6)** conservation of upstream sources of coarse sediments and maintenance/repair of episodic flood events to help maintain natural succession of riparian habitat; **(7)** implementation of the coordinated WQMP to address hydrologic conditions of concern and pollutants of concern; (**8)** control of Argentine ants; and **(9)** brown-headed cowbird trapping where needed. Habitat restoration also would address erosion and localized headcuts in Chiquita Creek, which supports a small chat population.

"Coordinated Management Plans" that are not formal elements of the HRMP but will also benefit the yellow-breasted chat are:

- Grazing Management Plan
- Water Quality Management Plan (as noted above)

The reader is referred to the individual management plans for more details.

Cattle normally are excluded from GERA. However, grazing would occur in GERA once every three years for fuel modification outside the chat breeding season (February 15-July 15). This periodic grazing in GERA will not affect the chat.

Potential Target Studies

Several management information needs relevant to management of the yellow-breasted chat were listed above, some of which could be addressed at the subregional scale and would help

inform management of the Habitat Reserve. Other management information needs, particularly those related to rangewide persistence of the species (*e.g.,* landscape habitat fragmentation) are best studied at a rangewide scale. The following are potential target studies that could be implemented at the subregional scale:

- Assessment of impacts of brown-headed cowbirds and evaluation of the effects of cowbird controls
- Assessment of impacts of Argentine ants and evaluation of the effects of ant controls related to:
    - Direct impacts on nestlings and fledglings
    - Indirect impacts on prey
- Evaluation of impacts of mesopredators on yellow-breasted chats
- Evaluation of restoration effects on breeding populations, including invasive species controls, active revegetation and upstream restoration in Gobernadora to reestablish natural creek meander and control fine sediments
- Evaluation of adverse edge effects on occupation and/or breeding success

SPECIES ACCOUNT

Rangewide and Regional Status

Yellow-breasted chats summer and nest 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). Within California the chat is an uncommon summer resident and migrant in coastal California and in the foothills of the Sierra Nevada (Zeiner *et al.* 1990), and is found up to about 1,450 m (4,800 ft) in valley foothill riparian habitats, and up to 2,050 m (6,500 ft) east of the Sierra Nevada in desert riparian habitats (Gaines 1977; 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 most of the region (Garrett and Dunn 1981). Once considered fairly common to common inCalifornia (Grinnell and Miller 1944), the yellow-breasted chat has been more recently considered to be uncommon and local in southern California (Garrett and Dunn 1981).

The yellow-breasted chat is a CDFG CSC and has a CNDDB rank of G5S3; it is secure in its global range but has a restricted range in California. Although once considered fairly common to common in California (Grinnell and Miller 1944), the yellow-breasted chat has been more

recently considered to be uncommon and local in southern California (Garrett and Dunn 1981). Loss and fragmentation of riparian woodlands in the coastal lowland as a result of development, agriculture, and channeling rivers has led to the decline of the yellow-breasted chat as well as other neotropical migrants such as the least Bell's vireo. Garrett and Dunn (1981) concluded that the clearing of dense riparian thickets and brush tangles has caused a noticeable decline in the number of breeding pairs of the chat. Cowbird parasitism may have played an additional role in the decline of the yellow-breasted chat affecting its distribution in addition to its density (Gaines 1974; Remsen 1978).

There are 63 records for the yellow-breasted chat in the 2003 CNDDB in the counties and general locations shown in *Table 2-23*. Of note in the CNDDB database is that 26 of the 63 records for the yellow-breasted chat are from the Colorado River area.

TABLE 2-23
2003 CNDDB RANGEWIDE DISTRIBUTION OF THE YELLOW-BREASTED CHAT IN CALIFORNIA

County	General Locations
Imperial	Potholes, Bard, Niland, Salton Sea, Picacho State Recreation Area, Colorado River
Inyo	Shoshone, Independence, Baker Meadows, Lone Pine, Olancha, Ash Creek, Hogback Creek, Wyman Creek
Kern	S. Fork Kern River, Lake Isabella
Mendocino	Little Lake Valley
Orange	San Diego Creek
Riverside	Mecca, Colorado River, Santa Ana River, Prado Basin, Temescal Wash
San Benito	San Benito River
San Bernardino	Yermo, Old Fort Piute, Baker, Colorado River, Lower Big Morongo Canyon, Soto Ranch, Cushenbury Springs, Mojave River
San Diego	4-S Ranch, Vallecito Creek, Sweetwater River, Otay Valley
Solano	SR-128 and Pleasants Valley Road
Stanislaus	Littlejohn Creek
Tehama	Todd Island, Sacramento River
Ventura	Santa Clara River

For coastal southern California, the Southern Subregion database includes 130 locations (described below). The western Riverside MSHCP database includes approximately 23 recent records that were considered precise enough to be used for the conservation analysis for that program. Areas of western Riverside County supporting the yellow-breasted chat include a large concentration in the Prado Basin and contiguous reaches of the Santa Ana River, as well as San

Timoteo Creek, Temescal Canyon (including the Alberhill Creek tributary), Canyon Lake, Temecula Creek, and Vail Lake. The San Diego MHCP database includes 47 locations for the chat, with locations in the San Luis Rey River, lower Escondido Creek in Encinitas, Pilgrim Creek in Oceanside, and Kit Carson Park in Escondido; the San Luis Rey River and Pilgrim Creek are identified in the MHCP as supporting major populations. Although the yellow-breasted chat was not evaluated for regulatory coverage in the San Diego MSCP, Unitt's (1984) summary of the known and probable breeding distribution of the species in this region includes the Sweetwater and San Diego rivers. The species also breeds in the Santa Margarita River on Camp Pendleton.

Subregional Status

There are 130 documented nesting locations for the yellow-breasted chat in the planning area database, of which 116 locations are in Subarea 1. The yellow-breasted chat generally co-occurs with the least Bell's vireo, but is more widespread because it has somewhat broader habitat affinities; it occurs in both willow thickets and more open riparian forests and woodlands. As listed below, five *important populations* of the chat were identified for the subregion: lower Arroyo Trabuco, lower Gobernadora Creek (GERA), San Juan Creek near the confluence with Chiquita Creek, San Juan Creek just downstream of the confluence with Bell Creek, and lower Cristianitos Creek between the confluences with Gabino and Talega creeks (see *Figure 175-M*).

- Lower Arroyo Trabuco below Crown Valley Parkway supports about 29 documented nesting sites (No. 1 on *Figure 175-M*). This area has high quality southern willow scrub habitat and also supports *important populations* of the least Bell's vireo and yellow warbler.
- GERA supports about 20 documented nesting sites (No. 2 on *Figure 175-M*). GERA also supports *important populations* of the least Bell's vireo, southwestern willow flycatcher and yellow warbler.
- Central San Juan Creek from the confluence with Chiquita Creek downstream to the Ortega Highway bridge supports about nine documented nesting sites and also an *important population* of the yellow warbler (No. 3 on *Figure 175-M*).
- Central San Juan Creek south of the confluence of Bell Creek supports about 17 documented nesting sites and also an *important population* of the yellow warbler (No. 4 on *Figure 175-M*).
- Lower Cristianitos between the confluences of Gabino and Talega creeks supports about 11 documented nesting sites and is associated with numerous nesting locations in lower Cristianitos and San Mateo creeks on Camp Pendleton (No. 5 on *Figure 175-M*).

No *key locations* in the subregion were identified for the yellow-breasted chat. There are no obvious locations with a high concentration of the species that would appear to be essential for conserving this species in the subregion. Also, as with the yellow warbler, there are several records for the chat along Gobernadora Creek within Coto de Caza, but the current status of habitat suitability at these locations is unknown.

Mule fat scrub is most common riparian habitat type associated with mapped locations of the yellow-breasted, followed closely by southern arroyo willow forest. Other habitats supporting yellow-breasted chats in the planning area include southern willow scrub, southern coast live oak riparian woodland, southern sycamore riparian woodland, freshwater marsh, intermittent and perennial rivers and streams.

Biological Considerations

Yellow-breasted chats usually arrive in southern California in April and depart by late September for wintering grounds in Mexico and Guatemala, although there are a few late fall and winter records of the chat. Migrants are observed only rarely to uncommonly away from breeding areas.

The species has been characterized as a relative generalist in regard to nesting habitat selection within a riparian area (Brown and Trossett 1989). They nest in dense plant cover within streams, swampy ground, and the borders of small ponds. Burhans and Thompson (1999) observed that chats preferred nesting in large habitat patches, which, despite increased risk of brood-parasitism, decreased the risk of nest predation and resulted in a higher nesting success.

The chat breeding season runs from early May into early August, with a peak of nesting activity in June. Nests are usually 0.6-2.4 m (2-8 ft) above the ground in dense shrubs along a stream or river. The species appears to be monogamous, although pairs may nest near one another (Ehrlich *et al.* 1988). Females may lay three to six eggs, but usually three or four eggs. Incubation is 11-15 days and chicks fledge in 8-11 days. The young are tended by both parents until fledged (Harrison 1978).

Home range sizes of yellow-breasted chats vary substantially, from 0.04 ha (0.1 ac) to 1.3 ha (3.2 acres) (Brewer 1955; Dennis 1958; Thompson and Nolan 1973).

The yellow-breasted chat eats insects and spiders and also may take berries and other fruits. Mostly the yellow-breasted chat gleans prey from foliage of shrubs and low trees (Zeiner *et al.* 1990).

Loss and fragmentation of riparian woodlands in the coastal lowland as a result of development, agriculture, and channeling rivers has led to the decline of the yellow-breasted chat. Garrett and

Dunn (1981) concluded that the clearing of dense riparian thickets and brush tangles has caused a noticeable decline in the number of breeding pairs of the chat. Cowbird parasitism may have played an additional role in the decline of the yellow-breasted chat affecting its distribution in addition to its density (Gaines 1974; Remsen 1978).

Protection Recommendations

- Protect the southern willow scrub in GERA in lower Gobernadora Creek that provides nesting habitat for an *important population* of the yellow-breasted chat.
- Maintain and manage riparian and aquatic habitats along San Juan Creek for the *important populations* of the yellow-breasted chat.
- Protect breeding habitat for the *important population* of the yellow-breasted chat along lower Cristianitos Creek.

Management Recommendations

- Implement a cowbird trapping program to mitigate for impacts to existing habitat within the Chiquita and Gobernadora sub-basins and for potential impacts associated with future development. The cowbird trapping program will be evaluated on an annual basis and trap locations and trapping effort will be adjusted as part of the overall Adaptive Management Program (*e.g.,* if the number of trapped cowbirds drops to a prescribed threshold, the trapping program may be terminated or otherwise modified).
- Pursuant to the Grazing Management Plan, implement grazing management techniques to help protect riparian habitats and associated species while allowing for continued cattle grazing sufficient to support cattle ranching operations, and, where appropriate reducing fuel loads for fire.
- Protect downstream habitats (*e.g.,* San Juan Creek and lower Cristianitos Creek in the planning area) for the yellow-breasted chat by maintaining hydrology, water quality and sediment delivery and minimizing additional loadings of nutrients or toxics.
- Control Argentine ants in proximity to yellow-breasted chat nesting habitat.

Restoration Recommendations

- Implement restoration efforts to address localized headcuts within the Chiquita sub-basin as further described in the Watershed and Sub-basin Planning Principles.
- Implement a restoration program in Gobernadora Creek which addresses: **(1)** the historic creek meander above the knickpoint; and **(2)** upstream land use induced channel incision

and erosion, including potentially excessive surface and groundwater originating upstream.

- Identify likely causes of erosion and potential measures to rectify causes of headcutting in the lower portion of Gobernadora Creek.
- Implement an invasive species eradication program for San Juan Creek between San Juan Capistrano and Bell Canyon to control giant reed and pampas grass.
- Implement an invasive species eradication program for lower Cristianitos Creek from the confluence with Gabino Creek and the RMV boundary to control tamarisk, giant reed and pampas grass.

2.12 YELLOW WARBLER

Species: Yellow Warbler (*Dendroica petechia*)
Federal Status: None
State Status: CSC
CNDDB Rank: G5T3?S2
Science Advisors Group: 3
Covered Species: Yes
Focal Monitoring Species: Yes
Planning Species: Yes

CONSERVATION GOAL

1. Manage habitat and populations of the yellow warbler to maximize the likelihood that populations are sustained in the planning area, and in doing so "provide for recovery" on a subregional basis and "contribute to recovery" on a rangewide basis.

CONSERVATION STRATEGY

1. Create a permanent subregional Habitat Reserve that provides sufficient breeding habitat to support the identified *important populations* in GERA, San Juan Creek, lower Cristianitos, and lower Arroyo Trabuco to maximize the likelihood of the species' persistence within the planning area.
2. Formulate a HRMP to provide for long-term protection and management of the yellow warbler and its habitat and provide for restoration of riparian habitat to enhance the amount and quality of existing habitat.

HABITAT AND SPECIES CONSERVATION AND IMPACTS ANALYSIS

The conservation analysis for the yellow warbler is based both on site-specific information (*i.e.*, documented occurrences and identified *important populations/key locations*) and amount of suitable riparian nesting habitat conserved. As a migrant, and similar to the vireo and the chat, yellow warblers are not particularly impacted by habitat patch connectivity within the subregion as long as discrete habitat patches within riparian systems are large enough and have the necessary habitat characteristics to support a breeding population.

Table 2-24 provides a summary of the existing conditions, and proposed conservation, and permanent and temporary impacts of the yellow warbler and its riparian and woodland/forest habitats in the planning area and within the Subarea 1 permit area.

TABLE 2-24
YELLOW WARBLER CONSERVATION AND IMPACT SUMMARY

	Acres	Percent	Locations	Percent
Planning Area				
Existing Total	5,140		34	
Habitat Reserve	3,119	61%	26	76%
Supplemental Open Space	1,186	23%	2	6%
Total Protected	4,304	84%	28	82%
Total Permanent Impact	411	8%	1	3%
Subarea 1				
Existing Total	3,980		26	
Habitat Reserve	3,119	78%	26	100%
Supplemental Open Space	576	14%	0	0%
Total Protected	3,695	93%	26	100%
Total Permanent Impact	186	5%	0	0%
Total Temporary Impact	66		1	

Subarea 1 Impacts

The proposed Covered Activities would result in direct, permanent impacts to 186 acres (5 percent) of riparian habitat, but no yellow warbler nest sites (*Table 2-24* and *Figure 175-M*). The proposed Covered Activities also would result in temporary direct impacts to 66 acres of habitat and one nest site (*Table 2-24*).

Subarea 1 Conservation

All 26 yellow warbler nest locations and 3,119 acres (78 percent) of riparian habitat would be conserved in the Habitat Reserve (*Table 2-24* and *Figure 175-M*). An additional 576 acres (14 percent) of riparian habitat are in Subarea 1 SOS, bringing the total conservation of riparian habitat to 3,695 acres (93 percent). All four of the identified *important populations* in Subarea 1 would be conserved in the Habitat Reserve. Furthermore, scattered locations in middle Chiquita, Bell Canyon, Lucas Canyon, upper San Juan Creek, middle Arroyo Trabuco, and lower Cristianitos Canyon would be conserved.

ADAPTIVE MANAGEMENT PROGRAM

Stressors

Management of the yellow warbler and its habitat will consider a number of environmental stressors with the potential to affect the species, including:

- Altered fire regime
- Too frequent flood regime

- Too infrequent flood regime
- Precipitation
- Urbanization adjacent to Reserve
- Exotic plant invasion
- Exotic animals
- Cattle-related impacts
- Upstream diversion
- Groundwater extraction
- Roads and trails

It is assumed that loss and fragmentation of riparian and woodland/forest vegetation communities in coastal lowlands to urban development and agriculture and flood control projects are primarily responsible for the decline of this species. Cowbird parasitism is a major stressor on this species and has been the subject of a number of scientific studies (*e.g.,* Clark and Roberston 1981; Graham 1988; Sealy 1992; Weatherhead 1989). For example, Sealy (1992) documented 21 percent cowbird parasitism and Weatherhead (1989) documented 30 percent parasitism in Manitoba, Canada. The yellow warbler has increased dramatically in the Prado Basin during the course of cowbird management since 1986; between 1986 and 1998, the yellow number of breeding territories increased from 5 to 250 (Hays 1986, pers. obs.; Pike 1998; USFWS, pers. comm.).

Over-grazing that reduces shrub volume adversely affects yellow warblers (Taylor and Littlefield 1986). Based on transect data collected in Oregon, yellow warblers were more numerous on transects with abundant willow and little or no cattle that on transects with heavy cattle use and low shrub volume.

Compared to the vireo, relatively few studies have been carried out on the yellow warbler to document environmental stressors, with the exception of the aforementioned studies on cowbird nest parasitism and cattle impacts. Because of the lack of species-specific studies, the stressors identified for the vireo are applied to the yellow warbler under the assumption that because the yellow warbler and vireo have similar nesting habitat requirements, they are likely to be sensitive to the same types of stressors (*e.g.*, invasive species, cowbird parasitism, etc.). It is also assumed that the management actions implemented for the vireo will benefit the yellow warbler.

Goals

Goals for protecting and managing the yellow warbler and its habitat include the following:

1. Maximize the likelihood of the persistence of the physiographic diversity of riparian/wetland habitats and associated focal species in the Habitat Reserve.

2. Restore riparian/wetland habitats and enhance the quality of degraded riparian/wetland habitats in the Habitat Reserve such that the net habitat value of the existing riparian/wetland habitat system is preserved.
3. Manage fire regimes to sustain and enhance riparian/wetland quality in the Habitat Reserve.
4. Manage exotic invasions of riparian/wetland habitats such as giant reed, pampas grass, tamarisk, and castor bean.
5. Protect and manage the yellow warbler nesting population in the Habitat Reserve.

Management and Monitoring Objectives (number of goal met by objective in parentheses)

Objective 1: Implement Conservation Strategy to protect and manage approximately 3,119 acres of riparian habitat in the Habitat Reserve (actual acreage will vary in relation to natural and anthropogenic environmental effects such as floods, wildfires and drought) (Goals 1 & 2).

Objective 2: Remap vegetation communities in Habitat Reserve within two (2) years of executing IA to establish a baseline for long-term tracking of the Reserve (Goals 1, 2 & 4).

Objective 3: Update vegetation community map at 5-year intervals (Goals 1, 2 & 4).

Objective 4: Collect regional climate, weather and air quality information to examine potential correlations between vegetation and population changes and environmental variables (Goals 1, 2 & 5)

Objective 5: Provide for no net loss of acreage and function of the waters of the U.S./State (Goals 1 & 2).

- Implement riparian/wetland restoration component of Habitat Restoration Plan.

Objective 6: Conduct annual botanical and wildlife field studies within predesignated sample plots to monitor fine-grained changes in riparian/wetland habitat for the yellow warbler (Goals 1, 2, 4 & 5).

Objective 7: Implement Wildland Fire Management Plan such that sub-basin watersheds and a riparian/wetlands habitats and yellow warbler nesting areas are protected to the extent feasible (Goals 1, 2, 3 & 5).

Objective 8: Implement Invasive Species Control Plan to manage invasive exotic species in riparian/wetland habitats (Goals 1, 2, 4 & 5).

- Control major infestations of giant reed in San Juan Creek and Arroyo Trabuco, and smaller infestations in GERA and Cristianitos Creek.
- Control major infestations of tamarisk in Cristianitos Creek and isolated clusters in Gabino and San Juan creeks.
- Control pampas grass infestation in Arroyo Trabuco, San Juan Creek and Cristianitos Creek.
- Control substantial castor bean infestation Cristianitos Creek and scattered occurrences in Arroyo Trabuco and San Juan Creek.
- Control Spanish sunflower occurrences Gobernadora Creek (GERA) and monitor/conduct early eradication in Arroyo Trabuco, Chiquita Creek, San Juan Creek and Cristianitos Creek as needed.
- Assess brown-headed cowbird parasitism risk and conduct cowbird trapping or some equivalent form of cowbird control such as mist netting as needed.
- Assess and control Argentine ants where determined to pose a risk to yellow warbler nestlings and fledglings and/or to native prey.

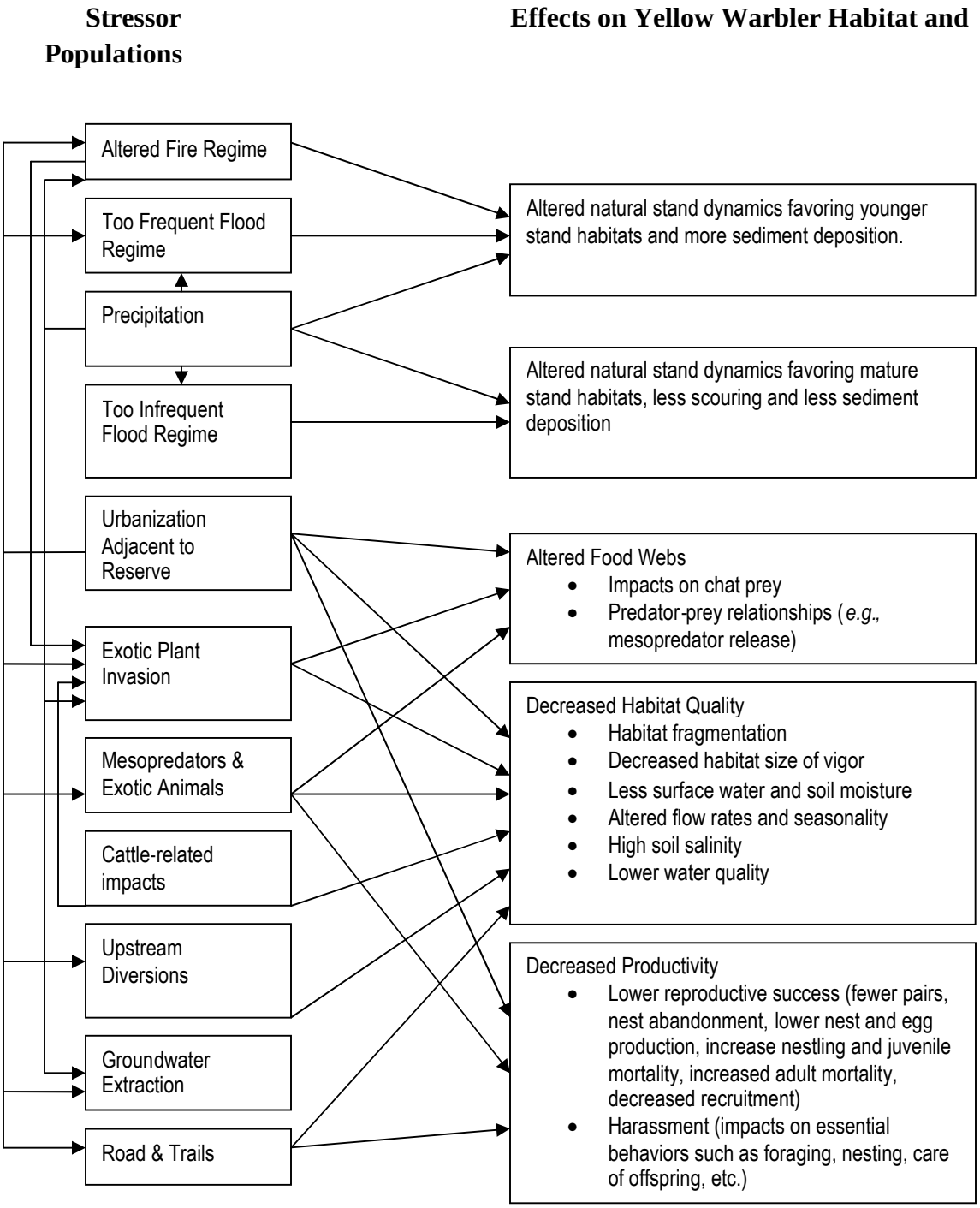
Conceptual Model

Yes – See figure below.

Regional and Subregional Management Information Needs

- The state-wide population trends of this species.
- The significant factors affecting population trends of this species in the state.
- Dispersal of juveniles and site tenacity.
- The appropriate stand age to maintain high quality breeding habitat; *i.e.*, such that a robust understory of willows and other species is present.
- The effectiveness of habitat restoration, including revegetation and enhancement, in supporting nesting populations of yellow warblers.
- Whether brown-headed cowbird parasitism poses a significant risk to nesting yellow warblers in the Habitat Reserve.
- Whether Argentine ants pose a significant direct risk to yellow warbler nestlings and fledglings in the Habitat Reserve and indirectly to yellow warblers through impacts on the native insect prey population.

Yellow Warbler Conceptual Stressor Model



- Whether urban-related predators such as cats pose a significant risk to nesting yellow warblers in the Habitat Reserve, particularly at the Habitat Reserve-urban development interface
- Whether certain land uses adjacent to occupied yellow warbler breeding habitat in the Habitat Reserve have adverse effects on breeding success, such as noise, human activity, etc.
- Whether cattle-related impacts in riparian areas have an adverse effect on yellow warbler habitat in the Habitat Reserve.

Level of Management and Monitoring Priority - Medium

With 26 documented locations in Subarea 1 and 34 locations in the larger planning area, the Subregion supports a moderate population of this species. At this time there are no identified imminent threats to the yellow warbler in the Habitat Reserve that require immediate action, although invasive species controls in Arroyo Trabuco and San Juan Creek will be a priority management action that will benefit the species. In particular, the County will provide funding for invasive species controls, including giant reed, in San Juan Creek within Caspers Wilderness Park as mitigation for impacts to vireos on the Prima Deshecha Landfill that will also benefit the yellow warbler. Brown-head cowbird parasitism and Argentine ants will be management issues that will be addressed as buildout of the project area progresses. Cowbird trapping has been and will continue to be conducted in lower Arroyo Trabuco in conjunction with the Golf Course. It is anticipated that initiation of cowbird trapping and Argentine ant assessment and potential management actions in GERA will occur with construction in PA 3.

Level of Monitoring (*e.g.*, Species-specific, habitat, landscape, combination)

Monitoring will be conducted both at a species-specific and habitat landscape level.

Monitoring Variables

Listed below are suggested species- and habitat-based monitoring variables. The detailed monitoring program for the yellow warbler will be developed by the Reserve Manager and Science Panel.

Species-specific Monitoring Variables

1. Status of breeding population
2. Proportion of "suitable" habitat occupied
3. Brown-headed cowbird nest parasitism

4. Argentine ant impacts
5. Urban-related predator impacts

Habitat-based Monitoring Variables

1. Vegetation communities long-term status
2. Relative cover of different native plant species
3. Proportion of exotic plant species/native plant species
4. Results of habitat restoration activities, including invasive species controls, riparian/wetland restoration, and creek and soils stabilization programs

Abiotic Monitoring Variables

1. Climate
2. Weather
3. Air quality
4. Water quality and runoff

Management Actions

The following management actions implemented as part of the HRMP will directly benefit the yellow warbler and its habitat:

- Habitat Restoration Plan
- Invasive Species Control Plan
- Wildland Fire Management Plan

The Habitat Restoration and Invasive Species Control plans are key to management of the yellow warbler. The Arroyo Trabuco *important population* is affected by giant reed and pampas grass proliferation and the GERA *important population* by stream perennialization and erosion/sediment impacts resulting from excessive surface and subsurface flows from upstream development. The *important populations* in San Juan Creek also are being affected by giant reed infestation. Management actions designed to address these stressors and enhance net habitat value for the yellow warbler chat include: **(1)** subject to the discretion by the Reserve Manager and Science Panel, revegetation in Sulphur Canyon to reduce the generation of fine sediments currently affecting downstream areas within Gobernadora Creek; **(2)** management of excessive surface and subsurface flows from Coto de Caza through the Gobernadora Multi-purpose Basin to protect existing riparian habitat downstream of the knickpoint in GERA and potential new habitat upstream of the knickpoint; **(3)** potential restoration of the historic meander and associated habitat above the knickpoint and potential restoration in the "fertile crescent" area near the mouth of Gobernadora Creek to provide additional chat habitat; **(4)** addressing upstream land use-induced channel incision and erosion through the Gobernadora Multi-purpose Basin; **(5)**

invasive plant species control, including giant reed in San Juan Creek and Arroyo Trabuco and pampas grass in Arroyo Trabuco, to provide for additional native riparian vegetation and increased water supplies; **(6)** conservation of upstream sources of coarse sediments and maintenance/repair of episodic flood events to help maintain natural succession of riparian habitat; **(7)** implementation of the coordinated WQMP to address hydrologic conditions of concern and pollutants of concern; (**8)** control of Argentine ants; and **(9)** brown-headed cowbird trapping where needed. Habitat restoration also would address erosion and localized headcuts in Chiquita Creek, which supports a small yellow warbler population.

"Coordinated Management Plans" that are not formal elements of the HRMP but will also benefit the yellow warbler are:

- Grazing Management Plan
- Water Quality Management Plan (as noted above)

The reader is referred to the individual management plans for more details.

Cattle normally are excluded from GERA. However, grazing would occur in GERA once every three years for fuel modification outside the warbler breeding season (February 15-July 15). This periodic grazing in GERA will not affect the warbler.

Potential Target Studies

Several management information needs relevant to management of the yellow warbler were listed above, some of which could be addressed at the subregional scale and would help inform management of the Habitat Reserve. Other management information needs, particularly those related to rangewide persistence of the species (*e.g.*, landscape habitat fragmentation) are best studied at a rangewide scale. The following are potential target studies that could be implemented at the subregional scale:

- Assessment of impacts of brown-headed cowbirds and evaluation of the effects of cowbird controls
- Assessment of impacts of Argentine ants and evaluation of the effects of ant controls related to:
    - Direct impacts on nestlings and fledglings
    - Indirect impacts on prey
- Evaluation of impacts of urban-related predators on yellow warblers

- Evaluation of restoration effects on breeding populations, including invasive species controls, active revegetation and upstream restoration in Gobernadora to reestablish natural creek meander and control fine sediments
- Evaluation of adverse edge effects on occupation and/or breeding success

SPECIES ACCOUNT

Rangewide and Regional Status

Yellow warblers nest from northern Alaska eastward to Newfoundland, Canada 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, the yellow warbler is an uncommon to common, summer resident in the north and locally common in the south (Zeiner *et al.* 1990). It breeds in riparian woodlands from northern and central California generally west of the Sierra Nevada to the coastal slopes of southern California. It breeds in coastal and desert lowlands up to 2,500 m (8,000 ft) in the Sierra Nevada and other montane chaparral and forest habitats (Grinnell and Miller 1944). The yellow warbler also occurs as a migrant throughout the state and it is a common migrant on the Channel and Farallon Islands in spring and fall (DeSante and Ainley 1980; Garrett and Dunn 1981).

The patterns of yellow warbler population densities probably have changed since Europeans settled North America and altered the character of riparian systems. Although no large-scale, range-wide changes are documented for the yellow warbler, populations in the southwestern United States have declined dramatically in recent decades in many lowland areas, including the southern coast, Colorado River, and San Joaquin and Sacramento valleys (Lowther *et al.* 1999). It is now rare to uncommon in many lowland areas where formerly it was common (McCaskie *et al.* 1979; Garrett and Dunn 1981). The subspecies *D. p. brewsteri*, which occurs in the NCCP planning area, is a CDFG CSC and has a CNDDB rank of G5T3?S2. The full species *D. petechia* is secure in its global range. The "T3" rank attached to the global rank refers to the subspecies *D. p. brewsteri,* and indicates that the subspecies is restricted in its range. The "?" indicates some possible question regarding the status of the subspecies within its range. The S2 state rank indicates that the subspecies is considered endangered in California. Threats to the species include habitat destruction and fragmentation and brood-parasitism by brown-headed cowbirds (Garrett and Dunn 1981). The populations in the western United States are particularly affected by intense grazing, especially where willow growth along riparian habitats is reduced or removed. Brown-headed cowbird parasitism also is a threat to yellow warblers (Garrett and Dunn 1981). For example cowbird management is associated with a dramatic increase from five breeding territories in 1986 to over 250 in 1998 in the Prado Basin in Riverside County (Hays

1986, USFWS pers. obs; Pike 1998 USFWS, pers. comm. as cited in Western Riverside MSHCP, November 2002, Vol II-B, B-645).

Available information on the state-wide distribution of the species is variable. For example, the 2003 CNDDB contains only 36 records for the species distributed among the counties and general locations shown in *Table 2-25*.

TABLE 2-25
2003 CNDDB RANGEWIDE DISTRIBUTION OF THE YELLOW WARBLER IN CALIFORNIA

County	General Location
Alameda	Cull Creek Recreation Area
Imperial	Niland, Calexico
Fresno	Lake Thomas A. Edison/Mono Creek
Inyo	Furnace Creek, Shosone, Wild Rose Mine
Kern	S. Fork Kern River
Marin	Olema Marsh
Mendocino	Little Lake Valley
Mono	Lee Vining
Monterey	Salinas River
Placer	Soda Springs-Baker Ranch Road, Antone Meadows
Riverside	Snow Creek, Cottonwood Springs, Prado County Park, Wilson Creek
San Bernardino	Hesperia, Morongo Valley, Big Morongo Wildlife Sanctuary, Black Rock Spring
San Diego	San Diego River, Vallecito Creek, Sweetwater River
Sierra	Lower Sardine Lake
Santa Barbara	Sisquoc River
Tehama	Todd Island, Sacramento River, Bisquit Flat, Sunflower Gulch, Ventura (Santa Clara River), Nevada (Donner Lake, Dry Creek

For southern California, the Southern Subregion database includes 34 locations (described below) and the western Riverside MSHCP database includes approximately 47 recent records that were considered precise enough to be used for the conservation analysis for that program. Within western Riverside County, significant breeding populations occur in the Prado Basin (Hays 1999, pers. obs.), and other breeding areas 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 woodland areas within the San Bernardino National Forest. The yellow warbler was not evaluated for regulatory coverage in either the San

Diego MSCP or MHCP. However, based on Unitt (1984), the known and probable breeding distribution of the species in San Diego County includes all the major coastal drainages, including the Tijuana, Sweetwater, San Diego, San Dieguito, and San Luis Rey rivers.

Subregional Status

There are 34 locations for the yellow warbler in the planning area database, of which 26 are in Subarea 1. The warbler distribution in the planning area generally overlaps with the least Bell's vireo distribution, but, like the yellow-breasted chat, is somewhat broader because it also occurs in more open canopy riparian woodlands in the subregion. As listed below, four *important populations* of the yellow warbler were identified for the study area: lower Arroyo Trabuco, lower Gobernadora Creek (GERA), San Juan Creek at the confluence with Chiquita Creek, and San Juan Creek downstream of the confluence with Bell Creek (see *Figure 175-M*).

- Lower Arroyo Trabuco south of Crown Valley Parkway supports at least four locations (No. 1 on *Figure 175-M*). This area also supports an *important population* of the least Bell's vireo, and thus has very high riparian habitat quality and importance in the subregion.
- GERA supports at least five locations, with a sixth just south of the dirt road below GERA in lower Gobernadora Creek (No. 2 on *Figure 175-M*). This area also supports *important populations* of the least Bell's vireo and southwestern willow flycatcher.
- Central San Juan Creek near the confluence with Chiquita Creek supports two locations, as well as about eight yellow-breasted chat locations, indicating high quality riparian habitat in this reach of the creek (No. 3 on *Figure 175-M*).
- Central San Juan Creek downstream of the confluence with Bell Creek supports four locations in association with about 10 yellow-breasted chat locations, indicating riparian habitat of sufficient quality for the yellow warbler in this reach of the creek (No. 4 on *Figure 175-M*). However, this reach of the creek currently supports extensive stands of giant reed that will need to be controlled to sustain the warbler in this area.

It is interesting to note the six locations for the yellow warbler occur in upper Gobernadora Creek within Coto de Caza. These data date back to 1997 and the current status of the habitat suitability for the warbler in this area is unknown.

No *key locations* in the subregion were identified for the yellow warbler. There are no obvious locations with a high concentration of the species that would appear to be necessary for conserving this species in the subregion.

The most common riparian habitat supporting the yellow warbler in the planning area is southern arroyo willow forest, followed by mule fat scrub, southern willow scrub, southern sycamore riparian woodland, and freshwater marsh. Other habitats supporting yellow warbler locations in the planning area are giant reed, floodplain sage scrub, intermittent rivers and streams, and southern coast live oak riparian woodland.

Biological Considerations

Throughout its range the yellow warbler most commonly breeds in wet, deciduous thickets (especially those dominated by willows) and in disturbed and early successional habitats (Lowther *et al.* 1999). Yellow warblers in southern California breed in lowland and foothill riparian woodlands dominated by cottonwoods, alders, or willows and other small trees and shrubs typical of low, open-canopy riparian woodland (Garrett and Dunn 1981). The yellow warbler is found at elevations from 100-2,700 m (328-8,858 ft) within riparian habitat and at higher elevations along watercourses with riparian growth (Lowther *et al.* 1999). The yellow warbler also breeds in montane chaparral, open ponderosa pine and mixed conifer habitats with substantial amounts of brush (Zeiner *et al.* 1990). Breeding in montane shrubs and conifers is perhaps a recent phenomenon (Gaines 1977).

Yellow warblers usually arrive in California in April, and generally have migrated out of the area by October. There appears to be a post-breeding, upslope movement, mostly to middle elevations (Beedy 1975); it is scarce at elevations above 2,500 m (8,000 ft) (Gaines 1977). Small numbers regularly overwinter in southern California lowlands (Garrett and Dunn 1981). During migration, they occur in lowland and foothill woodland habitats such as desert oases, riparian woodlands, oak woodlands, mixed deciduous-coniferous woodlands, suburban and urban gardens and parks, groves of exotic trees, farmyard windbreaks, and orchards (Small 1994).

Preferred nest trees of yellow warbles are willows, alders, and cottonwoods, but birds have been observed using tamarisk *(Tamarix* sp.) (Brown and Trosset 1989). The nest is an open cup placed 0.6 to 5 m (2-16 ft) above ground in a deciduous sapling or shrub. Breeding is from mid-April into early August with peak activity in June. Three to six eggs (usually four or five) are laid and incubated by the female for 11 days. Nestlings are tended by both parents until fledging at 9-12 days (Harrison 1978). The young breed the following year.

The annual adult survival rate of yellow warblers, based on returns of banded birds to the same breeding location, is estimated to be about 0.53. Nest predation has been found to be the major cause of nest failure of yellow warblers in Alaskan wetlands (Rodgers 1995). However, causes of nest failure for other geographical locations of breeding populations of yellow warbler are unknown, but it is likely that local conditions dictate level of predation risk (*e.g.*, abundance of

predators in an area). The maximum reported longevity is almost nine years by a male yellow warbler (Klimkiewicz *et al.* 1983).

Territories are established as soon as males arrive (Lowther *et al.* 1999). Yellow warblers defend multipurpose territories, which often include tall trees for singing and foraging and a heavy brush understory for nesting (Ficken and Ficken 1966). Territorial interactions are dynamic and continue throughout the breeding season. Territories and home ranges are relatively small, varying from 0.03-0.2 ha (0.08-0.5 ac) (Ficken and Ficken 1966; Beer *et al.* 1956). Peak densities measured in southeast Arizona have reached 48 birds/ha (~19 birds/ac) (Skagen *et al.* 1998).

The yellow warbler forages for insects and spiders in the upper canopy of deciduous trees and shrubs. Occasionally it hawks insects from air, or eats berries. It gleans and hovers in the upper canopy of deciduous trees and shrubs (Bent 1953; Ehrlich *et al.* 1988). Summer observations of foraging showed that small limbs are preferred to large limbs, tips, and dead limbs for both deciduous and coniferous trees (Morse 1973). Foraging is typically observed between 0.3 to 16.8 m (1 to 55 ft), at the top of the vegetation, never on the ground and mostly between 6 to 8 m (20 to 26 ft).

Threats to the species include habitat destruction and fragmentation and brood-parasitism by brown-headed cowbirds (Garrett and Dunn 1981). The populations in the western United States are affected by intense grazing especially where willow growth along riparian habitats is reduced or removed. For example, an Oregon study on the effects of cattle grazing on riparian habitat found a negative correlation between shrub volume and the frequency of cattle use and a positive correlation between the time since a transect was last grazed by cattle and shrub volume (Taylor and Littlefield 1986). Photographs substantiated improvements in riparian vegetation when protected from cattle. Yellow warblers were more numerous on transects with abundant willow and few or no cattle than on transects with heavy cattle use and low shrub volume. The yellow warbler population increases coincided with a decrease in cattle and the elimination of willow cutting and spraying.

Protection Recommendations

- Protect the southern willow scrub in GERA in lower Gobernadora Creek that provides nesting habitat for the *important population* of the yellow warbler.
- Maintain and manage riparian and aquatic habitats along San Juan Creek for the *important populations* of the yellow warbler.

Management Recommendations

- Implement a cowbird trapping program to mitigate for impacts to existing habitat within the Chiquita and Gobernadora sub-basins and for potential impacts associated with future development. The cowbird trapping program will be evaluated on an annual basis and trap locations and trapping effort will be adjusted as part of the overall Adaptive Management Program (*e.g.,* if the number of trapped cowbirds drops to a prescribed threshold, the trapping program may be terminated or otherwise modified).
- Pursuant to the Grazing Management Plan, implement grazing management techniques to help protect riparian habitats and associated species while allowing for continued cattle grazing sufficient to support cattle ranching operations, and, where appropriate reducing fuel loads for fire.
- Protect downstream habitats (*e.g.,* lower San Juan Creek and lower Cristianitos Creek within the planning area) for the yellow warbler by maintaining hydrology, water quality and sediment delivery and minimizing additional loadings of nutrients or toxics.
- Control Argentine ants in proximity to yellow warbler nesting habitat.

Restoration Recommendations

- Implement restoration efforts to address localized headcuts within the Chiquita sub-basin as further described in the Watershed and Sub-basin Planning Principles.
- Implement a restoration program in Gobernadora Creek which addresses: **(1)** the historic creek meander above the knickpoint; and **(2)** upstream land use induced channel incision and erosion, including potentially excessive surface and groundwater originating upstream.
- Identify likely causes of erosion and potential measures to rectify causes of headcutting in the lower portion of Gobernadora Creek.
- Implement an invasive species eradication program for San Juan Creek between San Juan Capistrano and Bell Canyon to control giant reed and pampas grass in conjunction with upstream eradication efforts.
- Implement an invasive species eradication program for lower Cristianitos Creek from the confluence with Gabino Creek and the RMV boundary to control tamarisk, giant reed and pampas grass.