

FINAL

**CALIFORNIA GNATCATCHER AND
COASTAL CACTUS WREN
MONITORING REPORT FOR THE
SAN JOAQUIN HILLS BURN AREA
2000**

HARMSWORTH ASSOCIATES

DECEMBER 2000

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2000**

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EXECUTIVE SUMMARY

Harmsworth Associates continued focused surveys for the California gnatcatcher (*Polioptila californica californica*) and the cactus wren (*Campylorhynchus brunneicapillus*) in those portions of the San Joaquin Hills within the Nature Reserve of Orange County burned in the 1993 Laguna Beach fire. This years surveys constituted the 6th year of post-fire avifaunal monitoring within the burn area.

The total number of gnatcatcher territories detected in the San Joaquin Hills burn area study site in 2000 decreased 35.9% from 92 in 1999 to 59 localities in 2000. The 46 gnatcatcher territorial pairs present in the study area in 2000 represent a 42% decrease in the number of gnatcatcher pairs from 1999, and a 24% decrease from 1998. This substantial decrease stands in contrast to four years of continued increase of the burn area population from the 8 pairs in 1996, 16 pairs present in 1997, 61 pairs in 1998, and 79 pairs in 1999.

A similar trend was observed for cactus wrens although the decrease was not as dramatic, a 28% reduction from 1999. The number of confirmed pairs decreased by 39.5%, from 38 to 23. The inland San Joaquin Hills, north of the transportation corridor continues to harbor the majority of the cactus wrens within the study area.

The decrease in the gnatcatcher and cactus wren population in the study area, and throughout the region, is likely attributed to large-scale environmental and climatological factors such as weather and seasonal rainfall.

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1.0 INTRODUCTION

1.1 Introduction

During the 1993 Laguna Beach Fire approximately 5,200 hectares of natural vegetation in the San Joaquin Hills burned, including 2,720 hectares of coastal sage scrub (Bontrager *et al.* 1995a). Only 188 hectares of coastal sage scrub within the burn area was unburned or lightly burned in the fire (LSA 1994). Prior to the fire an estimated 127 pairs of California gnatcatchers (*Polioptila californica californica*) and 282 pairs of cactus wrens (*Campylorhynchus brunneicapillus*) occupied the burn area of the San Joaquin Hills (Bontrager *et al.* 1995a, LSA 1994, 1995). The fire resulted in the loss or displacement of many of the resident California gnatcatchers and cactus wrens. (NOTE: the Orange County Central/Coastal Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) documented 116 California gnatcatcher sites and 509 cactus wren sites burned by the Laguna Beach Fire [County of Orange 1996]).

In an attempt to characterize the natural recovery of the burn areas as sensitive bird habitat, the U.S. Fish and Wildlife Service (USFWS) required the Transportation Corridor Agencies (TCA) to monitor the burn sites to detect the natural regeneration of the habitat and the return of the gnatcatcher and the cactus wren. This requirement was part of the mitigation measures for the construction of the San Joaquin Hills Transportation Corridor (SJHTC) (Term and Condition #11 of the FWS Biological Opinion (1-6-93-F-98R) and Mitigation Measure FWS 17 of the SJHTC Mitigation Monitoring Program. The monitoring program was initiated in 1993 and continued through 1998 (LSA 1994, 1995; GWB 1996; Harmsworth Associates 1996, 1997, 1998a). In 1998 the TCA, with the cooperation of the USFWS and California Department of Fish and Game (CDFG), transferred the obligation of the terms and conditions of the Biological Opinion to The Nature Reserve of Orange County (NROC). Thereafter, future gnatcatcher/cactus wren studies in the San Joaquin Hills burn area were incorporated into the NROC management program. Under the current program, Harmsworth Associates continued part of the monitoring efforts on behalf of the NROC. This is the second year of monitoring under this contract.

The objectives of this year's surveys were:

- to accurately assess the abundance of the California gnatcatcher and cactus wren in NROC lands in the San Joaquin Hills burned by the 1993 Laguna Beach fire, and
- to map potential habitat for the California gnatcatcher within the burn area.

This report documents the results of the 2000 surveys and provides a summary of survey efforts over the last five years (1996 through 2000).

1.2 Target species biology

The California gnatcatcher is an obligate resident of coastal sage scrub in southern California and northwestern Baja California. This small, non-migratory, insectivorous bird nests and forages in moderately dense stands of coastal sage scrub occurring on arid hillsides, mesas, and in washes. It generally occurs below 250 m in elevation (Atwood and Bolsinger 1992). Coastal sage scrub communities dominated by California sagebrush (*Artemisia californica*), California buckwheat

(*Eriogonum fasciculatum*), white sage (*Salvia apiana*), and black sage (*Salvia mellifera*) seem to be preferred by this species. The current population of California gnatcatchers in the United States is estimated to be approximately 2,899 pairs (USFWS 2000). Loss and fragmentation of suitable habitat due to expanding development have been major factors in the declining numbers of this species in southern California. The California gnatcatcher is currently listed as a Threatened Species by the USFWS (USFWS 1991).

The cactus wren is also an obligate resident of coastal sage scrub but, is further restricted in its distribution to large patches of prickly pear cactus (*Opuntia littoralis* and *O. oricola*) and cholla cactus (*O. prolifera*) within the scrub. The coastal population of cactus wrens are believed to be in decline but, this subspecies currently has no standing on the Endangered Species list primarily due to lack of taxonomic separation from other wren subspecies (Rea and Weaver 1990).

Both the California gnatcatcher and coastal cactus wren were target species around which the Orange County Natural Community Conservation Planning (NCCP) program was designed. Much of the remaining coastal sage scrub habitat in Orange County has been protected through this program.

1.3 Study area

The San Joaquin Hills are located in southwestern Orange County, east of Newport Beach and north of Laguna Beach, and are traversed by the San Joaquin Hills Transportation Corridor (Figure 1). The area encompasses 10,000 hectares of mostly undeveloped land, used primarily for cattle ranching, and local, regional, and state parks. The landscape is dominated by steep-sided canyons and hillsides, with elevations ranging from sea level along the Pacific shoreline to 480 meters in the interior. The climate is typically Mediterranean, with warm dry summers and cool wet winters. Early morning coastal fog frequently cloud the hillsides during Spring. Prior to the 1993 Laguna Beach Fire, the San Joaquin Hills were covered by a mosaic of plant communities with chaparral, coastal sage scrub and grassland dominating. Oak woodland, riparian woodland and marshes were also present. Due to the fire many of these communities are no longer present in their climax form, but are present in various stages of recovery.

The study area included all the burned portions of the San Joaquin Hills designated as NROC lands in the Coastal NCCP Sub-region. The study area is bisected by the San Joaquin Hills Transportation Corridor (SJHTC), forming the inland San Joaquin Hills (inland SJH) north of the SJHTC, and coastal San Joaquin Hills (coastal SJH), south of the SJHTC (Figure 1, 2a and 2b).

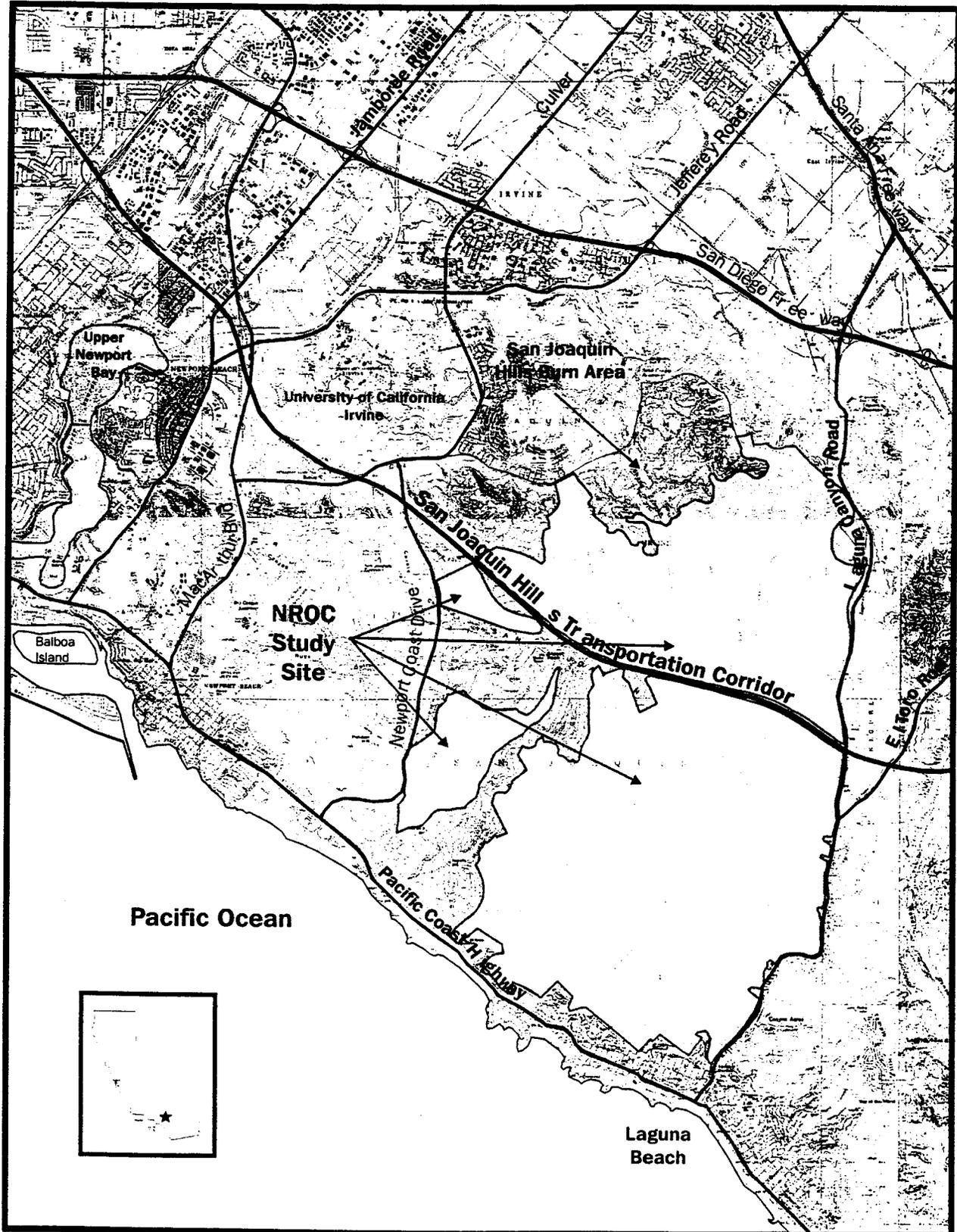


Figure 1
Location of 2000 Target Bird Study Site in Reserve Lands of the San Joaquin Hills Burn Area, California



2.0 METHODS

2.1 *Determination of gnatcatcher and cactus wren distribution and abundance*

To determine the distribution and abundance of California gnatcatchers and cactus wrens in the study area, presence/absence surveys were conducted at all suitable and potential habitat within the burn area three times during the breeding season (February through August). The SJHTC cut and fill slopes were surveyed where the vegetation was sufficiently well established to potentially support gnatcatchers or cactus wrens. Survey polygons were established based on topographic features (Figures 2a and 2b); survey routes were influenced by suitable habitat patches (Figure 3) and the previous year's locality data (Harmsworth Associates 1998a, 1999).

The survey methodology used to survey the monitoring sites followed the guidelines set forth by Mock *et al.* (1990), and by the Southern California Coastal Sage Scrub Scientific Review Panel (Brussard *et al.* 1992). In addition a 7-day interval was maintained between visits to the same monitoring site. The surveys were conducted during the morning hours (prior to 12:00 a.m.) and when the temperature exceeded 55°F. No more than 100 hectares were surveyed by each biologist per day, and no surveys were conducted during windy (>15 miles per hour), rainy, or extremely hot (>95°F) conditions. Taped vocalizations of gnatcatcher and wren calls were used when necessary (i.e., when pairs could not be located after observing the area for at least 10 minutes) to elicit a response from resident birds, if they were present.

Once target birds were located their legs were checked for the presence of bands, and if present the unique color combination of the bands were recorded. Biologists followed each bird long enough to determine whether the bird was paired or single. This, and other behavioral information, was recorded at each location. Bird locations were mapped on color aerial photographs and later transferred to 7.5-minute USGS topographic maps (Figure 4a, 4b, 5a, 5b; Appendix 8.6 and 8.7). This information shall be incorporated into the County of Orange Geographical Information System (GIS) database.

2.2 *Habitat Mapping*

In order to determine the succession of coastal sage scrub within the burn area and map the habitat available to the California gnatcatcher and cactus wren, potential habitat was updated from the mapping effort in 1998 (Harmsworth Associates 1998a). During the first sweep of presence/absence surveys all potential habitat was identified and mapped on a 7.5 minute USGS topographic map (Figure 3). This information shall be incorporated into the County of Orange GIS database.

2.3 *Sensitive Species, non-target avifauna and other wildlife*

During each field survey, biologists kept a record of all sensitive plant and wildlife species detected in the study area, and of all other wildlife species encountered (Appendix 8.1).

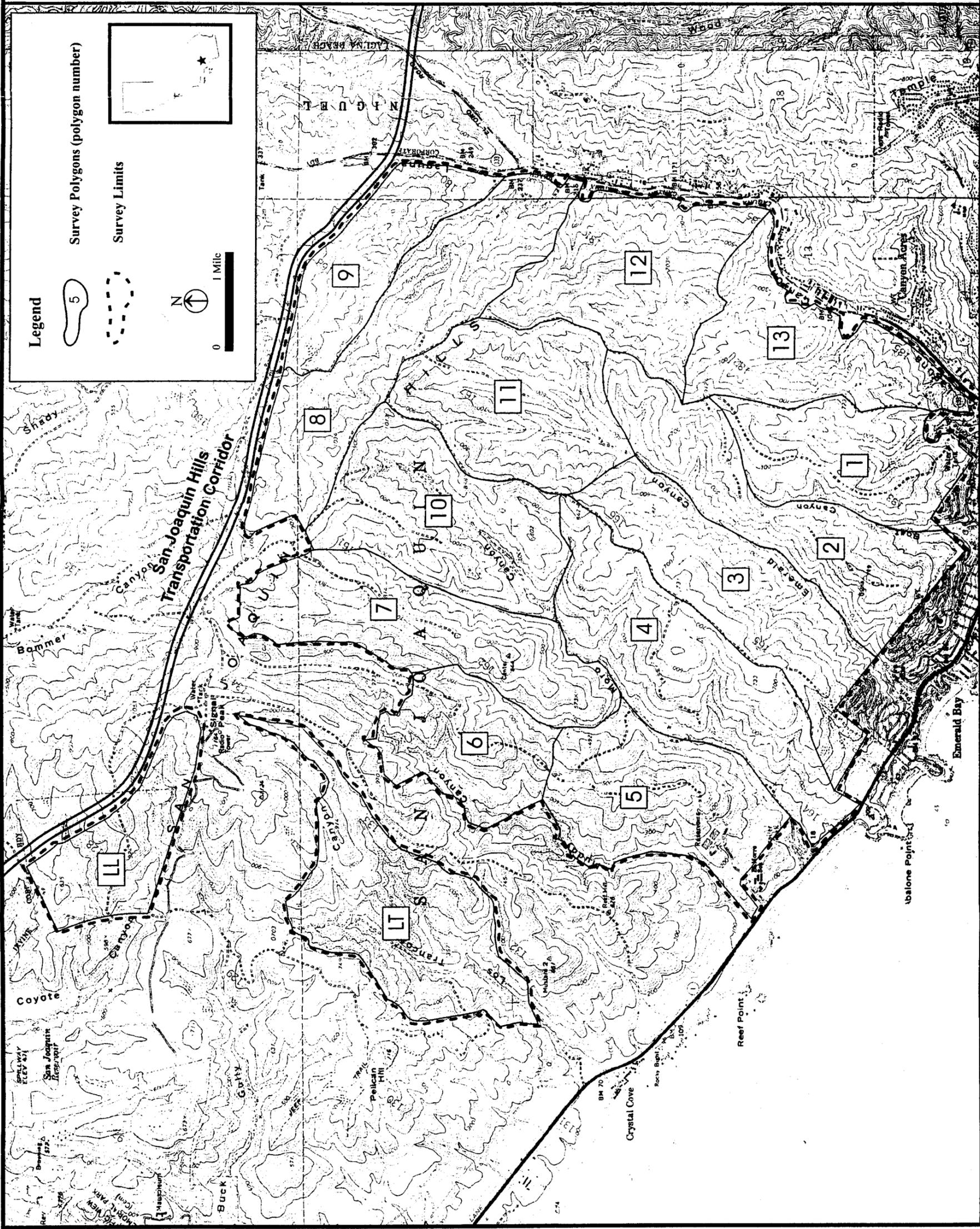


Figure 2a

Survey polygons in the coastal San Joaquin Hills Laguna Beach Burn Area, 2000

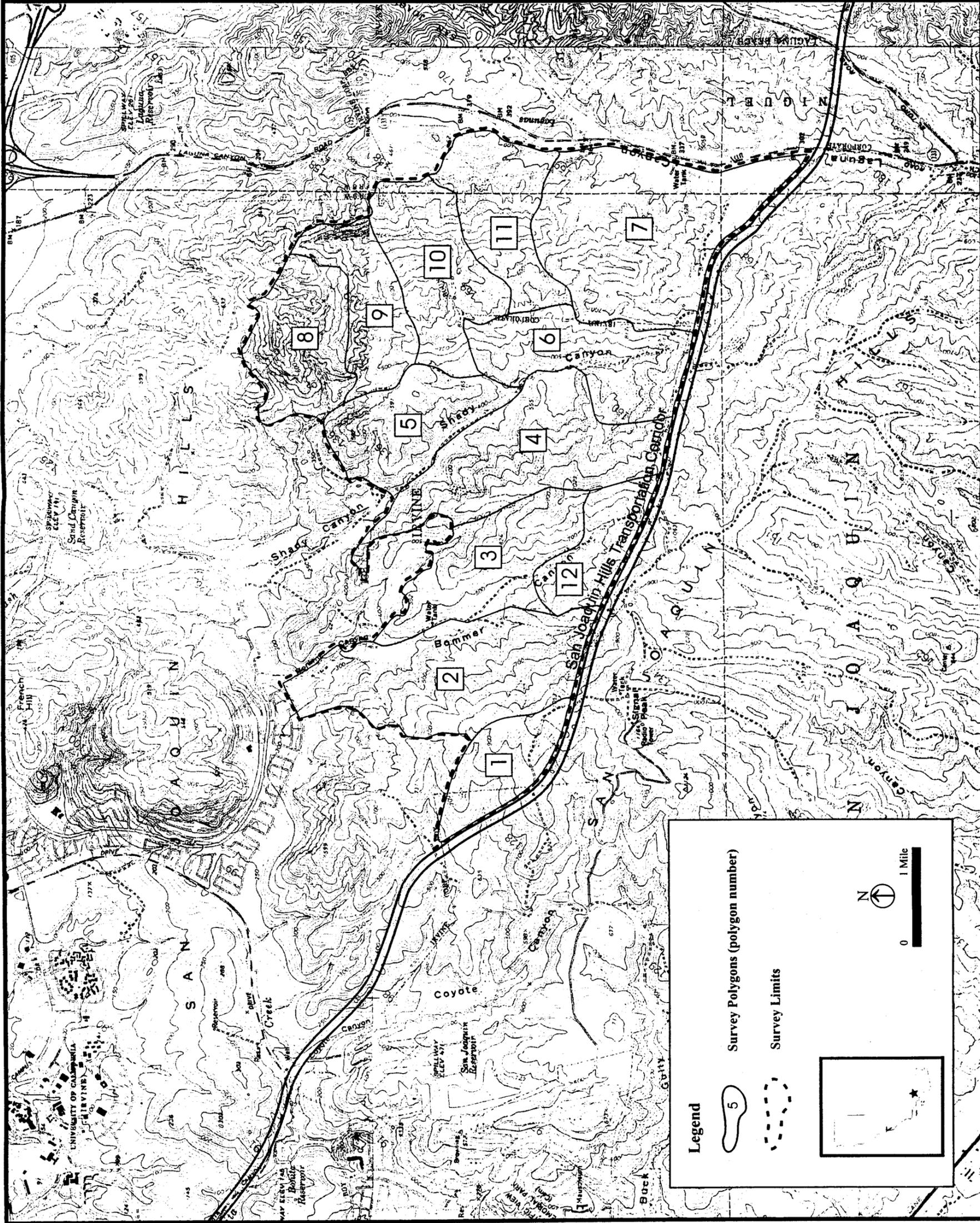


Figure 2b
Survey polygons in the
inland San Joaquin Hills
Laguna Beach Burn Area,
2000

3.0 RESULTS

3.1 *Distribution and abundance of the California gnatcatcher and the cactus wren*

California gnatcatchers were recorded at 80 different locations within the coastal and inland San Joaquin Hills study area (Figure 4a, 4b). Forty-six of these sightings represented pairs, of which 18 (39%) were confirmed breeding (determined through the observation of one or more adult bird tending at least one fledgling) (Table 1). Thirteen localities were single territorial adult gnatcatchers (either unpaired solitary male or solitary female birds holding territories). The remaining 21 localities were post-breeding dispersing juveniles. Gnatcatcher breeding pairs were located throughout the study area, with the largest numbers Church Canyon, Laguna Canyon and at Laidlaw (Table 1, Figure 4a and 4b). An additional five (5) gnatcatcher pairs and two (2) single territorial adult individuals were detected in non-reserve lands or immediately adjacent to the study area, in non-burned areas. These localities are excluded from Table 1 but are presented in Figures 4a and 4b and in Appendix 8.6.

Cactus wrens were recorded at 32 different locations in the study area in 2000 (Figure 5a, 5b). Of these sightings, 23 represented pairs, of which 5 pairs (22%) were confirmed breeding successfully (adult/s observed tending at least one fledgling). The other sightings were nine unpaired territorial adult wrens and 3 post-breeding dispersing juveniles. Wrens were located primarily in Bommer Canyon, Shady Canyon, Church Canyon and the coastal slopes above Laguna Beach (Table 1, Figures 5a, 5b). An additional two (2) cactus wren pairs were detected in non-reserve lands adjacent to Church Canyon (Figure 5b) and were excluded from Table 1 (Appendix 8.7).

Table 1: Locations of California gnatcatchers and cactus wrens in Reserve lands in the San Joaquin Hills burn area, 2000.

LOCATION	CAGN-PAIR	CAGN-SINGLE	CACW-PAIR	CACW-SINGLE
Laidlaw	10 (5)	0	0	0
Church Canyon	8 (6)	0	4 (1)	0
Bommer Canyon	6 (1)	0	10 (1)	4
Shady Canyon	3 (2)	3	5 (2)	3
Laguna Canyon	9 (2)	4	0	1
Upper Little Sycamore	0	0	0	0
Los Trancos Canyon	1	0	0	0
Moro Canyon	2	4	0	1
Emerald Canyon	2 (1)	2	2	0
Boat Canyon	1	0	0	0
Muddy Canyon	4 (1)	0	2 (1)	0
TOTAL	46 (18)	13	23 (5)	9

() = Parentheses indicates number of confirmed successful breeding pairs (adults observed tending fledglings).

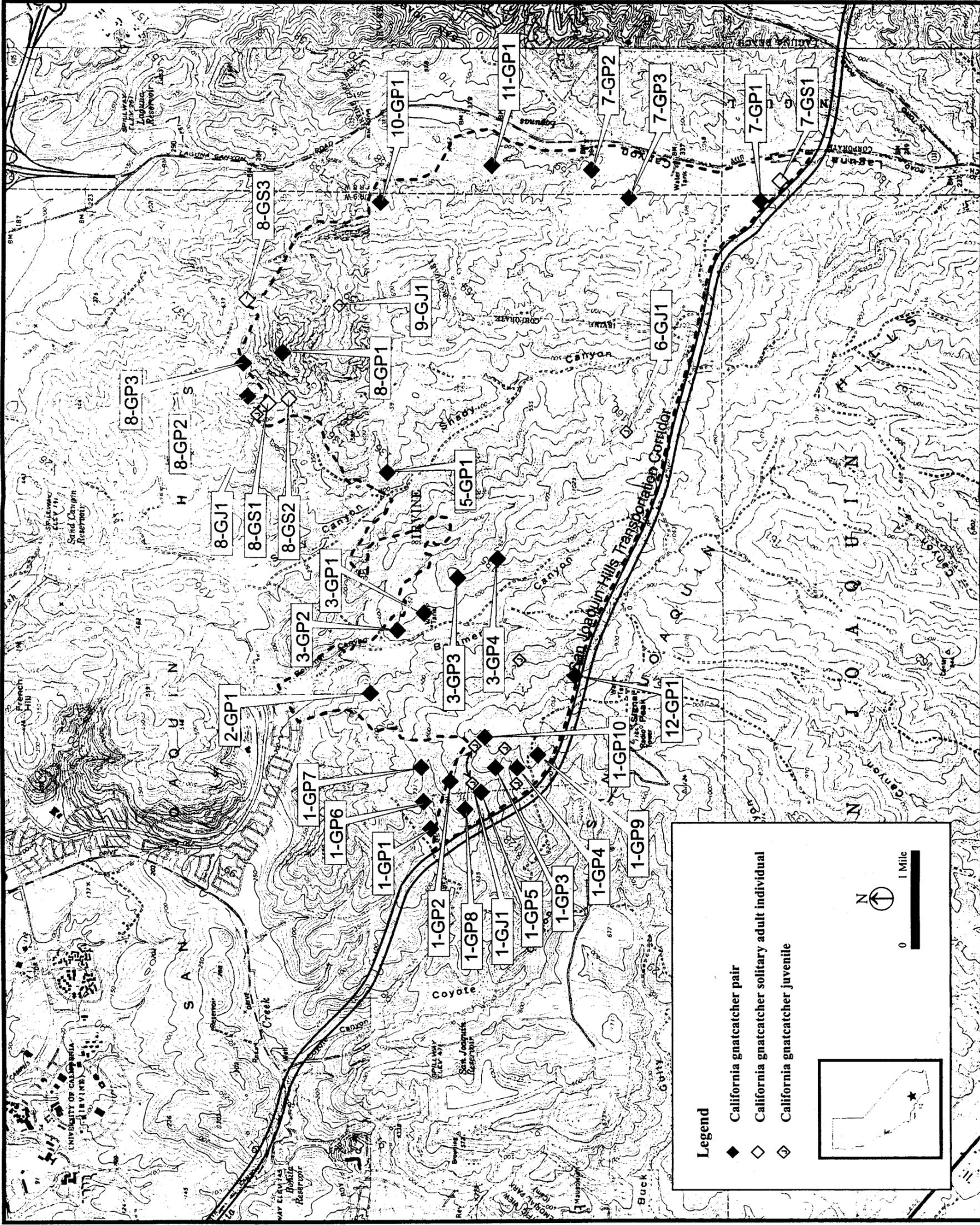


Figure 4b

Locations of California gnatcatcher adult pairs, solitary adult individuals and juveniles in the inland San Joaquin Hills Laguna Beach Burn Area, 2000

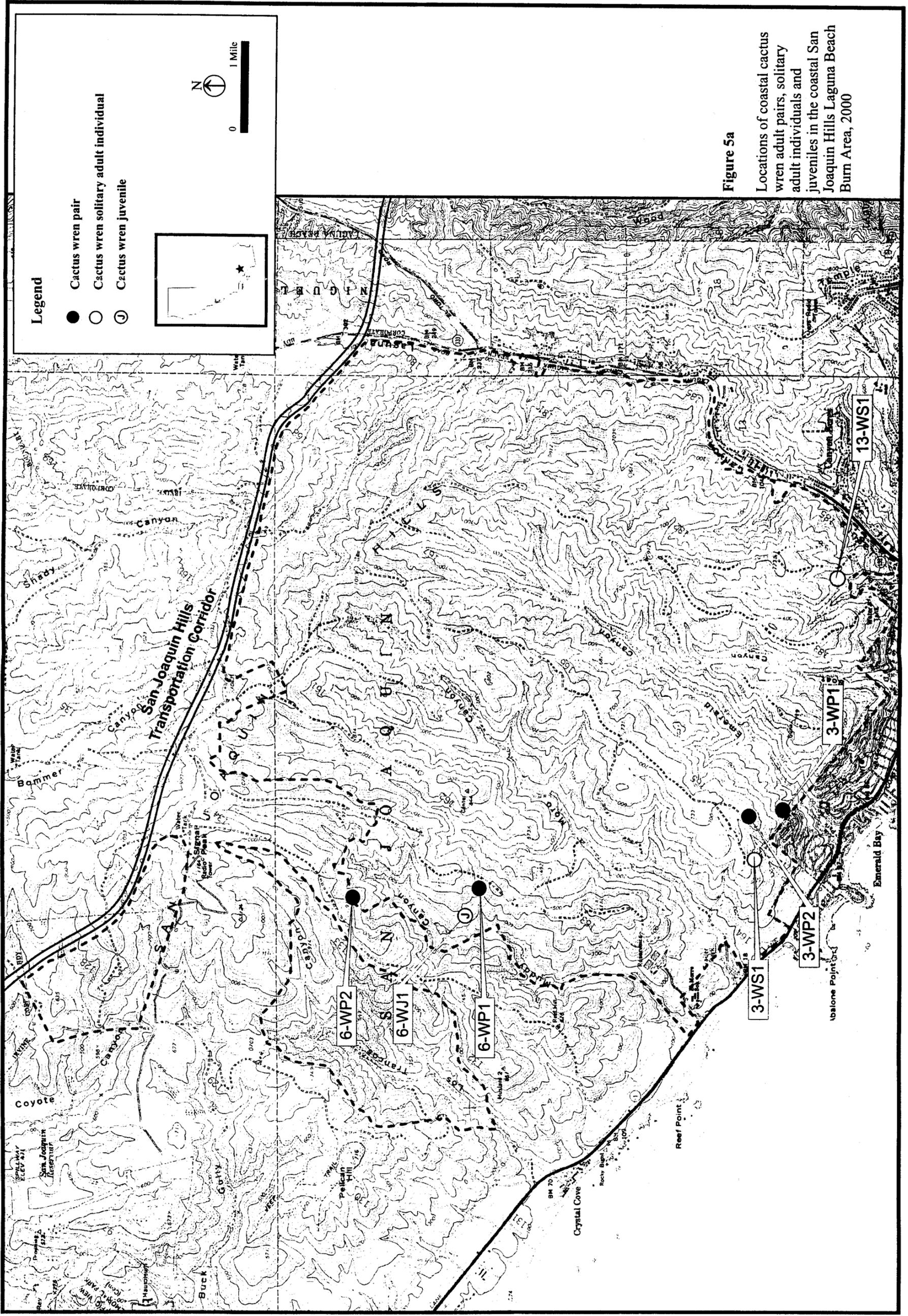


Figure 5a

Locations of coastal cactus wren adult pairs, solitary adult individuals and juveniles in the coastal San Joaquin Hills Laguna Beach Burn Area, 2000

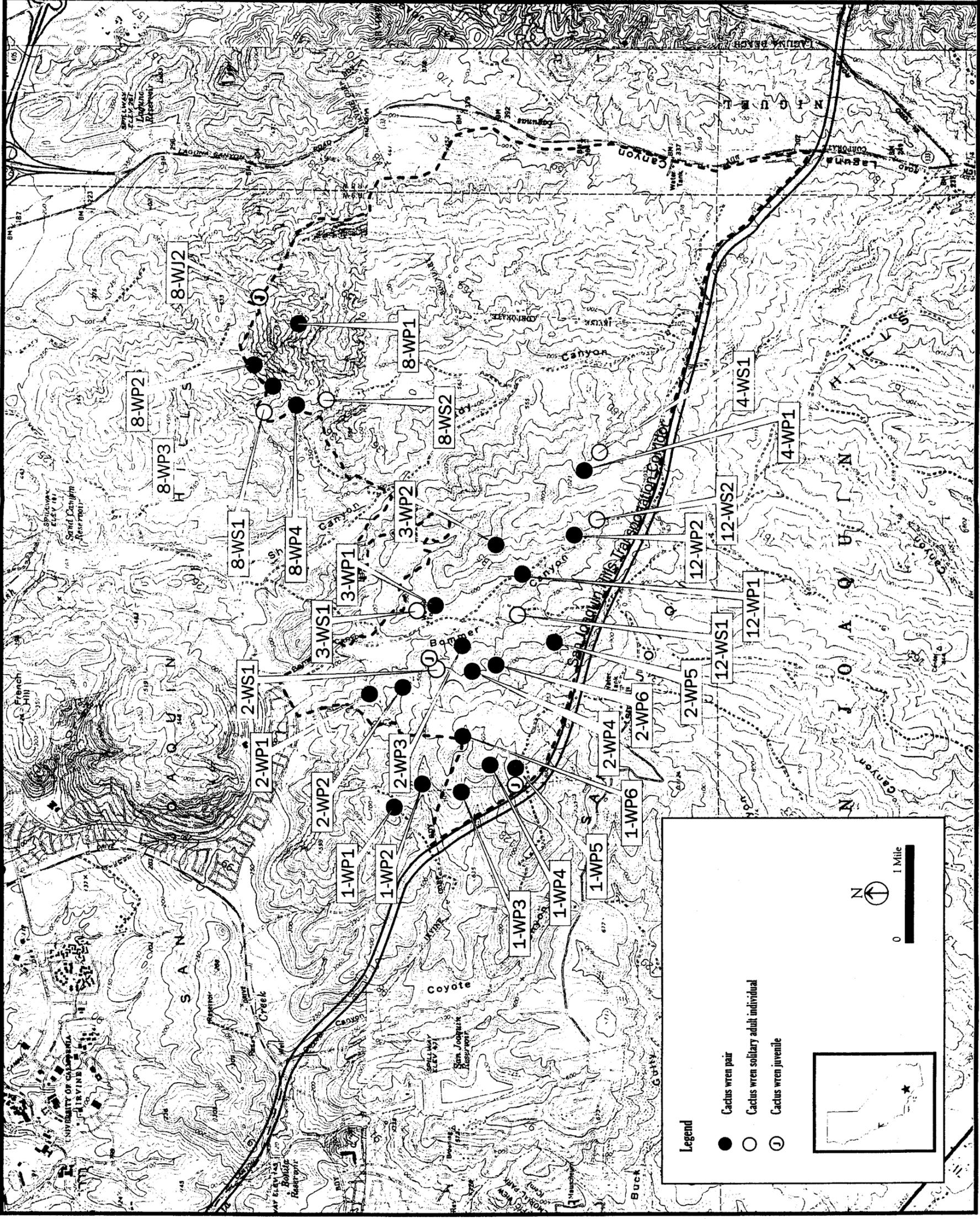


Figure 5b

Locations of coastal cactus wren adult pairs, solitary adult individuals and juveniles in the inland San Joaquin Hills Laguna Beach Burn Area, 2000

3.2 *Banded birds located*

Only four banded California gnatcatchers were recorded in the study area in 2000 (Appendix 8.2). All four banded gnatcatchers were banded in refugia adjacent to the study site by Dana Kamada. All band combinations were provided to Dave Bontrager to use in his analysis of gnatcatcher movement in the San Joaquin Hills (Atwood *et al.* 1998).

The documentation of 39 banded gnatcatchers recorded in the study site between 1996 through 2000 indicates a high level of movement into the burn area from surrounding mature scrub (Harmsworth Associates 1996, 1997, 1998, 1999). The majority of these birds were banded outside of the study area.

Only eight banded cactus wrens have been recorded in the study area, the last banded bird observed in 1998 (Appendix 8.3, Harmsworth Associates 1996, 1997, 1998, 1999). This is not surprising since cactus wren banding studies have not been conducted in the study area for several years.

3.3 *Habitat Mapping*

Potential habitat available for California gnatcatchers and cactus wrens did not vary substantially from that mapped in 1998. Much of the increase in suitable habitat was documented in the ridges between Shady and Laguna Canyons, Bommer and Church Canyons, ridges between Muddy and Moro Canyons and the coastal hills near Laguna Beach. The results of the 2000 habitat mapping are included in Figure 5.

3.4 *Sensitive species*

3.4.1 Sensitive wildlife species

Sensitive wildlife detected, other than the target species, included yellow-breasted chat (*Icteria virens*), San Diego horned lizard (*Phrynosoma coronarium*), Cooper's hawk (*Accipiter cooperii*), northern harrier (*Circus cyaneus*), loggerhead shrike (*Lanius ludovicianus*), Wilson's warbler (*Wilsonia pusilla*), rufous-crowned sparrow (*Aimophila ruficeps*), grasshopper sparrow (*Ammodramus savannarum*), white-tailed kite (*Elanus caeruleus*), great horned owl (*Bubo virginianus*), and black-tailed jackrabbit (*Lepus californicus*) (Figure 6a, 6b).

Only three records of yellow-breasted chat were documented within the study area in 2000, as compared to nine localities in 1999. The yellow-breasted chat localities in El Moro Canyon suggest that these migrants return each year to breed in the canyon since birds were also detected in 1999 (Figure 7). The yellow-breasted chat breeds in dense riparian woodlands and dense brush, scrub or thickets associated with streams, swamps and ponds. The yellow-breasted chat is listed by the CDFG as a species of special concern, whose decline in California has been attributed to loss and degradation of riparian habitats and possibly brood-parasitism by the brown-headed cowbird. In Orange County, yellow-breasted chats are rare localized breeders in

dense willow riparian woodlands of the foothills and lowlands (Hamilton and Willick 1996, Gallagher 1997, HWA 1998b).

During the 2000 surveys, the San Diego horned lizard was recorded in one location in the coastal portion of the study area at the head of Boat Canyon. Two neonates (approximately 3cm - snout to vent length) were detected on the edges of the ridgeline road on August 14, 2000. This locality is one of only a few locations known within the study area. Another record in 1999 documented the species from the ridgeline between Emerald and El Moro Canyon (Figure 7). The horned lizard, a California Species of Concern, inhabits sandy washes and open sandy areas within coastal sage scrub, grassland, chaparral, oak and riparian woodland.

Cooper's hawks were detected in Bommer, Church and El Moro Canyons in the study area (Figure 6a, 6b). Although focused surveys in 1997 did not document nesting Cooper's hawks within the burn area (Bloom 1999), these observations in 2000 suggest that the hawk utilizes habitat within the study area for foraging and cover, and may nest in the study area in the future. Cooper's hawk breed mainly in riparian and oak woodlands, preferring coast live oaks (*Quercus agrifolia*) as their primary host species, and willows as secondary hosts. The Cooper's hawk, a California Special of Concern, has declined significantly in recent decades because of habitat loss, persistent pesticide use and excessive nest robbing by falconers (Bloom 1999).

The loggerhead shrike is a fairly common but declining species in Orange County (Gallagher 1997) preferring flat and gentle sloping lands with occasional perches, such as fence posts or shrubs. Within the study area, the species was detected on only one occasion along the ridgeline between Los Trancos and Muddy Canyon, adjacent to the border of the study area (Figure 6a). The shrike is declining throughout its range and has been placed on the National Audubon Society's "Blue List" (Gallagher 1997).

The four northern harrier sightings are important records for the NROC since these raptors have experienced severe population declines within the region. The northern harrier is a "Species of Special Concern" in California, and on the National Audubon Society's "Blue List" of species showing serious population declines, with only one known breeding territory within the Central Coastal NCCP subregion (Bloom 2000).

Wilson's warblers are common spring and fall migrants, often forming mixed flocks with other neotropical transients. Wilson warblers likely nested in Orange County in extensive riparian woodlands in the earlier part of the 1900s (Hamilton *et al.* 1996). Rufous-crowned sparrows were ubiquitous, found throughout the Reserve lands with the greatest observations recorded at Church Canyon, Bommer Canyon, and Morro Canyon. With the exception of grasshopper sparrows, the remaining sensitive species recorded were observed at less than five locations (Figures 6a, 6b).

3.4.2 Sensitive plant species

Two sensitive plant species were detected during the 2000 target bird surveys. Intermediate mariposa lily (*Calochortus weedii* var. *intermedius*) and many-stemmed dudleya (*Dudleya multicaulis*) were both observed in the coastal and inland portions of the study area. The localities of these sensitive plant species are illustrated in Figure 6a and 6b.

The first sensitive species, intermediate mariposa lily is a bulbiferous herb, member of the lily family (Liliaceae). This geophyte is a Federal species of concern (FSC) and California Native Plant Society (CNPS) 1B species, indicating that it is rare, threatened or endangered in California and elsewhere. It is also a "conditionally covered species" under the Central/Coastal NCCP Subregion. Its distribution is limited to dry rocky open slopes and hills in the coastal ranges and northern Peninsula Ranges in Orange County associated with chaparral, coastal sage scrub, and valley and foothill grassland. In 2000, individuals were detected along Bommer Canyon ridge and in lower Laguna Canyon on rocky, northeast aspects dominated by bushmallow (*Malacothammus fasciculatus*) and black sage (*Salvia mellifera*). The species was not detected from several other known populations in the San Joaquin Hills (Figure 7), presumably a result of an unusually cool spring and lack of sufficient spring rainfall.

Many-stemmed dudleya were detected in 2000 on rocky ridgelines primarily in the vicinity of Bommer Canyon, and Laguna Canyon. Many-stemmed Dudleya is a perennial herb often found on clay soils in chaparral, coastal scrub and valley and foothill grasslands. It is also a FSC and CNPS 1B species. The small succulent occurred in thin well-drained soils on slopes and ridge tops in coastal sage scrub, chaparral, and native perennial grasslands. Other populations of many-stemmed dudleya are known from the study area including Camarillo ridge and the ridges east of Shady Canyon (Figure 7).

Several other sensitive plant species detected in 1999, including Catalina Mariposa Lily (*Calochortus catalinae*) and prostrate spineflower (*Chorizanthe procumbens*) were not detected in 2000. These locations and other sensitive species detected in 1999 are shown on Figure 7.

3.5 Non-target avifauna and other wildlife

A total of 103 wildlife species were detected in the study area in 2000 including 12 butterflies, 3 amphibia, 7 reptiles, 76 birds and 5 mammals (Appendix 8.1).

In both the coastal and inland San Joaquin Hills, the most frequently detected passerine species included spotted towhee (*Pipilo erythrophthalmus*), California towhee (*Pipilo crissalis*), mourning dove (*Zenaida macroura*), scrub jay (*Aphelocoma coerulescens*), rufous-crowned sparrows (*Aimophila ruficeps*), Anna's hummingbird (*Calypte anna*), cliff swallow (*Hirundo pyrrhonota*), raven (*Corvus corax*), Bewick's wren (*Thryomanes bewickii*), wrentit (*Chamaea fasciata*), northern mockingbird (*Mimus polyglottos*), house finch (*Carpodacus mexicanus*), wrentit (*Chamaea fasciata*), lesser goldfinch (*Carduelis psaltria*), common bushtit (*Psaltriparus minimus*). The turkey vulture (*Cathartes aura*) and red-tailed hawk (*Buteo jamaicensis*) were the most frequently observed raptors. The most abundant mammal was the desert cottontail (*Sylvilagus auduboni*).

No cowbirds were detected during the surveys. The paucity of cowbirds in the study area could be a result of several cowbird trapping programs conducted within the San Joaquin Hills (Harmsworth Associates 2000, Griffith Wildlife Biology, pers. comm.).

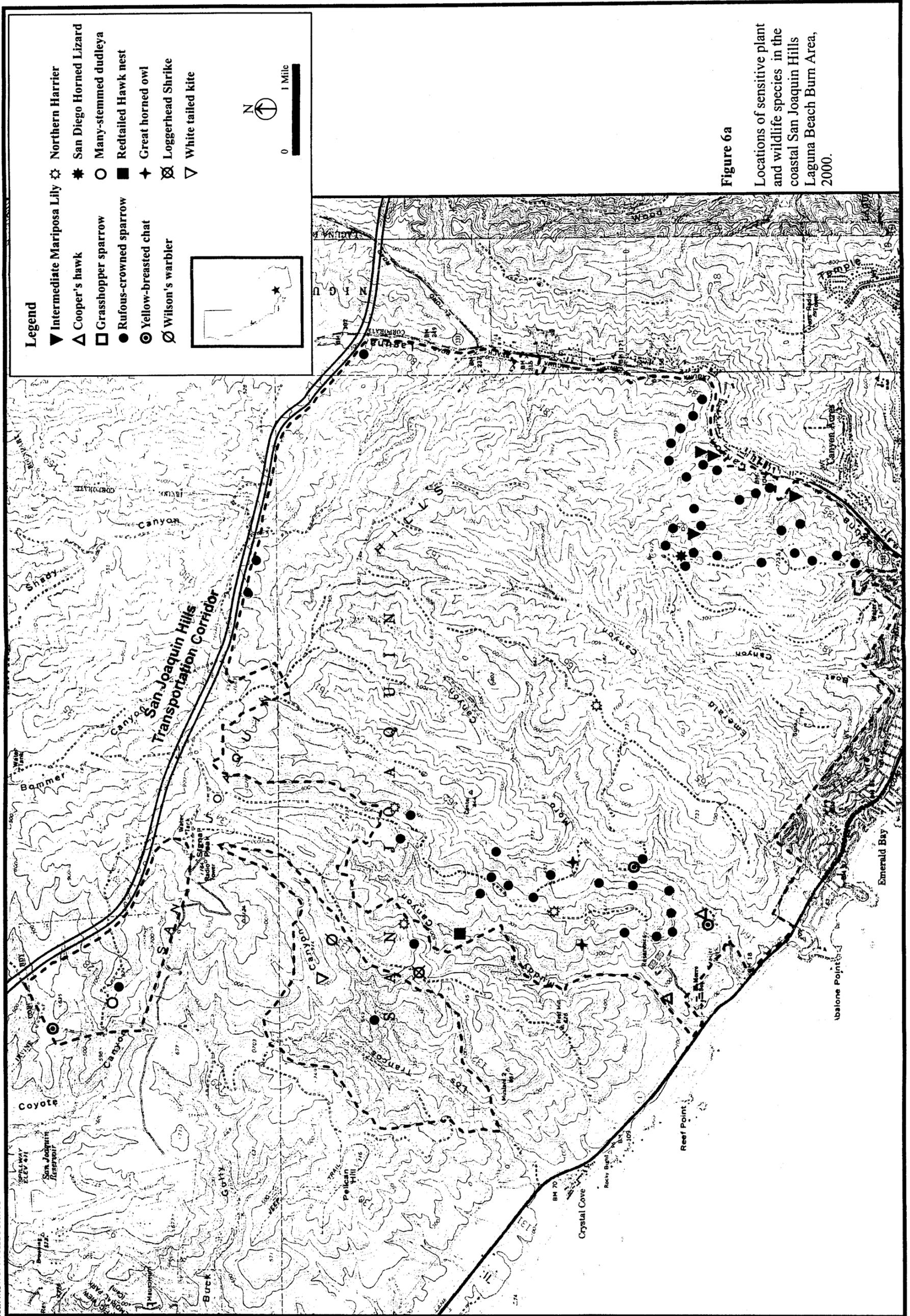


Figure 6a

Locations of sensitive plant and wildlife species in the coastal San Joaquin Hills Laguna Beach Burn Area, 2000.

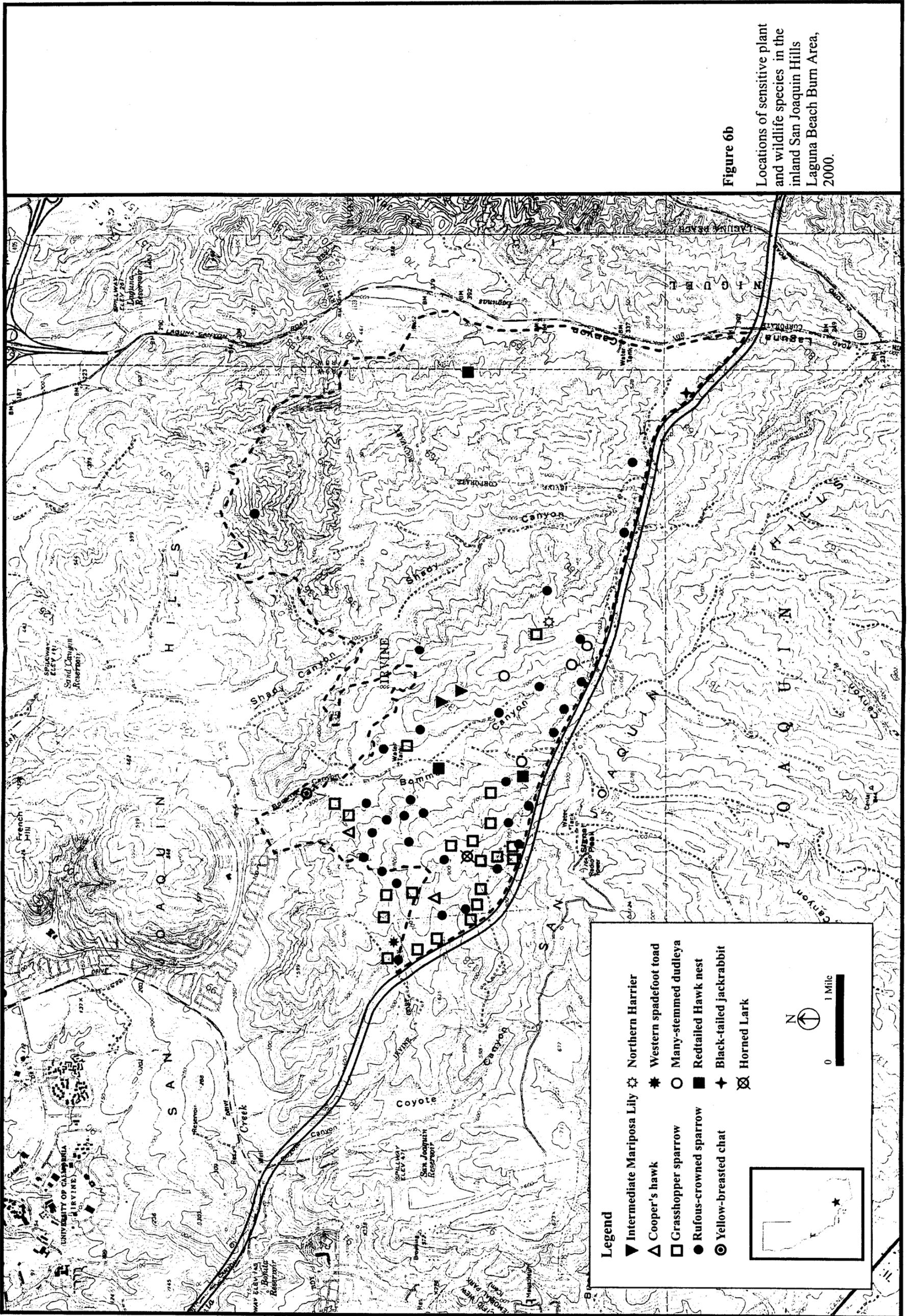


Figure 6b

Locations of sensitive plant and wildlife species in the inland San Joaquin Hills Laguna Beach Burn Area, 2000.

for concern, since only four wren pairs were confirmed in 2000. If this trend continues, cactus wrens may be extirpated from the coastal study area. Reasons for the low numbers of cactus wrens in the coastal SJH as compared to the inland SJH may include the following:

- Slow growth and recovery of cactus patches in the coastal SJH,
- Extirpation of southern cactus scrub, previously supporting wrens (source population eliminated) in upper Muddy and Los Trancos Canyons,
- Source populations (source of dispersing juveniles) are more abundant in the immediate vicinity of the inland SJH (Shady Canyon, Bommer Canyon),
- The SJHTC may present a barrier for post-breeding dispersing juveniles which may have historically dispersed from the inland SJH to suitable habitat in the coastal SJH, and
- Cactus wren localities on the urban edges adjacent North Laguna Beach may be subject to higher levels of predation from Argentine ants, feral animals, skunks and raccoons.

In addition, surveys conducted immediately after the burn, documented most cactus wrens in the northern portion of the burn area (inland SJH), where a greater number unburned refuges occurred (Turtle Rock, Shady Canyon, Sand Canyon, and Sycamore Hills). Only one refuge remained unburned in the coastal SJH, namely Crystal Cove State Park, at Pelican Point, where limited suitable cactus wren habitat occurs.

4.0 DISCUSSION

4.1 *California gnatcatcher*

The total number of gnatcatcher locations, including paired and single territorial unpaired individuals, detected in the San Joaquin Hills burn area study site in 2000 decreased 35.9% from 92 in 1999 to 59 localities in 2000. The decline in the inland study area was almost threefold that of the decline in the coastal portion of the study area (Table 2). Nevertheless, the current gnatcatcher population within the San Joaquin Hills burn area represent over 35 percent of gnatcatcher sites known on Reserve Lands within the coastal Subarea (59 of 164 sites [County of Orange 1996]). Clearly, the inland and coastal San Joaquin Hills burn areas are important refugia for gnatcatchers.

The 46 gnatcatcher territorial pairs present in the study area in 2000 represent a 42% decrease in the number of gnatcatcher pairs from 1999, and a 24% decrease from 1998 (Figure 8). This decrease stands in contrast to four years of continued increase of the burn area population from the 8 pairs in 1996, 16 pairs present in 1997, 61 pairs in 1998, and 79 pairs in 1999 (Figure 8, Appendix 8.4; Harmsworth Associates 1999). Although the same number of single territorial adults were detected in the study area in 1999 and 2000, the ratio of single individuals to pairs is relatively high indicating that many post-breeding dispersing individuals failed to find pair mates in the 2000 breeding season.

Table 2: Decline in number of gnatcatcher and cactus wren territories, 1999 – 2000*.

Study Area	Gnatcatcher territories			Cactus wren territories		
	1999	2000	% change	1999	2000	% change
Coastal SJH	41	34	-17.1	7	6	-14.3
Inland SJH	51	25	-51.0	38	26	-31.6
Total	92	59	-35.9	45	32	-28.9

* Territorial gnatcatcher and cactus wrens include paired and single unpaired individuals.

Other focused surveys for gnatcatchers in the NROC have reported similar declines in the Coastal Subarea and the Central Subarea (65% declines in the Coastal Subarea and 37% decline in the Central Subarea, an overall 48% reduction, Hamilton, pers. comm.). Similarly, other gnatcatcher studies in San Diego County have documented reductions in the number of territories greater than 50% (Carol Reynolds, pers. comm.). The consistency of this trend throughout the region may be attributed to large-scale environmental and climatological factors such as weather and seasonal rainfall. Lower monthly minimum temperatures in winter coupled with severe winter storms in January/February affect plant, insect and prey availability, which may account for the decline in the species (see Mock 1998). However, mean minimum temperatures recorded from Laguna Beach in January and February 2000 were 15% and 34%, respectively, above normal, while precipitation levels in February 2000 were approximately 39.3mm (58.7%) above normal rainfall levels (Western Regional Climate Center, Appendix 8.5). Thus, temperature and precipitation alone may not account for the reduction in numbers.

Although the large-scale population density factors proposed to explain this trend are assumed to affect populations similarly, within the San Joaquin burn area, gnatcatcher observations increased at some locations. In particular, three populations Church Canyon, Boat Canyon, and

Muddy Canyon exhibited increased populations in 2000 following decreased gnatcatcher populations in 1999 (Appendix 8.4). The slight increase in Church Canyon is likely a result of birds moving in from adjacent saturated breeding territories (source sites) at Laidlaw and Bonita Creek. Increases in gnatcatcher territories in 2000 were also recorded at Peter's Canyon Regional Park in the Central Subarea (Hamilton, pers. comm). On a local scale this variation may be explained by juvenile dispersal, emigration, immigration, or habitat suitability. More importantly, it illustrates typically population cycling and that individual year changes are not indicative of population trends.

Similarly given the regional context, the 2000 gnatcatcher population decrease in the San Joaquin Hills cannot directly be related to the recovery, or lack thereof, from the 1993 fire. The decrease observed most likely represents short-term population fluctuations. Population fluctuations are well documented from other gnatcatcher study sites within Orange County (Erickson and Miner 1998).

As the gnatcatcher and cactus wrens continue to breed, juvenile gnatcatchers (and cactus wrens) are expected to disperse both within the burn area and to other locations within the region. It is important to document the extent and location of these dispersal events. In order to achieve this, gnatcatcher nestlings (and possibly cactus wren nestlings) from monitored breeding pairs should be individually color banded in 2001. One such gnatcatcher nest-monitoring program within the region is expected to occur in 2001, in Coyote Canyon, Bonita Creek and along the SJHTC revegetation/restoration slopes (funded by TCA). Birds dispersing within the burn area will be recorded during future monitoring efforts by NROC and TCA biologists. Unfortunately, there are no planned nest-monitoring programs for the cactus wren.

4.2 *Cactus wren*

The same downward trend was observed for cactus wrens although the decrease was not as dramatic, a 28% reduction from 1999 (Figure 8, Table 2, Appendix 8.4). The number of confirmed pairs decreased by 39.5%, from 38 to 23. A total of 26 cactus wren territories (81% of the mapped territories within the study area) occurred north of the SJHTC (Figure 5b). However, the decrease in the inland SJH population was twice that of the coastal SJH population, reflecting the same trend recorded for the gnatcatchers. The inland study area overwhelmingly harbors the majority of the cactus wrens within the study area, 26 of the 32 localities (81.3% of the territories within the study area) (Table 2).

The proportionally smaller population decrease is consistent with the slower rate of increase observed over the last five years and is within the range of variation that would be expected from population fluctuations. However, more important than the total numbers observed is the proportion of the population that is successfully reproducing. In 1999, 70% of the cactus wrens observed were confirmed to be breeding pairs. During 2000, only 20% (5 of 24) pairs were observed with at least one fledgling/juvenile. Although these anecdotal notations should not be considered an estimate of breeding success, it may provide some insight on the relative abundance of adults rearing successful brood in 2000. Based on the low number of reproducing pairs, the cactus wren population within the burn area will likely require a few years to rebound to 1999 population numbers.

The distribution of cactus wrens is consistent with previous year surveys with the vast majority occurring in the inland SJH. The low numbers of cactus wrens within the coastal SJH is cause

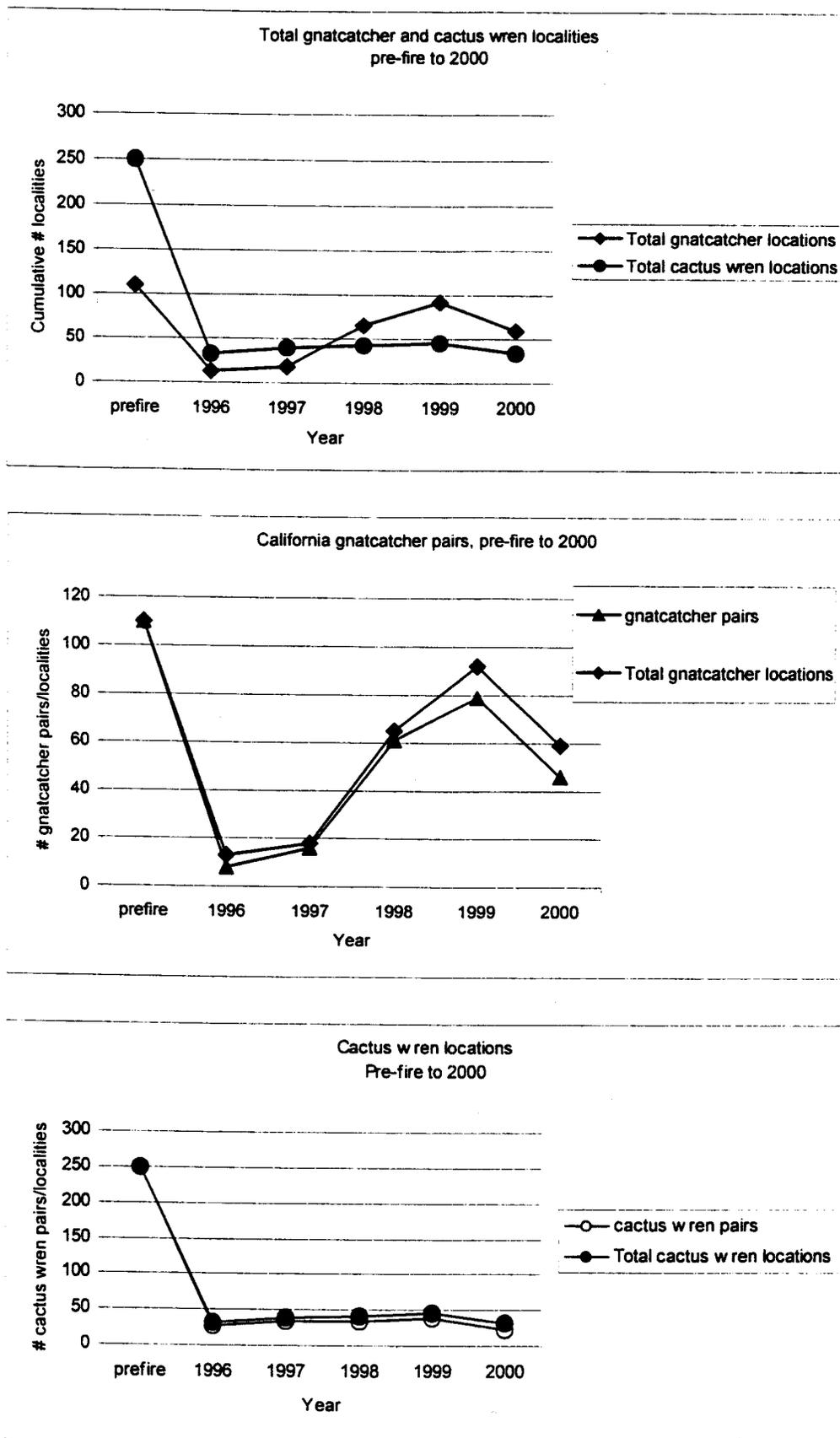


Figure 8: Number of California gnatcatcher and cactus wren localities recorded in the San Joaquin Hills burn area since the 1993 Laguna Beach Wildfire

5.0 RECOMMENDATIONS

The Nature Reserve of Orange County is obligated to continue burn studies within the San Joaquin Hills to document the recovery of California gnatcatchers and cactus wrens. While the 36 percent decline in gnatcatcher territories and 29 percent decline in cactus wren territories may be normal fluctuations in populations to be expected, it is important to continue documenting changes in populations over time, especially during periodic perturbations (such as wildfire) (County of Orange NCCP/HCP, Section 5.4.4, II-290). Therefore, it is recommended to continue the gnatcatcher and cactus wren census within the San Joaquin Hills burn area, as specified in the mitigation-monitoring program.

To continue the census, all suitable and potential habitat for the two target species in the burn area should be surveyed three times, beginning in early February, 2001. In addition, we recommend nest-monitoring and color-banding studies of a subset of gnatcatcher and cactus wren breeding pairs to document reproductive success and dispersal patterns within the burn area (specifically in the coastal SJH for the cactus wren). These studies could determine what management activities should be employed to facilitate the recovery of these target species within the burn area, and thus improve reserve functions (County of Orange NCCP/HCP, Section 5.4.6, II-294).

In addition to monitoring the reintroduction of the two identified species mentioned above, the census and nest monitoring data will also contribute information for the following:

- Documenting large scale changes in population status for the gnatcatcher and cactus wren, contributing to basic knowledge of the Reserve's biodiversity, dispersal and demography of the target species,
- Documenting the level of recovery after fire, which will be useful in fire management strategies provided for in NCCP/HCP documents; and
- Monitoring the recovery of other "identified species" to demonstrate their viability within the San Joaquin Hills.

Harmsworth Associates recommends the following studies in 2001:

- Continue gnatcatcher and cactus wren census in the San Joaquin Hills burn area,
- Implement nest-monitoring and color-banding program for a subset of cactus wren breeding pairs within the coastal and inland SJH, and
- Continue nest-monitoring and color-banding program for California gnatcatcher breeding pairs in adjacent unburned refugia (Atwood *et al.* 1998).

In addition, we recommend that the NROC Technical Advisory Committee (TAC) consider the low numbers of cactus wren sites within the coastal SJH, and address potential management strategies that may reverse or slow the decline. The NROC TAC should consider both passive and active management considerations including potential relocation of cactus wrens from the inland SJH (if the SJHTC indeed presents an obstacle for dispersing cactus wrens), enhancement of cactus wren habitat in the coastal SJH, and nest-monitoring studies.

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7.0 ACKNOWLEDGMENTS

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8.0 APPENDICES

Appendix 8.1: Fauna recorded in the San Joaquin Hills burn area, 2000.

ORDER Species Name	ORDER Common Name
LEPIDOPTERA	BUTTERFLIES
PIERIDAE	WHITES AND ORANGETIPS
<i>Artogeia rapae</i>	cabbage white
<i>Pontia protodice</i>	checkered white
SATYRIDAE	SATYRIDS
<i>Coenonympha californica</i>	California ringlet
DANAIDAE	MILKWEED BUTTERFLIES
<i>Danaus plexippus</i>	monarch
NYMPHALIDAE	BRUSH FOOTED BUTTERFLIES
<i>Speyeria callippe comstocki</i>	Comstock's fritillary
<i>Euphydryas chalcedona chalcedona</i>	Chalcedon checkerspot
<i>Vanessa cardui</i>	painted lady
LYCAENIDAE	BLUES
<i>Glaucopsyche lygdamus australis</i>	southern blue
<i>Leptotes marina</i>	marine blue
<i>Icaricia acmon</i>	Acmon blue
RIODININAE	METALMARKS
<i>Apodemia mormo virgulti</i>	Behr's metalmark
HESPERIDAE	DUSKYWINGS
<i>Erynnis funeralis</i>	funeral duskywing
<i>Hylephila phyleus</i>	fiery skipper
AMPHIBIA AND REPTILIA	AMPHIBIANS AND REPTILES
HYLIDAE	TREEFROGS
<i>Hyla regilla</i>	Pacific treefrog
RANIDAE	TRUE FROGS
<i>Rana catesbeiana</i>	bullfrog
IGUANIDAE	IGUANIDS
<i>Sceloporus occidentalis</i>	western fence lizard
<i>Phrynosoma coronatum*</i>	coast horned lizard
SCINCIDAE	SKINKS
<i>Eumeces skiltonianus</i>	western skink
ANGUIDAE	ALLIGATOR LIZARDS
<i>Gerrhonotus multicarinatus</i>	southern alligator lizard
COLUBRIDAE	COLUBRIDS
<i>Masticophis lateralis</i>	California racer
<i>Pituophis melanoleucus</i>	gopher snake
VIPERIDAE	VIPERS
<i>Crotalus viridis</i>	western rattlesnake

ORDER Species Name	ORDER Common Name
AVES	BIRDS
ARDEIDAE	HERONS & BITTERNS
<i>Ardea herodias</i>	great blue heron
<i>Egretta thula</i>	snowy egret
ANATIDAE	SWANS, GEESE & DUCKS
<i>Anas platyrhynchos</i>	mallard
<i>Anas strepera</i>	Gadwall
<i>Aythya valisineria</i>	canvasback
CATHARTIDAE	AMERICAN VULTURES
<i>Cathartes aura</i>	turkey vulture
ACCIPITRIDAE	KITES, HAWKS, EAGLES AND OSPREYS
<i>Elanus caeruleus*</i>	black-shouldered kite
<i>Circus cyaneus</i>	northern harrier
<i>Accipiter cooperii*</i>	Cooper's hawk
<i>Buteo jamaicensis</i>	red-tailed hawk
<i>Accipiter striatus</i>	sharp-shinned hawk
FALCONIDAE	FALCONS
<i>Falco sparverius</i>	American kestrel
PHASIANIDAE	PARTRIDGES AND ALLIES
<i>Callipepla californica</i>	California quail
CHARADRIIDAE	PLOVERS
<i>Charadrius vociferus</i>	killdeer
COLUMBIDAE	PIGEONS & DOVES
<i>Zenaida macroura</i>	mourning dove
CUCULIDAE	CUCKOOS & ROADRUNNERS
<i>Geococcyx californianus</i>	greater roadrunner
TYTONIDAE	BARN OWLS
<i>Tyto alba</i>	barn owl
STRIGIDAE	TYPICAL OWLS
<i>Bubo virginianus</i>	great horned owl
CAPRIMULGIDAE	NIGHTJARS
<i>Chordeles acutipennis</i>	lesser nighthawk
<i>Phalaenoptilus nuttallii</i>	common poor-will
APODIDAE	SWIFTS
<i>Aeronautes saxatalis</i>	white-throated swift
TROCHILIDAE	HUMMINGBIRDS
<i>Calypte anna</i>	Anna's hummingbird
<i>Selasphorus sasin</i>	Allen's hummingbird
<i>Calypte costae</i>	Costa's hummingbird
PICIDAE	WOODPECKERS
<i>Melanerpes formicivorus</i>	acorn woodpecker
<i>Colaptes auratus</i>	northern flicker
<i>Picoides nuttallii</i>	Nuttall's woodpecker
TYRANNIDAE	TYRANT FLYCATCHERS

ORDER Species Name	ORDER Common Name
<i>Tyrannus verticalis</i>	western kingbird
<i>Tyrannus vociferans</i>	Cassin's kingbird
<i>Myiarchus cinerascens</i>	ash-throated flycatcher
<i>Sayornis nigricans</i>	black phoebe
<i>Sayornis saya</i>	Say's Phoebe
<i>Empidonax difficilis</i>	pacific-slope flycatcher
ALAUDIDAE	LARKS
<i>Eremophila alpestris</i>	horned lark
HIRUNDINIDAE	SWALLOWS
<i>Hirundo rustica</i>	barn swallow, swallow
<i>Hirundo pyrrhonota</i>	cliff swallow
<i>Stelgidopteryx serripennis</i>	northern rough-winged swallow
CORVIDAE	CROWS, JAYS
<i>Corvus brachyrhynchos</i>	American crow
<i>Corvus corax</i>	raven
<i>Aphelocoma coerulescens</i>	scrub jay
AEGITHALIDAE	BUSHTIT
<i>Psaltriparus minimus</i>	common bushtit
TROGLODYTIDAE	WRENS
<i>Troglodytes aedon</i>	house wren
<i>Thryomanes bewickii</i>	Bewick's wren
<i>Catherpes mexicanus</i>	canyon wren
<i>Campylorhynchus brunneicapillus*</i>	cactus wren
MUSCICAPIDAE	THRUSHES, OLD WORLD WARBLERS
<i>Catharus guttatus</i>	hermit thrush
<i>Polioptila caerulea</i>	blue-gray gnatcatcher
<i>Polioptila californica*</i>	California gnatcatcher
<i>Chamaea fasciata</i>	wrentit
MIMIDAE	MIMIC THRUSHES
<i>Mimus polyglottos</i>	northern mockingbird
<i>Toxostoma crissale</i>	California thrasher
PTILOGONATIDAE	SILKY-FLYCATCHERS
<i>Phainopepla nitens</i>	phainopepla
LANIIDAE	SHRIKES
<i>Lanius ludovicianus*</i>	loggerhead shrike
STURNIDAE	STARLINGS
<i>Sturnus vulgaris</i>	European starling
PARULIDAE	WOOD-WARBLERS
<i>Dendroica coronata</i>	Yellow-rumped warbler
<i>Vermivora celata</i>	orange-crowned warbler
<i>Icteria virens*</i>	yellow-breasted chat
<i>Geothlypis trichas</i>	common yellowthroat
<i>Wilsonia pusilla*</i>	Wilson's warbler
EMBERIZIDS	NEW WORLD SPARROWS

ORDER Species Name	ORDER Common Name
<i>Zonotricha leucophrys</i>	white-crowned sparrow
<i>Zonotrichia atricapilla</i>	golden-crowned sparrow
<i>Chondestes grammacus</i>	lark sparrow
<i>Aimophila ruficeps</i> *	rufous-crowned sparrow
<i>Ammodramus savannarum</i> *	grasshopper sparrow
<i>Melospiza melodia</i>	song sparrow
<i>Pipilo erythrophthalmus</i>	spotted towhee
<i>Pipilo crissalis</i>	California towhee
<i>Junco hyemalis</i>	dark-eyed junco
CARDINALIDAE	CARDINALID FINCHES
<i>Pheucticus melanocephalus</i>	black-headed grosbeak
<i>Guiraca caerulea</i>	blue grosebeak
<i>Passerina ciris</i>	lazuli bunting
ICTERIDAE	AMERICAN ORIOLES
<i>Agelaius phoeniceus</i>	red-winged blackbird
<i>Sturnella neglecta</i>	western meadowlark
<i>Icterus galbula bullocki</i>	northern/bullocks oriole
<i>Icterus cucullatus</i>	hooded oriole
FRINGILLIDAE	OLD WORLD FINCHES
<i>Carpodacus mexicanus</i>	house finch
<i>Carduelis psaltria</i>	lesser goldfinch
PASSERIDAE	OLD WORLD SPARROWS
<i>Passer domesticus</i>	house sparrow
MAMMALIA	MAMMALS
CANIDAE	DOGS, WOLVES, FOXES
<i>Canis latrans</i>	coyote
SCIURIDAE	SQUIRRELS
<i>Citellus beecheyi</i>	California ground squirrel
LEPORIDAE	HARES, RABBITS
<i>Lepus californicus</i>	blacktailed jackrabbit
<i>Sylvilagus auduboni</i>	desert cottontail
CERVIDAE	DEER
<i>Odocoileus hemionus</i>	mule deer

Appendix 8.2: Band Combinations of California gnatcatchers detected in the San Joaquin Hills study area, 2000.

Band Combo.	Sex	Observation Location	Observation Date	Breeding Status	Date banded	Banding Location	Dispersal Distance
M-DGDB	Male	Laidlaw - south canyon	6/14/00	Breeding Adult	5/15/00	Laidlaw	0
M-W/RB	Female	Laidlaw - south canyon	6/14/00	Breeding Adult	5/15/00	Laidlaw	0
MLG/Y-DG	Juvenile	Church Canyon, UTM coordinate = 11S, 4 24 481mE, 37 19 908 mN, Elevation = 270m; detected 7/21/00 0.5 km west of 7/20/00 sighting.	7/20/00, 7/21/00	Juvenile	5/3/00	Laidlaw	1.22 (across or under SJHTC)
LG/YY/LG-M	Male	Church Canyon: UTM coordinate = 11S, 4 24 426mE, 37 20 274mN, Elevation = 216m, detected 06/14/2000 with unbanded female, feeding fledglings in <i>Rhus integrifolia</i> .; detected 7/21/00 with unbanded female feeding 3+ fledglings.	6/14/00, 7/21/00	Breeding Adult	6/13/98	Laguna Canyon (Pump House near Laguna Lake) Territory = SH 1/31	5.57

Key to color-band combinations:

In the field, band combinations are read left to right with the bird facing the observer. Therefore, a bird with a red band on its right tarsus and a yellow band above a USFWS metal band on the left tarsus is read as R-YM: D = dark green; LG = light green; DB = dark blue; M = USFWS metal band; B = black; W = white; LG/Y = light green over yellow split band; Y/LG = yellow over light green split band; W/R = white over red split band.

Appendix 8.3: Band Combinations of Cactus wrens detected between 1996 and 2000 in NROC Lands burned by the 1993 Laguna Canyon Fire, San Joaquin Hills, Orange County California.

Band Combo.	Sex	Observation Location	Observation Date	Breeding Status	Date banded	Banding Location	Dispersal Distance (km)
UK	?	Bommer Canyon	Numerous times in 1998	Breeding Adult	UK	UK	UK
UK	?	Church Canyon	2/7/98	Breeding Adult	UK	UK	UK
O-M	?	Los Trancos	2/16/98	Breeding Adult	UK	UK	UK
LGM-YY	?	Shady Canyon	2/17/98, 3/3/98	Breeding Adult	UK	UK	UK
LBM-YY	F	Shady Canyon	2/97, 3/97	Breeding Adult	6/6/95	Laguna Laurel	1.71
YM-LB	?	Church Canyon	5/96, 6/96	Breeding Adult	7/29/93	Ridgeline	3.17
LBM-Y	?	Shady Canyon	2/96, 5/96	Breeding Adult	7/25/92	Laguna Laurel	2.07
M?-DG	?	Bommer Canyon	4/96	Breeding Adult	UK	UK	UK

Key to color-band combinations:
 In the field, band combinations are read left to right with the bird facing the observer. Therefore, a bird with a red band on its right tarsus and a yellow band above a USFWS metal band on the left tarsus is read as R-YM: M = USFWS metal band; O = orange; LG = light green; LB = light blue; Y = yellow; DG = dark green; UK = unknown or inaccurate/incomplete band combination.

Appendix 8.4: Summary Tables of California gnatcatcher and cactus wren locations in the San Joaquin Hills burn area 1996 through 1999.

1996

LOCATION	CAGN-PAIR	CAGN-SINGLE	CACW-PAIR	CACW-SINGLE
Laidlaw	5	1	0	0
Church Canyon	1	1	4	1
Bommer Canyon	0	1	7	0
Shady Canyon	1	1	6	0
Laguna Canyon	0	0	2	0
Upper Little Sycamore	0	0	0	0
Los Trancos Canyon	0	0	2	2
Muddy Canyon	0	0	1	0
Moro Canyon	1	0	0	1
Emerald Canyon	0	1	2	0
Boat Canyon	0	0	3	1
TOTAL	8	5	27	5

1997

LOCATION	CAGN-PAIR	CAGN-SINGLE	CACW-PAIR	CACW-SINGLE
Laidlaw	5	0	0	0
Church Canyon	0	0	3	1
Bommer Canyon	1	1	9	2
Shady Canyon	3	0	7	0
Laguna Canyon	4	1	3	0
Upper Little Sycamore	0	0	0	0
Los Trancos Canyon	0	0	4	0
Muddy Canyon	0	0	4	1
Moro Canyon	2	0	1	0
Emerald Canyon	0	0	3	0
Boat Canyon	1	0	1	0
TOTAL	16	2	35	4

1998

LOCATION	CAGN-PAIR	CAGN-SINGLE	CACW-PAIR	CACW-SINGLE
Laidlaw	11	1	0	0
Church Canyon	6	0	3	3
Bommer Canyon	4	1	14	0
Shady Canyon	9	0	6	1
Laguna Canyon	9	1	1	1
Upper Little Sycamore	0	0	0	0
Los Trancos Canyon	5	0	1	2
Muddy Canyon	1	0	2	0
Moro Canyon	10	1	2	1
Emerald Canyon	2	0	2	0
Boat Canyon	4	0	3	0
TOTAL	61	4	34	8

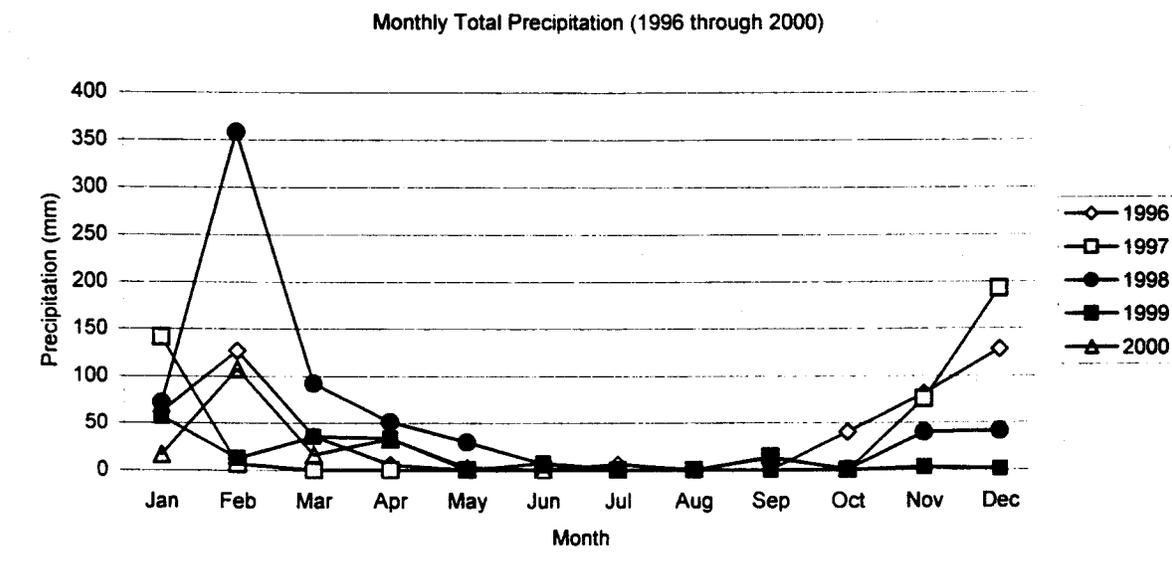
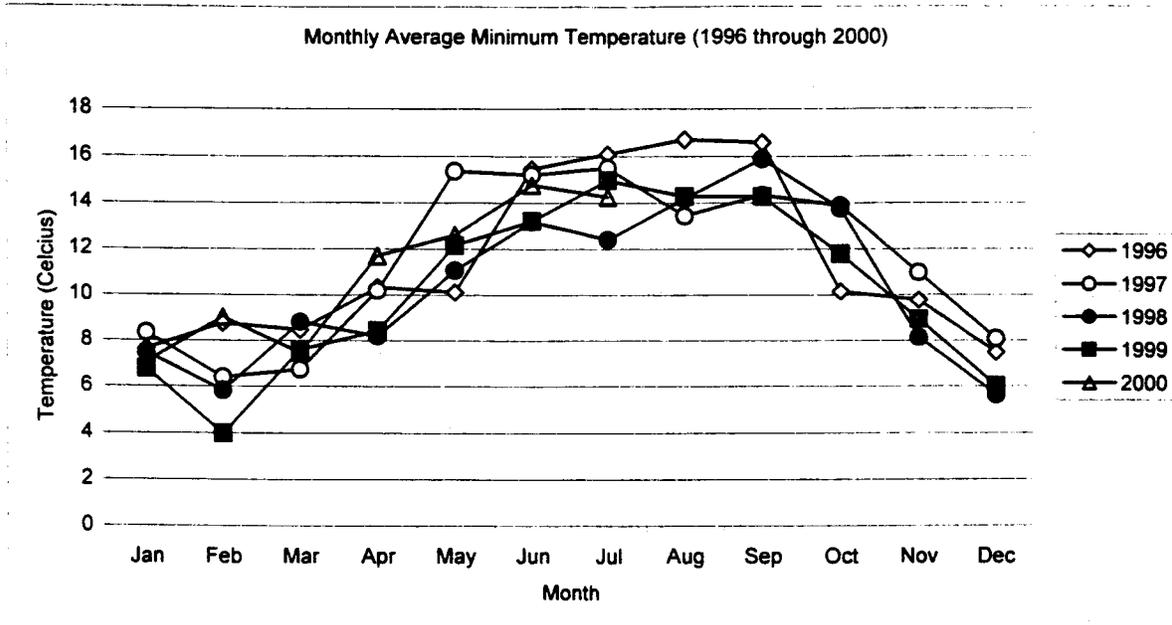
1999

LOCATION	CAGN-PAIR	CAGN-SINGLE	CACW-PAIR	CACW-SINGLE
Laidlaw	15 (9)	0	0	0
Church Canyon	5 (3)	2	4 (3)	0
Bommer Canyon	8 (6)	1	16 (11)	2
Shady Canyon	13 (8)	5	10 (4)	1
Laguna Canyon	19 (8)	3	3 (3)	2
Upper Little Sycamore	3 (2)	0	0	0
Los Trancos Canyon	6 (3)*	1	1 (1)	0
Moro Canyon	6	0	0	2
Emerald Canyon	4	1	2 (2)	0
TOTAL	79 (39)*	13	38 (24)	7

* = includes three pairs located in revegetation sites in Los Trancos Canyon.

() = Parentheses indicates number of confirmed successful breeding pairs (adults tending fledglings).

Appendix 8.5: Monthly Average Minimum Temperature and Monthly Total Precipitation for Laguna Beach, 1996 through July 2000 (Western Regional Climate Center, <http://www.wrcc.dri.edu>)



CALIFORNIA GNATCATCHER ATTRIBUTE DATA
SAN JOAQUIN HILLS BURN AREA, NATURE RESERVE OF ORANGE COUNTY

Coastal/ Inland	Location	Survey Dates	# Target Bird detections (GP = pair, GS = single adult, GJ = juvenile)	Polygon No.	Pr. No.	Single	Juvi	Band Nos.	Comments	Artical	Ertical	Salmel	Opulit	Opupro	Mimaur	Salapi	NNG	nn	forbs	chedum	bacsal	isomen	ruunt	brangl	brodia	sammex	maliau	bascpil	rock	mallas	lotasco	cyncar	toxdiv	iscarb	Biologist
Inland	1-GP1	2000	1	1	1-GP1			unb/umb	pr. With fledglings 6/14/2000, male chasing unbanded juvenile 7/21/2000	4					3		4								2	2							Wolf		
Inland	1-GP2	3/27, 6/14, 7/21	1	1	1-GP2			unb/umb	pr. + 2 fledglings 6/14; with nestlings 7/21	3	2		3		3								2		1								Wolf		
Inland	1-GP3	3/27, 6/14, 7/21	1	1	1-GP3			unb/umb	pr. + 2 fledglings 6/14; 4 fledglings 7/21	3	2		2		2								2		2	4							Wolf		
Inland	1-GP4	3/27, 6/14, 7/21	1	1	1-GP4			unb/umb	pr. 4 fledglings - all unbanded	3	2		2		1								2		2	2							Wolf		
Inland	1-GP5	3/27, 6/14, 7/21	1	1	1-GP5			unb/umb	male with juvenile 6/14/2000	4					1										1								Wolf		
Inland	1-GP6	3/27, 6/14, 7/21	1	1	1-GP6			unb/umb	pair obs. independent of 1-GP5	4																							Wolf		
Inland	1-GP7	3/27, 6/14, 7/21	1	1	1-GP7			unb/umb	Male banded; pr. Feeding fledglings/nestlings 6/14; pr. Feeding 3+ fledglings 7/21	5	1	TR	1				3						1		2									Wolf	
Inland	1-GP8	3/27, 6/14, 7/21	1	1	1-GP8			unb/umb	pr. With 2+ fledglings 6/14; family grp. 7/21	4	1		1										2											Wolf	
Inland	1-GP9	3/27, 6/14, 7/21	1	1	1-GP9			unb/umb	pr. Obs 3/28; family grp 6/15	3	2		2										2											Wolf	
Inland	1-GP10	3/27, 6/14, 7/21	1	1	1-GP10			unb/umb	pair obs. 2/28/00 in artichoke dominated scrub	1					3									1	2									Wolf	
Inland	1-GJ1	3/27, 6/14, 7/20, 7/21	1	1	1-GJ1			MLGY-DG	ind. Obs. 7/20 in upper cyl. 7/21 in lower cyl	no data																								Wolf	
Inland	2-GP1	2/28, 3/28, 6/12	2	2	2-GP1			unb/umb	pr. Detected 2/28. Pr. + 2 fledglings (6/12)	1														2										Wolf	
Inland	3-GP1	3/3, 6/6, 8/10	3	3	3-GP1			unb/umb	pr. Obs 3/3	2			2	1																				Wolf, simonsen	
Inland	3-GP2	3/3, 6/6, 8/10	3	3	3-GP2			unb/umb	pr. Obs 3/3	1	2		1												2									Wolf, simonsen	
Inland	3-GP3	3/3, 6/6, 8/10	3	3	3-GP3			unb/unknown	male patrolling wide area, heard 2nd bird	2	1		1	TR									2			2								Wolf, simonsen	
Inland	3-GP4	3/3, 6/6, 8/10	3	3	3-GP4			unb/umb	pr. detected 3/3	1	2		1													2								Wolf, simonsen	
Inland	5-GP1	3/24, 6/5, 7/28	5	5	5-GP1			unknown		5	2																							Marchant	
Inland	6-GJ1	3/4, 6/5, 7/28	6	6	6-GJ1			unb		1																								Marchant	
Inland	7-GS1	(2/25), 5/21, 8/3, 8/24	7	7	7-GS1			Male - unb	Single male without mate (Kamada)	2		1																						Wolf	
Inland	7-GP1	(2/25), 5/21, 8/3, 8/24	7	7	7-GP1			unb/umb	Pair produced 7 fledglings in 2000 (Kamada)	1												2												Wolf	
Inland	7-GP2	(2/25), 5/21, 8/3, 8/23	7	7	7-GP2			unb/umb		1	TR	1	TR																					Marchant	
Inland	8-GP1	3/10, 5/22, 7/26	8	8	8-GP1			unb/umb		2	1	2	1																					Marchant	
Inland	8-GS1	3/10, 5/22, 7/26	8	8	8-GS1			unknown		1	2	2	3	TR																				Marchant	
Inland	8-GP2	3/10, 5/22, 7/26	8	8	8-GP2			unb/umb	7/26 with 2 FI	2																								Marchant	
Inland	8-GS2	3/10, 5/22, 7/26	8	8	8-GS2			unknown		2																									Marchant
Inland	8-GP3	3/10, 5/22, 7/26	8	8	8-GP3			unb/umb	5/22 with 2 FI	3	2	2	3		TR																			Marchant	
Inland	8-GS3	3/10, 5/22, 7/28	8	8	8-GS3			unb		3	1																							Marchant	
Inland	8-GJ1	3/10, 5/22, 7/28	8	8	8-GJ1			unb		No data																								Marchant	
Inland	9-GJ1	3/4, 3/24, 7/27	9	9	9-GJ1			unknown		No data																									Marchant
Inland	10-GP1	2/26, 5/21, 7/27	10	10	10-GP1			unb/unknown		3	1	TR																							Marchant
Inland	11-GP1	2/26, 5/21, 7/27	11	11	11-GP1			unb/unknown		4	1		TR																						Marchant
Inland	12-GP1	2/22, 6/7, weekly	12	12	12-GP1			unb/umb	No fledglings produced by pair (Kamada), see nest study TCA report HWA 2000	No data																									Marchant
Inland	7-GP3	3/4, 5/21, 8/24	7	7	7-GP3			unknown	8/24 with 1 juv	No veg																								Wolf	

Biologists

Heifner, Rick
Simonsen, Julie
Marchant, Tito
Wolf, Adrian
Langdon, Spencer
Kamada, Dana

Habitat Conditions (vegetation rating scale)

TR = trace (<1%)
1 = 0-20%
2 = 21-40%
3 = 41-60%
4 = 61-80%
5 = 81-100%

Key to Species/Vegetation Cover

Artical	Artemisia californica
Bacsal	Baccharis pilularis
brangl	Baccharis salicifolia
brodia	Brassica nigra
chedum	Bromus diandrus
cyncar	Cynara cardunculus
Enccal	Eriogonum fasciculatum
Ertical	Eriogonum fasciculatum
Isobar	Isomeris arborea
Isomen	Isomeris menziesii
lotasco	Lotus scoparius
maliau	Melicopestrum fasciculata
Mimaur	Melospiza laura
nn forbs	Mimulus aurantiacus
NNG	non native forbs
Opulit	Opuntia littoralis
Opupro	Opuntia protera
ruunt	Rhus integrifolia
rock	Rock
Salapi	Salvia apiana
Salmel	Salvia melifera
sammex	Sambucus mexicana
toxdiv	Toxicodendron diversilobum

Appendix 8.6: Attribute data for the California gnatcatcher localities detected in the San Joaquin Hills burn area, 2000.

