

**2014 Bernardo Mountain Avian Surveys
San Dieguito River Park, San Diego County, California**

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EXECUTIVE SUMMARY

The 2014 avian survey of the Bernardo Mountain Preserve, San Dieguito River Park, San Diego County, California determined the point locations, territories, and breeding status of two rare songbirds, the California Gnatcatcher (*Polioptila californica californica*) and the Coastal Cactus Wren (*Campylorhynchus brunneicapillus cousei*). Eleven field surveys conducted between 14 March and 21 June detected a total of twelve gnatcatcher and three Cactus Wren territories within the preserve. This compares favorably with previous surveys conducted after the Witch Fire of 2007 despite the continuation of a three-year drought. Our observations show that the gnatcatcher, in particular, has expanded into revegetated areas. Cactus Wrens, with their more specific requirements, are still largely confined to cactus scrub that did not burn in 2007 as replanted cactus has yet to reach a height suitable for nest-building. Other vertebrates noted during the survey include sixty-six additional species of birds, four species of mammals, and five species of reptiles.

Table of Contents

Executive Summary.....	2
List of Figures and Tables.....	4
Introduction and Objectives.....	5
Study Area.....	9
Methods.....	14
Results.....	15
Discussion.....	21
Management Recommendations.....	26
Acknowledgements.....	27
Literature Cited.....	27
Appendix 1. Birds recorded during Bernardo Mountain surveys.....	30
Appendix 2. GPS waypoints recorded during 2014 surveys.....	35
Appendix 3. Avian survey dates, time of surveys, and weather conditions.....	41
Appendix 4. Additional photos of wildlife observed during Bernardo Mountain surveys.....	42

List of Figures

Figure 1. California Gnatcatcher.....	6
Figure 2. Coastal Cactus Wren.....	6
Figure 3. Location of the Bernardo Mountain Preserve.....	8
Figure 4. Location of the avian survey study site.....	8
Figures 5-10. Habitat photos.....	11-13
Figure 11. California Gnatcatcher territories.....	16
Figure 12. Coastal Cactus Wren territories.....	18
Figure 13. Brood nest of Coastal Cactus Wren.....	19
Figure 14. Banded Coastal Cactus Wren.....	19
Figure 15. Red Diamond Rattlesnake.....	42
Figure 16. Greater Roadrunner.....	42
Figure 17. Juvenile Rock Wren.....	43
Figure 18. Incubating California Gnatcatcher.....	43

List of Tables

Table 1. Location and reproductive activity of the California Gnatcatcher and Coastal Cactus Wren.....	17
Table 2. Summary of records from reports and published sources relating to California Gnatcatchers at the Bernardo Mountain Southeast and Southwest mitigation sites.....	22
Table 3. Summary of records from reports and published sources relating to Coastal Cactus Wrens at the Bernardo Mountain Southeast and Southwest mitigation sites.....	24

INTRODUCTION AND OBJECTIVES

The 2014 avian survey was initiated as part of the implementation of the Bernardo Mountain Preserve Habitat Management Plan. The Bernardo Mountain Preserve, a protected area within the the San Dieguito River Park (SDRP) provides habitat for two scarce songbirds, the California Gnatcatcher (*Polioptila californica*) and the Coastal Cactus Wren (*Campylorhynchus bruneicapillus cousei*). The northern subspecies of the California Gnatcatcher (*Polioptila californica californica*) (Figure 1), the race occurring in the preserve, was listed as a threatened species by the U.S. Fish and Wildlife Service in March 1993. The coastal population of the Cactus Wren (Figure 2) is listed as a California State Species of Special Concern (Shuford and Gardali 2008) and as a Cleveland National Forest Federal Sensitive Species. Both the gnatcatcher and the wren require coastal sage scrub. The wren is further restricted to areas with tall prickly pear and cholla patches, often known as cactus scrub, within which it almost exclusively nests (Rea and Weaver 1990).

In October 2007 a massive wildfire, referred to as the Witch Fire, swept through much of the San Dieguito River Valley, including the river park. The fire eliminated a large percentage of the natural vegetation within the preserve. Following the fire, the SDRP established two mitigation areas within the preserve, referred to as the Bernardo Mountain Southeast and Bernardo Mountain Southwest mitigation sites (hereafter referred to as the Southeast and Southwest mitigation sites). The SDRP further divided portions of the mitigation sites into seven zones in order to facilitate replanting efforts and to monitor populations of rare species.

The objectives of this study included: (1) updating the post-fire distribution and breeding status of the California Gnatcatcher and the Coastal Cactus Wren within the Bernardo Mountain Preserve, (2) checking post-fire restoration sites and determining their effectiveness in supporting these rare songbirds, and (3) comparing results with previous surveys. We also compiled a list of all mammals, birds, and reptiles observed in the Bernardo Mountain Preserve during the course of the avian survey.

Prior History and Previous Surveys

Sharp (1907), an Escondido egg-collector, was apparently the first to record the presence of the wren and the gnatcatcher in the local area, stating that “almost every good-sized cactus patch has its pair of wrens.” Curiously, he only noted the California Gnatcatcher once, possibly confusing it with the similar Blue-gray Gnatcatcher (*Polioptila caerulea*), as he stated that the latter was “(n)ot uncommon in the brush near ravines and on low hillsides and among the willows.” The habitat listed as “brush near ravines and on low hillsides” is actually more descriptive of the preference of the California Gnatcatcher.

Following Sharp’s observations at the turn of the last century, though, little was recorded of the wildlife of the area until the 1980s and 1990s when a number of surveys were completed by local naturalists. Since 2000, Bernardo Mountain and nearby areas have been the subject of a number



Figure 1. California Gnatcatcher. This individual is the male of gnatcatcher pair #3. Photo taken 23 May 2014.



Figure 2. Coastal Cactus Wren. This individual is the female of cactus wren pair #3. Photo taken 16 Apr 2014.

of avian surveys both prior to the Witch Fire as well as post-fire. Some have been general surveys, others have focused specifically on the gnatcatcher and/or the cactus wren.

Surveys of the birds of Bernardo Mountain and vicinity completed before the Witch Fire include those of Weaver (unpublished surveys 1984-1986, 1988), the Palomar Audubon Society (Barber 1991-1998), Merkel (2000), Haas (2006), and Griffith Wildlife Biology (2006).

Weaver's surveys of 1984-1986 took place prior to a previous wild fire referred to as the Hodges #2 Fire. His survey of 1988 occurred following that fire. The Palomar Audubon Society's spring and summer surveys of the Lake Hodges area in the 1990s included population counts of the Coastal Cactus Wren and California Gnatcatcher at Bernardo Mountain. Volunteers working with the Audubon Society also noted the number of male gnatcatchers on the spring surveys of 1994-1998. Haas's survey provided baseline assessments of the two species in the first year of the Bernardo Mountain Preserve's establishment in 2005. Griffith Wildlife Biology provided additional data regarding the two rare songbirds prior to the Witch Fire.

Griffith Wildlife Biology (2008) also conducted the first post-fire survey which exclusively focused on the preserve. Hamilton (2009) included the preserve as part of a wider post-fire survey of the California Gnatcatcher and Coastal Cactus Wren within the San Dieguito River Valley in 2008. Additionally, the U. S. Geological Survey conducted studies at Bernardo Mountain in 2011-2013 which focused strictly on the Cactus Wren as part of a region-wide DNA study of the species (Kus 2014, U.S. Geological Survey; Barr et al. 2012).

Griffith Wildlife Biology (2008) and Hamilton (2009) together provide a detailed review of the taxonomic history, habitat, and reproductive biology of the California Gnatcatcher and the Coastal Cactus Wren which will not be repeated here.

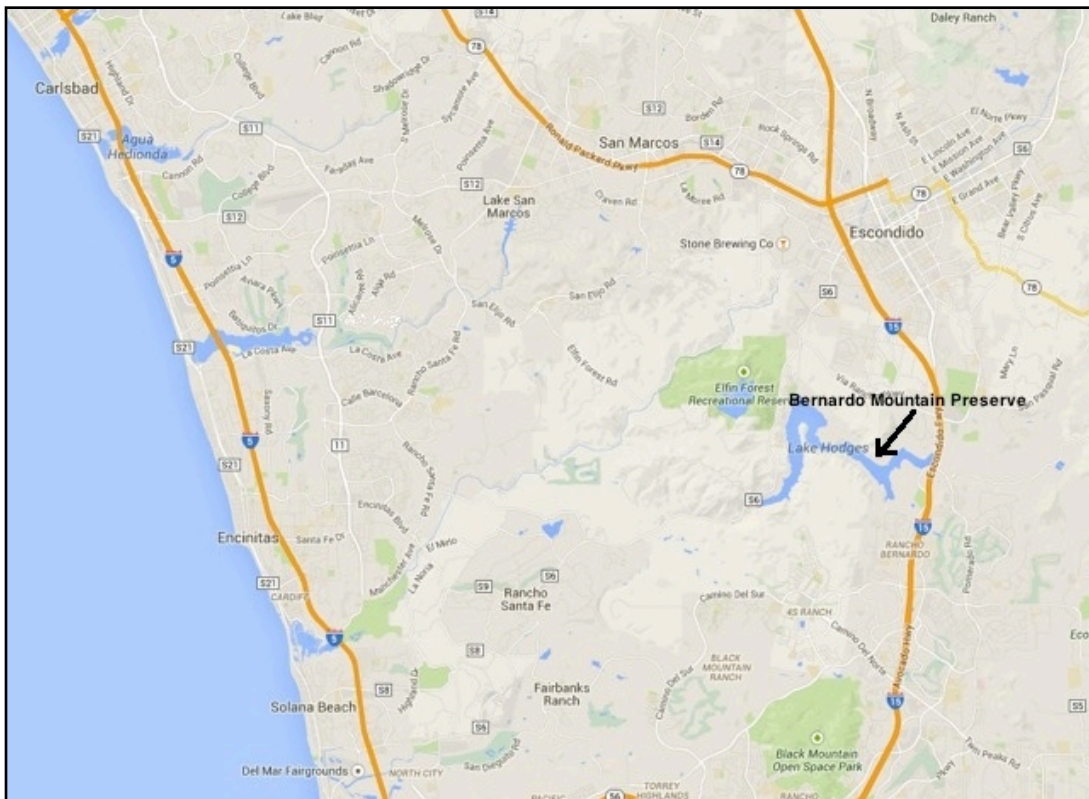


Figure 3. The Bernardo Mountain Preserve, general location of the avian survey of 2014.



Figure 4. The seven mitigation zones established by the SDRP constitute the specific study site for the 2014 avian survey.

STUDY AREA

The 133.2 ha (329 ac) Bernardo Mountain Preserve is located on the north shore of Lake Hodges Reservoir, approximately 3 km (1.9 mi) east of the community of Del Dios (Figure 3). This survey focused on the seven zones within the Southeast and Southwest mitigation sites of Bernardo Mountain as established by the SDRP (Figure 4). The survey covered an aerial distance of 2 km (1.2 mi) comprising 25.54 ha (63.11 ac). Elevations range from 100 m to 180 m (328-591 ft) and consist of low (>24%) to steep slope gradients (<52%). Six well-vegetated stream courses bisect the study site and provide nesting habitat for a number of avian species observed during the survey work.

Prior to the construction of the Lake Hodges Dam in 1918, Bernardo Mountain was an isolated topographic feature rising 349 m (1145 ft) in elevation on the north side of the San Dieguito River Valley, formerly known as the Bernardo River. Historically, the southern portion of Bernardo Mountain, now submerged by Lake Hodges, bordered thick willow riparian woodland interspersed with large cottonwood and sycamore trees (Sharp 1907). Oak woodlands were scattered among the canyons and north-facing hillsides. Large patches of cactus, presumably *Opuntia* spp., along with sage and sumac, occurred on the south-facing slopes downstream to “Crescent Valley” on the valley’s western margin where Del Dios presently exists. The region surrounding Bernardo Mountain has a long history of agriculture and cattle grazing dating back to pre-1890 (see Sharp 1907; U. S. Geological Survey Escondido Quadrangle, 1901 Edition).

Vegetation

The survey area consists of coastal sage scrub vegetation and includes the following dominant species: California sagebrush (*Artemisia californica*), flat-topped buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), white sage (*Salvia apiana*), California brickellbush (*Brickellia californica*), California sunflower (*Encelia californica*), and chaparral yucca (*Hesperoyucca whipplei*), interspersed with large woody shrubs such as laurel sumac (*Malosma laurina*), lemonadeberry (*Rhus integrifolia*), toyon (*Heteromeles arbutifolia*), and Mexican elderberry (*Sambucus mexicana*). Cactus species, a conspicuous component of coastal sage scrub, are represented by two species of prickly pear (*Opuntia littoralis* and *O. oricola*) and coastal cholla (*Cylindropuntia prolifera*). Other species of lesser abundance are bladderpod (*Isomeris arboreus*), mulefat (*Baccharis salicifolia*), broom baccharis (*Baccharis sarothroides*), wild cucumber (*Marah macrocarpa*) and chalk dudleya (*Dudleya pulverulenta*).

The most abundant non-native species, many which are now naturalized in San Diego County (Lightner 2011), include mustards (*Brassica* spp), horehound (*Marrubium vulgare*), Russian thistle (*Salsola australis*), tocalote (*Centaurea melitensis*), fennel (*Foeniculum vulgare*) and several species of grasses (*Avena*, spp., *Bromus*, spp.).

The lower downstream portion of Felicita Creek is located on the extreme northeast boundary of the survey site. It includes riparian woodland species such as coast live oak (*Quercus agrifolia*),

western sycamore (*Plantanus racemosa*), and willows (*Salix* spp.) in addition to non-native palms and eucalyptus. Although this 100 m (328 ft) stretch of creek was not included in our focused surveys, we did record species that we incidentally observed near the margin of the woodland

Fire History

Three major fires have been reported on Bernardo Mountain since 1940. A widespread, unnamed fire in 1943 burned approximately 5668 ha (14,005 ac) in north San Diego County, including the north shore of Lake Hodges and the lower southern slope of Bernardo Mountain. Forty-six years later, on 29 March 1988, the Hodges #2 Fire burned 60.3 ha (149 ac) on the southern and eastern slopes and ridge line of Bernardo Mountain. This fire burned most of the area upslope of the dirt road now referred to as the river park trail. Areas below the trail remained largely intact.

On October 21, 2007, the Witch Creek Fire burned approximately 80 ha (197 ac) of the Bernardo Mountain Preserve in a somewhat mosaic pattern. The fire destroyed chaparral and coastal sage scrub stands on hilltops and along ridge lines. The fire also eliminated nearly all habitat along the entire 2.1 km (1.3 mi) of shoreline between Lake Hodges and the river park trail which lies upslope of the lake. The only exceptions were three very thick prickly pear patches which were able to exclude the fire from the central portion of their patches. Overall, though, approximately fifty percent of the cactus scrub on the southern slope of the mountain was lost. The river park trail, which bisects the survey area, served as a critical firebreak and prevented the fire from spreading above the lower portions of the Southeast and Southwest mitigation sites in zones 2-5. Very little of Bernardo Mountain's south slope has escaped fire damage when the areas affected by the fires of 1988 and 2007 are combined.

More recently, a small fire on July 25, 2013 burned 4.9 ha (12 ac) west and adjacent to the mitigation sites.

Restoration Efforts

Restoration, which also includes weed control, has been occurring at the Bernardo Mountain Habitat Management Area since 2004. As a result of a post-fire habitat restoration grant, the restoration area was greatly expanded in 2008 to include areas adjacent to the preserve that burned in the Witch Fire of 2007. The goal was to provide immediate improvement to areas adjacent to habitat supporting the Cactus Wren and California Gnatcatcher that survived the fire (Jason Lopez, pers. comm.). Figures 5-10 show this ongoing process.



Figure 5. Coastal sage scrub dominated by buckwheat and prickly pear. Vegetation downslope of the lower trail (right) was severely burned in 2007 and has since recovered. Cactus Wren pair #1 and gnatcatcher pairs #2 and #3 occupied this hillside in 2014.



Figure 6. Recovering coastal sage scrub on the south-facing slope of Bernardo Mountain. Only scattered patches of non-native weeds such as mustard (foreground) remain. Cactus Wren pair #2 and gnatcatcher pair #5 occupied portions of this area 2014.



Figure 7. The vegetation downslope of the trail (right) was severely burned in 2007 and is slowly recovering. The site was infested with non-native mustard in 2008. Cactus Wren pair #3 and gnatcatcher pairs #6 and #7 occupied this area in 2014.



Figure 8. Photo showing re-vegetation south of the lookout trail. This site was totally burned in 2007 and only non-native weeds were present in 2008. Gnatcatcher pair #7 occupied this area in 2014.



Figure 9. Coastal sage scrub located southeast of the lookout trail. This area completely burned in 2007 and was re-planted in 2008. In 2014 gnatcatcher pair #7 and its recently-fledged young frequented this location and nearby areas.



Figure 10. Southeastern slope of Bernardo Mountain. Upper slopes have been replanted; lower slopes are dominated by coastal sagebrush and prickly pear. Cactus Wren pair #3 and gnatcatcher pairs #8, #9, and #10 occupied portions of this site in 2014.

METHODS

We conducted eleven surveys from March 14 to June 21, 2014 covering the seven coastal sage scrub mitigation zones as designated by Jason Lopez, SDRP Resource and Trails Manager. Collectively, these zones comprise the Southeast and Southwest mitigation sites (see Hamilton 2009) and were used to assess past and present mitigation and re-vegetation efforts of the coastal sage scrub community. We slowly walked transects covering the entire two kilometer mitigation area identifying and observing all avian species (Appendix 1). Digital playback recordings were used for the California Gnatcatcher and Coastal Cactus Wren only to elicit an initial response. Playback recordings were not used if birds were initially observed or audibly detected. We used a Garmin GPSmap 60CSx to record elevation (in meters), time of observation, and breeding and distribution data (waypoints) in decimal degrees coordinates (Appendix 2).

We conducted surveys in the morning hours generally from 0600-1200 hours. Date, start and end time of surveys, and weather conditions (air temperature, wind speed, relative humidity and cloud cover) were recorded (Appendix 3). A Kestrel 4000 pocket meter was used to record all weather data. Surveys were not conducted under inclement weather conditions such as extreme temperatures (>90F), rain, or high winds. Photographs were taken throughout the survey site in order to provide a representation of the vegetation composition and topographic features as well as to document incidental vertebrate species encountered in the field.

To determine the territories of the gnatcatcher and Cactus Wren, we followed the spot-mapping method as described by Hall (1964). This included noting multiple sightings in the same general area, male-female presence, simultaneous sightings of multiple males/pairs, aggressive intra-specific interactions, individual movements, and, in the case of the cactus wren, counter-singing (the gnatcatcher lacks a definitive song). GPS waypoints were recorded and numbered by site visit on Google Earth maps for each adult male, female, or pair observed in order to locate the approximate breeding territory for each nesting pair. Dispersing juveniles were also recorded but were not a factor in assigning territories.

Once presumed pairs were identified and mapped, we made successive visits to the site to observe/confirm breeding behavior. We determined the actual breeding status of each pair of gnatcatcher and wren by following criteria presented in Laughlin et al. (1982). Using their protocol, we considered breeding to be “confirmed” by noting any one or combination of the following: nest building (for the gnatcatcher only), occupied nest, feeding young, and/or the presence of fledglings. If we did not observe any of the above criteria, the breeding status of a pair was considered as “probable.”

To determine 2014 population trends, we used baseline population data from the pre-fire surveys from the 1980s and 1990s as well as the more recent pre-fire surveys of Merkel (2000), Haas (2006), and Griffith Wildlife Surveys (2006), and the post-2007 fire surveys of Griffith Wildlife Surveys (2008) and Hamilton (2009), as well as data provided by U. S. Geological Service biologists.

RESULTS

California Gnatcatcher

We detected twelve pairs of the California Gnatcatcher making it the second most abundant songbird within the mitigation zones and nearby areas of the preserve (Appendix 1). Only the California Towhee (*Melospiza crissalis*) exceeded the gnatcatcher in numbers. We noted no bands on any of the gnatcatchers.

We found gnatcatcher territories to form clusters through much of the length of the seven mitigation zones (Figure 11). The general distribution of territories was very similar to what Griffith Wildlife Biology reported in 2008. Eleven of the twelve gnatcatcher pairs had territories that extended into areas that burned in 2007 (all but pair #3). This was particularly evident with pairs #7-12 which occupied portions of zones 5, 6, and 7, all of which were greatly impacted by the Witch Fire. Each of these six pairs had more than half of their territories located within areas where mitigation efforts had taken place.

We confirmed breeding for ten of the twelve pairs that we observed (Table 1). We found four nests, all of which were located in white sage (*Salvia apiana*). We observed a total of fifteen fledglings. This is many fewer than the 26-40 fledglings estimated by Griffith Wildlife Biology in 2008 and is a reflection of the continuing drought, currently in its third year. We were interested to note one pair (#7) re-using the same nest previously used for its first brood. An unknown predator apparently destroyed the nest of gnatcatcher pair #8.

Coastal Cactus Wren

We noted three pairs of the Coastal Cactus Wren within the study area (Figure 12). We had no observations of any of these pairs outside of the patches of tall prickly pear cactus that survived the 2007 fire. Although none of the territories appeared to be adjoining, as we observed with the gnatcatcher, we frequently heard counter-singing between pairs #1 and #2 and between pairs #2 and #3. We did sight a single male twice in zone 1 in an area of habitat restoration, but where the prickly pear appeared to be of too small a stature for the placement of nests. We also noted a pair of wrens once far from any cactus patches above mitigation zone 7.

Although we observed nest-building for all three Cactus Wren pairs exhibiting territorial behavior (Table 1), only one nest definitely contained young (Figure 13). Nest-building by cactus wrens is not necessarily evidence of breeding as the birds also construct nests for roosting (Anderson and Anderson 1973). We repeatedly observed a male Cactus Wren (Figure 14) which was banded on 8 Jul 2011 by U.S. Geological Survey biologists (left leg: yellow over dark blue, right leg: red). This individual, the male of pair #3, occupied a wide stretch of cactus patches extending from the east edge of zone 4 to the western part of zone 6, an area, according to previous surveys, that supported more than one pair of wrens.



Figure 11. California Gnatcatcher territories based on eleven surveys Apr-Jun 2014 overlain on an aerial photo taken three months after the Witch Fire. Red markers refer to waypoints of individuals/pairs recorded by consecutive survey. White numbers correspond to pairs listed in Table 1. Identity of individuals represented by out-lying markers is uncertain.

Table 1. Location and reproductive activity of the California Gnatcatcher (cagn) and Coastal Cactus Wren (cacw) in 2014 at Bernardo Mountain Preserve, San Dieguito River Park, California.

Pair no.	Location ⁽¹⁾		Breeding evidence				Breeding Status
			nb ⁽²⁾	on/un ⁽³⁾	fy	no.fl	
cagn 1	33.06143	-117.09592	-	x	x	-	confirmed
cagn 2	33.06023	-117.09331	-	-	x	-	confirmed
cagn 3	33.06044	-117.09183	-	-	x	-	confirmed
cagn 4	33.05884	-117.09058	-	-	-	-	probable
cagn 5	33.05782	-117.08955	-	-	-	-	probable
cagn 6	33.05803	-117.08845	-	-	-	1	confirmed
cagn 7	33.05955	-117.08753	-	x	x	4	confirmed
cagn 8	33.05804	-117.08716	-	x	-	2	confirmed
cagn 9	33.05862	-117.08642	x	x	-	3	confirmed
cagn 10	33.05929	-117.08571	x	-	-	-	confirmed
cagn 11	33.05902	-117.08484	x	-	-	3	confirmed
cagn 12	33.05836	-117.08687	x	-	x	2	confirmed
cacw 1	33.06077	-117.09367	x	x	x	u	confirmed
cacw 2	33.05841	-117.09039	x	-	-	-	probable
cacw 3 ⁽⁴⁾	33.05863	-117.08645	x	-	-	-	probable

Breeding evidence codes: nest-building (nb), occupied/used nest (on/un), feeding young (fy), number of fledglings observed (no.fl), unknown (u).

(1) based on nest location, presence of fledglings, or frequent occurrence.

(2) nest-building for wrens is not considered to be definite evidence of breeding as the birds also build nests for roosting.

(3) all gnatcatcher nests were located in white sage (*Salvia apiana*).

(4) male of this pair is banded, left leg: yellow over dark blue, right leg: red.



Figure 12. Coastal Cactus Wren territories based on eleven surveys Apr-Jun 2014 overlain on an aerial photo taken three months after the Witch Fire. Red markers refer to waypoints of individuals/pairs recorded by consecutive survey. White numbers correspond to pairs listed in Table 1. Identity of individuals represented by out-lying markers is uncertain.



Figure 13. Brood nest of Cactus Wren pair #1. Photo taken 17 May 2014.



Figure 14. Male of Cactus Wren pair #3. This individual was banded on 8 July 2011(B. Kus, *in litt.* 3 Mar 2014). Photo taken 18 Mar 2014.

Additional Wildlife Observations

Of the fifty-nine species of birds incidentally observed in coastal sage scrub on Bernardo Mountain (Appendix 1), twenty-seven species maintained territories or partial territories within the preserve. We confirmed breeding by ten species including the gnatcatcher and cactus wren, despite the three-year drought. With the exception of young gnatcatchers, though, we found very few fledglings at a time when young birds should be very evident. One example that illustrates the effect of drought on breeding by coastal sage scrub birds is the California Towhee. Of the twenty-five pairs of the towhee present within the study site, we only noted a single pair with young.

We recorded thirty-four species of birds in the Felicita Creek area, (Appendix 1) including nine species that we did not note in coastal sage scrub. We did not detect the least Bell's Vireo (*Vireo bellii pusillus*), listed by both the federal government and the State of California as endangered, in the riparian growth along Felicita Creek.

Additional vertebrate species noted include four mammals and five reptiles. Mammals include the Desert Cottontail (*Sylvilagus audubonii*), California Ground Squirrel (*Spermophilus beechyi*), Coyote (*Canis latrans*), and Southern Mule Deer (*Odocoileus hemionus fuliginatus*). Reptiles include the Western Fence Lizard (*Sceloporus occidentalis*), Granite Spiny Lizard (*Sceloporus orcutti*), Orange-throated Whiptail (*Aspidoscelis hyperythra*), Tiger Whiptail (*Aspidoscelis tigris*), and Red Diamond Rattlesnake (*Crotalus ruber*). Photos of some of the wildlife observed are displayed in Appendix 4.

In addition to the cactus wren, three birds that we observed, the Northern Harrier (*Circus cyaneus*), Vaux's Swift (*Chaetura vauxi*), and Yellow Warbler (*Setophaga petechia*) are listed as state species of special concern (Shuford and Gardali 2008). The Orange-throated Whiptail, noted above, is also listed as a species of special concern (Jennings and Hayes 1994). In addition to the California Gnatcatcher and the Coastal Cactus Wren, the San Diego Multiple Species Conservation Program lists the following observed species as sensitive: Cooper's Hawk (*Accipiter cooperii*), Golden Eagle (*Aquila chrysaetos*), Northern Harrier (*Circus cyaneus*), Rufous-crowned Sparrow (*Aimophila ruficeps*), Orange-throated Whiptail, and Southern Mule Deer.

DISCUSSION

California Gnatcatcher Population Status

California Gnatcatcher population levels can fluctuate widely from year to year and are influenced by factors such as rainfall, habitat quality, habitat degradation (Preston et al. 1998), fire (Atwood et al. 1998), and plant community composition (Weaver 1998). Prior to the Witch Fire, Unitt (2004) reported that the largest population of the species in San Diego County was concentrated around Lake Hodges based largely on surveys by R. Barber (1991-1998) and results of the San Diego Atlas project (1997-2002).

A review of historical surveys (Table 2) indicates that the gnatcatcher population of Bernardo Mountain has remained relatively constant over three decades. This has occurred despite the habitat destruction caused by two major fires, but only because core stands of coastal sage scrub were able to survive intact. The twelve pairs noted on the 2014 survey are actually very close to the numbers reported on previous surveys despite the continuation of a three-year drought.

Hamilton (2009) estimated that the Bernardo Mountain mitigation sites which total 33.18 ha (82 ac) could support a maximum of twenty-seven territories for the gnatcatcher. This would result in an average territory size of 1.12 ha (3.03 ac) per territory. This is within the lower estimates of 1 – 8+ ha (2.47-19.8 ac) per territory provided by Preston et al. (1998). Her studies also concluded that territory size increases with distance from the coast, a factor attributed to higher quality of coastal sage scrub habitat near the coast of southern California. The distance from the coast to the nearest of the mitigation zones at Bernardo Mountain is 17.9 km (11.1 mi).

Weaver (1982, 1983a, 1983b) found the average territory size of twenty pairs observed on study plots located 1-6 km (0.6-3.7 mi) from Bernardo Mountain to be approximately 2 ha (5 ac). We found territory size at the preserve to range from approximately 1.6-2.7 ha (3.95-6.7 ac). We are therefore doubtful that Hamilton's estimate can be realized even under ideal conditions in non-drought years.

The mitigation efforts of the SDRP have had a major impact in allowing the gnatcatcher to regain habitat lost in the Witch Fire as noted in the results section of this report. The gnatcatcher population still has room to expand with continued re-planting, especially in zones 1 and 5, as well as areas downslope of zones 6 and 7.

This study and previous surveys of Bernardo Mountain indicate that the gnatcatcher is widely distributed, fairly resilient, and relatively common. The species appears to be more adaptable to fire than its coastal sage scrub counterpart, the Cactus Wren, provided that some habitat remains following catastrophic fires. Hamilton (2009) concludes "the conservation outlook appears to be less dire for California gnatcatchers than it is for cactus wrens."

Table 2. Summary of records from reports and published sources relating to California Gnatcatchers at the Bernardo Mountain Southeast and Southwest mitigation sites.

Survey dates	No. of Surveys	CAGN males/pairs	CAGN max. no.	Source
Pre-Hodges #2 Fire Surveys				
1984	1	6	7	K. Weaver (unpublished survey)
1985	3	11	--	K. Weaver (unpublished survey)
1986	8	7	--	K. Weaver (unpublished survey) ⁽¹⁾
Post-Hodges #2 Fire (1988)/Pre-Witch Fire (2007) Surveys				
1988	1	9	--	K. Weaver (unpublished survey)
1991-1995	5	4 ⁽²⁾	20 ⁽³⁾	Barber (1998)
1991-1998	7	13 ⁽⁴⁾	21 ⁽⁵⁾	Barber (1998)
2002	n/a	14	--	Merkel (2000)
2005	12	12 ⁽⁶⁾	--	Haas (2006)
2006	12	11 ⁽⁷⁾	--	Griffith Wildlife Biology (2006)
Post-Witch Fire Surveys				
2008	12	13 ⁽⁸⁾	--	Griffith Wildlife Biology (2008)
2008	3	18	34	Hamilton (2009)
2014	11	12	28	Mahrtdt and Weaver (this study)

n/a, not available max. no., maximum no. of individuals recorded

(1) Only included mitigation zones 2-6 as currently designated.

(2) This is the median no. of males recorded in summer censuses from 1992-1995. Range was from 1 in 1992 to 4 in 1993.

(3) This is the median no. of individuals recorded in summer censuses from 1992-1998. Range was from 12 in 1996 to 48 in 1998.

(4) This is the median no. of males recorded in spring censuses from 1993-1998. Range was from 5 in 1996 to 23 in 1998.

(5) This is the median no. of individuals recorded in spring censuses from 1991-1998. Range was from 12 in 1996 to 48 in 1998.

(6) Excludes two pairs found east of Felicita Creek.

(7) Twelve pairs, two single males reported.

(8) Eleven pairs, two single males reported.

Coastal Cactus Wren Population Status

In coastal San Diego County, early reports of this species' decline were first mentioned by Dawson (1923) and Grinnell and Miller (1944), and later by Sams and Stott (1959), Unitt (1984), and Rea and Weaver (1990). Unitt (2004) summarizes the severity of the species decline stating, "The survival of the San Diego Cactus Wren is one of the county's greatest challenges in bird conservation."

Development and fire are responsible for the reduction and fragmentation of habitat required by the wren. Frequent fires outside of normal fire intervals, as seen at Bernardo Mountain, can alter coastal sage scrub habitat to grassland habitat (Zedler et al. 1983) thereby having potentially devastating effects on Cactus Wren populations. Surveys conducted during the San Diego County Atlas project also indicate that the Cactus Wren has low dispersal ability (Unitt 2004). This is further corroborated by a study (Barr et al. 2012) showing the disruption of gene flow and low connectivity between major population centers of the wren in San Diego County.

Following the Witch Fire, the Coastal Cactus Wren population of the Lake Hodges area is now restricted to the south-facing slope of Bernardo Mountain. Two small populations of Cactus Wrens, one across Lake Hodges at Bernardo Bay, another at Hill 506 located just west of Bernardo Mountain, formerly existed. These locations may have provided recruits for Bernardo Mountain in the past. The last individual of the Bernardo Bay population was recorded on a Christmas bird count on 4 January 2003. The Witch Fire destroyed the remaining habitat at this site in 2007 (pers. obs.). Similarly, most of the habitat on Hill 506, located approximately 0.75 km (0.5 mi) west of the mitigation site, was severely burned in 2007. A survey on 19 October 2014 revealed little sign of regeneration and no Cactus Wrens (pers. obs.). The nearest site occupied by the wrens which could provide a linkage to Bernardo Mountain is approximately 3 km (1.9 mi) east of the Bernardo Mountain Preserve across Interstate 15, an area that was not surveyed by Hamilton but one which also largely burned in the Witch Fire (pers. obs.). The nearest site hosting the wren that was not burned in 2007 is an isolated coastal sage scrub patch located west of Summit Drive in Escondido. This site is 5.1 km (3.2 mi) from Bernardo Mountain and is surrounded by development. Recruitment from other areas, then, appears to be very limited.

A review of the number of males/pairs recorded on Bernardo Mountain surveys (Table 3) indicates an overall pattern of continuing decline. Although, the 2014 survey shows a slight improvement in the number of Cactus Wren pairs over 2012-2013, numbers are below the pairs recorded in the post-fire count of 2008 (Griffith Wildlife Biology) and fewer than half the number of pairs recorded in the 1980s and 1990s.

If the small Bernardo Mountain wren population is to increase, it will likely only come through improved habitat, primarily through mitigation efforts. The rate at which newly planted prickly pear matures as suitable nesting and roosting habitat for the Cactus Wren is highly variable.

Table 3. Summary of records from reports and published sources relating to Coastal Cactus Wrens at the Bernardo Mountain Southeast and Southwest mitigation sites.

Survey dates	No. of Surveys	CACW males/pairs	CACW max. total	Source
Pre-Hodges #2 Fire Surveys				
1984	1	8	11	K. Weaver (unpublished survey)
1985	3	7	--	K. Weaver (unpublished survey)
1986	8	7	--	K. Weaver (unpublished survey) ⁽¹⁾
Post-Hodges #2 Fire (1988)/Pre-Witch Fire (2007) Surveys				
1988	1	8	17	K. Weaver (unpublished survey)
1991-1995	5	--	20 ⁽²⁾	Barber (1991-1995)
1991-1998	8	--	15 ⁽³⁾	Barber (1991-1998)
2000	n/a	7	--	Merkel (2000)
2005	12	5	19	Haas (2006)
2006	12	5	--	Griffith Wildlife Biology (2006)
Post-Witch Fire Surveys				
2008	12	5	--	Griffith Wildlife Biology (2008)
2008	3	2	12	Hamilton (2009)
2011	5	3	--	Kus (2014)
2012	n/a	2	--	Kus (2014)
2013	n/a	1	3	Kus (2014)
2014	11	3	7	Mahrtdt and Weaver (this study)

n/a, not available max. total, maximum total

(1) Only included mitigation zones 2-6 as currently designated, but covered all cactus scrub habitat.

(2) This is the median of five summer censuses. Range was from 15 in 1993 to 31 in 1992.

(3) This is the median of eight spring censuses. Range was from 14 in 1994 and 1995 to 23 in 1998.

Studies to measure growth rates of the cacti at the preserve are currently in progress based, in part, on plantings originally established in 1998 (J. Lopez pers. comm.). In the intervening sixteen years the cacti reached 90-120 cm (35-47 in), typical heights of cacti required by the wrens for constructing their nests (Rea and Weaver 1990). Lopez believes this growth could actually be achieved in as few as eight years if the plants are grown in containers, installed in the fall, and maintained.

Hamilton (2009) estimated that the mitigation sites on Bernardo Mountain could support a maximum of ten pairs of the wren, double the number of pairs recorded in the best of the post-Witch Fire surveys. Griffith Wildlife Biology (2008), on the other hand, stated that little vacant land remains for Cactus Wren occupation. We believe that Hamilton's estimates are unlikely to be met until the drought ends and further prickly pear growth occurs in the replanted areas mentioned for the California Gnatcatcher.

Additional Comments Regarding the Birdlife

Species composition has changed relatively little since Weaver's surveys of the 1980s. Recent surveys this century, though, failed to record the Bell's Sparrow (*Amphispiza bellii*). In April-May 1985, Weaver noted thirteen singing males. This species was apparently last recorded at Bernardo Mountain on Weaver's survey of November 1988. The Bell's Sparrow currently has a very local distribution on the coastal slope (Unitt 2004) and appears to have been eliminated from the San Dieguito River Valley (pers. obs.). The thinning of the brush cover due to the Witch fire, on the other hand, has allowed two species preferring open-country, the Killdeer (*Charadrius vociferus*) and the Rock Wren (*Salpinctes obsoletus*), to expand into the preserve.

MANAGEMENT RECOMMENDATIONS

The following management recommendations are proposed to better enhance the habitat quality of southern California's coastal sage scrub and cactus scrub vegetation on the southern and eastern slopes of Bernardo Mountain. It is likely that maximizing habitat quality will create additional breeding territories of both species.

Historically, the largest population of gnatcatchers in San Diego County occurred on the slopes surrounding Lake Hodges, although fires have been reported to be a major cause of temporary population declines (see Unitt 2004). Management recommendations also include a monitoring program specifically designed for the remnant population of Coastal Cactus Wrens, a species requiring a local conservation effort by the San Dieguito River Park. These recommendations are similar to those presented in Griffith (2008) and Hamilton (2009), as well as the management actions currently being implemented by the river park (Lopez 2012).

1. Habitat Restoration:

Increased frequency of wildfires in drought-stressed coastal sage scrub may be a factor in the population decline of gnatcatchers and, of even greater urgency, Cactus Wrens. These declines may potentially be long-term. We suggest maintaining invasive weed abatement and monitoring program. Continue with habitat restoration of cactus scrub in cleared areas or areas of depauperate vegetation to further enhance Cactus Wren nesting sites. This may require several years to achieve based on growth rates of *Opuntia*. As it currently exists, the mitigation site is restricted in aerial extent to 25 ha (62 acres). In order to maximize the carrying capacity and potential breeding territories for gnatcatchers and wrens, it is essential to maintain existing habitat and, where possible, further expand contiguous habitat of coastal sage and cactus scrub vegetation on the lower gradient slopes of Bernardo Mountain. Rufous-crowned Sparrow and Bell's Sparrow may benefit from continued restoration efforts as well as other wildlife limited to this habitat.

2. Invasive Species:

Invasive species have long been implicated in the decline or extirpation of native species. Implement a cowbird trapping program in gnatcatcher habitat surrounding Lake Hodges. Control all domesticated pets and subsidiary wildlife (i.e. dogs, feral cats, and squirrels) that are likely to prey on nesting gnatcatchers and wrens.

3. Monitoring Avian Species:

Priority should be given to the severe regional declines in core Coastal Cactus Wren populations (Hamilton 2009). Depending on SDRP funding, it is highly recommended that the river park conduct annually or biennially three focused Cactus Wren surveys, one or two surveys each in the months of April, May, and June. Surveys could include other sections of Lake Hodges (i.e.

Bernardo Bay and E. Lake Hodges, north shore). Continue to periodically conduct California gnatcatcher surveys from March - May not to exceed five year intervals.

4. Public Awareness and Public Education:

We recommend that signs enforcing fire and safety regulations be implemented on recreational trails. Educate the public using kiosks to illustrate the importance of coastal sage scrub habitat and its role in sustaining California Gnatcatcher, Cactus Wren, and avian species diversity. To minimize habitat disturbance, restrict human and dog activity in coastal sage scrub habitat including habitat that is currently being restored. This is especially critical during the nesting season.

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Appendix 1. Birds recorded during Bernardo Mountain surveys.

Maintained territory in preserve (*) confirmed breeder (**) out of normal range (***)

Note: Surveys of 7 June and 21 June were abbreviated.

Coastal Sage Scrub Area

Species	3 18	4 9	4 16	4 23	5 3	5 7	5 17	5 23	5 31	6 7	6 21
California Quail *	18	19	18	8	25	20	22	6	4	0	3
Turkey Vulture	2	3	2	3	1	1	8	1	1	0	0
Northern Harrier	1	0	0	1	0	0	0	0	0	0	0
Cooper's Hawk	0	0	0	0	0	0	0	0	0	0	2
Red-shouldered Hawk	1	0	0	0	0	0	0	1	0	0	0
Red-tailed Hawk *	4	1	4	4	1	2	1	1	1	0	2
Golden Eagle	0	0	1	0	0	0	0	0	0	0	0
Killdeer **	0	0	0	0	0	1	0	0	0	0	0
Peregrine Falcon	1	0	0	0	0	0	0	0	0	0	0
Mourning Dove *	5	0	2	4	4	0	2	4	4	22	3
American Kestrel *	2	0	1	0	0	2	1	0	2	1	0
Greater Roadrunner **	2	0	0	1	1	2	1	0	2	1	0
Vaux's Swift	0	0	0	0	0	2	0	0	0	0	0
White-throated Swift	0	0	0	4	1	20	0	10	3	4	0
Anna's Hummingbird *	2	8	3	6	3	5	4	10	4	1	4
Costa's Hummingbird *	0	2	7	5	1	2	3	10	11	0	0
Nuttall's Woodpecker	0	1	0	0	0	0	0	0	0	0	0
Pacific-slope Flycatcher	0	0	1	0	0	0	0	0	0	0	0

Species	3 18	4 9	4 16	4 23	5 3	5 7	5 17	5 23	5 31	6 7	6 21
Say's Phoebe	1	2	0	1	1	0	0	0	0	0	0
Ash-thr. Flycatcher *	0	0	1	2	1	0	2	1	1	0	2
Cassin's Kingbird *	0	1	0	1	3	3	4	3	4	0	0
Western Kingbird	0	0	2	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	2	2	2	0	0	0
Western Scrub-Jay *	3	0	2	1	2	3	3	3	2	0	0
American Crow	1	1	0	0	0	0	0	0	0	0	0
Common Raven *	4	2	2	2	4	3	3	1	1	0	0
Tree Swallow	0	0	0	0	0	1	0	0	0	0	0
Violet-green Swallow	0	0	0	0	0	2	0	0	0	0	0
N. Rough-w. Swallow	4	0	0	0	0	0	0	0	2	0	0
Cliff Swallow	0	0	2	1	1	20	1	25	47	0	12
Bushtit **	6	18	12	12	11	32	14	2	34	0	8
Cactus Wren **	5	3	5	4	3	5	7	5	4	1	1
Rock Wren **	1	1	4	4	1	8	5	1	3	1	0
Canyon Wren *	0	1	1	2	0	0	0	1	0	0	0
Bewick's Wren **	15	1	9	14	10	12	15	12	6	2	0
House Wren	2	0	0	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	1	0	0	0	0	0	0	0	0	0	0
Calif. Gnatcatcher **	16	17	14	22	14	18	22	28	27	4	5
Wrentit *	7	4	5	1	6	10	3	7	9	0	0
California Thrasher **	10	3	9	9	5	8	7	14	10	0	0
Phainopepla	0	0	0	0	0	3	1	2	0	0	0

Species	3 18	4 9	4 16	4 23	5 3	5 7	5 17	5 23	5 31	6 7	6 21
Orange-cr. Warbler	0	0	0	0	0	0	1	0	0	0	0
MacGillivray's Warbler	0	0	0	1	0	0	0	0	0	0	0
Common Yellowthroat *	1	0	3	5	3	6	5	13	4	0	0
Yellow Warbler	0	0	0	0	0	0	3	2	0	0	0
Yellow-rumped Warbler	49	12	2	0	0	0	0	0	0	0	0
Black-thr. Gray Warbler	0	0	0	2	0	0	0	0	0	0	0
Wilson's Warbler	1	0	0	3	0	0	1	0	0	0	0
Spotted Towhee *	2	1	5	1	4	3	3	3	6	0	0
Rufous-cr. Sparrow *	6	2	2	10	1	2	1	8	7	3	4
California Towhee **	31	45	27	25	25	55	36	43	29	7	7
Brewer's Sparrow ***	0	0	0	0	0	1	0	0	0	0	0
Song Sparrow *	5	5	1	6	5	7	6	5	5	0	0
White-crowned Sparrow	6	11	14	0	0	1	0	0	0	0	0
Western Tanager	0	0	0	0	0	0	1	0	0	0	0
Black-headed Grosbeak	0	0	0	0	1	0	0	0	0	0	0
Blue Grosbeak *	0	0	1	4	3	9	4	1	5	0	1
House Finch *	6	2	2	2	1	3	3	13	22	0	1
Lesser Goldfinch **	6	7	7	12	2	16	10	12	7	5	6

Felicita Creek Area

Species	3 18	4 9	4 16	4 23	5 3	5 7	5 17	5 23	5 31
Red-shouldered Hawk	1	1	1	1	1	1	1	1	0
Golden Eagle	0	0	1	0	0	0	0	0	0
Mourning Dove	1	0	0	1	1	0	0	1	0
Acorn Woodpecker	1	1	2	1	1	1	0	2	1
Nuttall's Woodpecker	1	0	1	1	1	1	1	1	1
American Kestrel	1	0	0	0	0	0	0	0	0
Northern Flicker	1	0	0	0	0	0	0	0	0
Pacific-slope Flycatcher	0	1	2	1	0	1	1	1	1
Say's Phoebe	0	0	0	0	0	0	0	1	0
Ash-throated Flycatcher	0	1	0	0	0	1	1	1	1
Hutton's Vireo	0	0	0	0	0	1	0	0	0
Western Scrub-Jay	0	1	0	0	0	1	1	1	0
American Crow	0	0	0	1	0	1	1	1	0
Common Raven	0	0	1	0	0	0	0	0	0
Tree Swallow	0	0	0	1	1	0	1	1	0
Cliff Swallow	0	0	0	1	0	0	0	0	0
Oak Titmouse	1	0	0	0	0	0	0	0	0
Bushtit	0	4	0	0	0	0	0	0	0
White-breasted Nuthatch	1	0	0	0	0	0	0	0	0
Bewick's Wren	0	0	0	0	0	1	0	0	0
House Wren	1	3	3	1	1	3	2	2	0
Wrentit	0	1	0	0	0	0	0	0	0

Species	3 18	4 9	4 16	4 23	5 3	5 7	5 17	5 23	5 31
Northern Mockingbird	0	0	1	1	1	1	1	1	1
European Starling	3	0	0	0	0	1	0	0	0
Phainopepla	1	0	0	0	0	0	0	0	0
Orange-crowned Warbler	0	0	0	0	0	0	0	1	0
Common Yellowthroat	0	0	1	4	0	0	0	2	0
Yellow Warbler	0	0	0	0	0	0	0	1	1
Spotted Towhee	0	0	0	1	1	0	0	0	0
Black-headed Grosbeak	0	1	1	2	2	1	1	1	1
Great-tailed Grackle	0	1	0	0	0	0	0	0	0
Hooded Oriole	1	1	0	0	0	0	0	0	0
House Finch	3	1	1	1	1	1	1	0	0
Lesser Goldfinch	0	1	0	2	3	2	3	3	0

Appendix 2. GPS waypoints recorded during 2014 surveys.

SDRP AVIAN SURVEY: RESULTS OF BERNARDO MOUNTAIN RESTORATION SITE SURVEY, 18 MARCH 2014			
Latitude-Longitude	Species	Comments	Time Obs.
N33.06219 W-117.08362	CAGN (170)	Pair	0719 h
N33.06060 W-117.08508	CAGN (172)	Individual	0820 h
N33.05999 W-117.08706	PEFA	Individual	0833 h
N33.05863 W-117.08645	CACW (175)	Pair (one banded individual; active nest)	0844 h
N33.05878 W-117.08688	CAGN (176)	Pair	0849 h
N33.05825 W-117.08643	CAGN (177)	Pair (likely same pair as 176)	0853 h
N33.05793 W-117.08669	CAGN (178)	Pair	0901 h
N33.05763 W-117.08817	CAGN (180)	Pair (moving upslope and downslope of trail)	0937 h
N33.05859 W-117.09020	CAGN (182)	Pair	1021 h
N33.05871 W-117.09123	CAGN (183)	Pair (likely same pair as 182)	1029 h
N33.06007 W-117.09130	ORWH	<i>Aspidoscelis hyperythra</i> , foraging	1034 h
N33.06017 W-117.09122	CAGN (185)	Pair in dense vegetation, drainage from Bernardo Mtn	1036 h
N33.05980 W-117.09091	CACW (186)	Pair (moving east in chaparral vegetation)	1042 h
N33.05995 W-117.09190	CAGN (187)	Males displaying territorial behavior	1045 h
N33.06279 W-117.09715	CACW (188)	Singing male in recently planted, low growth <i>Opuntia</i>	1125 h
N33.05841 W-117.09041	CACW (190)	Pair (possibly same pair as 186)	1157 h
N33.05805 W-117.08754	CACW (191)	Single individual, banded as same pair 175	1212 h

SDRP AVIAN SURVEY: RESULTS OF BERNARDO MOUNTAIN RESTORATION SITE SURVEY, 9 APRIL 2014				
Latitude-Longitude	Species	Comments	Time Obs.	Map Number
N33.06279 W-117.08298	CAGN (192)	Male, appeared agitated	0738h	7
N33.06161 W-117.08402	CAGN (193)	Female, feeding in <i>Melospiza laurina</i>	0755h	6
N33.06033 W-117.08479	CAGN (195)	Male (CACW noted singing upslope of trail)	0823h	6
N33.05891 W-117.08669	CAGN (196)	Male, same individual as 195	0853h	5
N33.05861 W-117.08686	CAGN (197)	Male, same individual as 195	0859h	5
N33.05848 W-117.08691	CAGN (198)	Pair, male same individual as 195	0907h	5
N33.05740 W-117.08761	CAGN (199)	Pair	0942h	5
N33.05797 W-117.08775	CAGN (200)	Male	0948h	5
N33.05825 W-117.08987	CACW (201)	Male, singing upslope of trail	1016h	4
N33.05841 W-117.09039	CACW (202)	Male and nest	1026h	4
N33.05868 W-117.09090	CAGN (203)	Pair, obs. moving in a 50 m radius	1030h	4
N33.06017 W-117.09122	CAGN	Male, same as Wpt 185 on 18 Mar 2014 drainage from Bernardo	1045h	4
N33.06053 W-117.09320	CACW (204)	Male, singing upslope of trail	1055h	2
N33.06023 W-117.09331	CAGN (205)	Male, singing 35 m downslope of trail	1056h	3
N33.06051 W-117.09191	CAGN (207)	Pair, likely nesting upslope near bicycle trail	1136h	3
	ASHY	7 - 8 Orange-throated Whiptail Lizards obs. near trail	1000h - 1145h	3 and 4

SDRP AVIAN SURVEY: RESULTS OF BERNARDO MOUNTAIN RESTORATION SITE SURVEY, 16 APRIL 2014				
Latitude-Longitude	Species	Comments	Time Obs.	Map Number
N33.06193 W-117.08358	CAGN (208)	vocalized briefly	0758h	7
N33.06161 W-117.08402	CACW (209)	Flew downslope	0831h	6
N33.05861 W-117.08648	CACW (210)	Unbanded female obs downslope, 25 ft. up from nest site. (photo)	0833h	6
N33.05852 W-117.08695	CAGN (211)	Male, obs 25 ft. upslope from trail	0856h	5
N33.05742 W-117.08759	CAGN (212)	Pair, dirt road seems to separate this pair from CAGN 213	0921h	5
N33.05776 W-117.08792	CAGN (213)	Male, obs 15 ft. downslope	0950h	5
N33.05811 W-117.08829	CAGN (214)	Male, upslope from trail	0955h	5
N33.05832 W-117.08971	CAGN (215)	Male, 50 ft upslope from trail	1012h	4
N33.05824 W-117.09024	CACW (216)	Male, singing upslope of trail	1017h	4
N33.05794 W-117.08959	CAGN (217)	Male, downslope from trail	1026h	4
N33.05877 W-117.09076	CAGN (218)	Pair, obs. moving downslope 50 ft, moved upslope 50 ft.	1034h	4
N33.06044 W-117.09183	CAGN (219)	Pair, upslope 50 ft./ plus intruding male flew downslope	1051h	3
N33.06055 W-117.09440	CACW (220)	Male, singing upslope of trail	1126h	2
N33.06092 W-117.09527	CAGN (221)	Pair	1131h	2

SDRP AVIAN SURVEY: RESULTS OF BERNARDO MOUNTAIN RESTORATION SITE SURVEY, 23 APRIL 2014				
Latitude-Longitude	Species	Comments	Time Obs.	Map Number
N33.06114 W-117.08396	CAGN (000)	Male and three female-plumaged individuals	?	6
N33.05862 W-117.08654	CACW (222)	Pair nest building; male is banded (RL= pink, LL= yellow over blue)	0745 h	6
N33.05929 W-117.08571	CAGN (223)	Calling 150 ft. upslope from trail.	0816 h	6
N33.06294 W-117.08405	CACW (225)	Pair upslope in chaparral; male calling	0852 h	7
N33.06488 W-117.08271	RCSP (226)	Pair	0913 h	7
N33.06272 W-117.08263	CAGN (227)	Pair	0931 h	7
N33.05920 W-117.08588	CAGN (228)	Pair (check with Ken, may be same as CAGN 000 above; see my field notes	1009 h	6
N33.05923 W-117.08600	CACW (229)	Female	1011 h	6
N33.05887 W-117.08625	CACW (230)	Male	1016 h	6
N33.05679 W-117.08684	CAGN (000a)	Male	?	5
N33.05820 W-117.08678	CAGN (231)	Pair	1021 h	5
N33.05756 W-117.08756	CAGN (000b)	Pair nest 2.5 ft up in white sage, feeding at least 2 young	?	5
N33.05773 W-117.08816	CACW (232)	Pair (in <i>Sambucus</i>)	1056 h	5
N33.05810 W-117.08967	CAGN (233)	Male, 50 ft upslope from trail	1105 h	4
N33.05825 W-117.08961	CACW (233)	Male, singing and nest building near sumac, 100 ft upslope from trail	1105 h	4
N33.06017 W-117.09129	CAGN (234)	Pair (same male as #235?)	1124 h	3
N33.06038 W-117.09191	CAGN (235)	Male	1136 h	3
N33.06077 W-117.09365	CAGN (000c)	Pair	?	2
N33.06077 W-117.09365	CACW (000)	Male, sang but not observed (near CAGN 000c coordinates)	?	2
N33.06262 W-117.09602	CAGN (236)	Sex unknown; heard only	1217 h	1

Waypoints 3 May 2014

WP	Time	Latitude	Longitude	Species	Zone	Comments
1	0635	33.06038	-117.09246	CAGN	#3	male
2	0638	33.06039	-117.09183	CAGN	#3	individual heard
3	0648	33.05874	-117.09082	CAGN	#4	male, likely nest
4	0658	33.05852	-117.08854	CAGN CACW	#4	individual observed male countersang w/#8
5	0701	33.05803	-117.08978	CACW	#4	singing male, prob. same as #4
6	0701	33.05782	-117.08955	CAGN	#4	male
7	0722	33.05760	-117.08747	CAGN	#5	male, empty but intact nest
8	0745	33.05863	-117.08655	CAWR	#6	singing male, 20 ft. downslope
9	0810	33.06131	-117.08342	CAGN	#7	individual heard
10	0817	33.06093	-117.08305	CAGN	#6/7	male, same as #9
11	0840	33.06273	-117.08268	CAGN	#7	pair
12	0909	33.06280	-117.08313	CAGN	#7	pair, prob. same as #11
13	0913	33.06246	-117.08329	CAGN	#7	male with unique call
14	0935	33.06064	-117.08535	CAGN	#6	pair, likely nest or young nearby
15	0948	33.05924	-117.08544	RDRA	#6	2.5 ft. individual
16	1020	33.05788	-117.08939	CAGN	#4	pair, 60 ft. downslope
17	1033	33.05899	-117.09108	CAGN	#4	female, flew 150 ft. upslope, likely mate of #3
18	1102	33.06093	-117.09406	CACW	#4	singing male, flew 300 ft. east

Waypoints 7 May 2014

WP	Time	Latitude	Longitude	Species	Zone	Comments
1	0640	33.05833	-117.08993	CACW	#4	pair
2	0645	33.05788	-117.08950	CACW CAGN	#4 #4	singing male, same as #1 male
3	0724	33.05803	-117.08845	CAGN	#5	pair feeding one fledgling
4	0755	33.05808	-117.08710	CAGN	#5	pair
5	0755	33.05865	-117.08653	CACW	#6	banded male singing
6	0816	33.05882	-117.08575	CACW	#6	singing male, same as #5 above
7	0826	33.06233	-117.08378	CAGN	#7	male w/food
8	1020	33.05882	-117.08575	CAGN	#6	pair feeding two fledglings
9	1048	33.05682	-117.08673	CAGN	#5	pair feeding four fledglings
10	1128	33.05918	-117.09124	CAGN	#4	pair, flew upslope 150'
11	1135	33.06078	-117.09319	CACW	#3	singing male, location approximate
12	1140	33.06046	-117.09188	CAGN	#3	individual heard

SDRP AVIAN SURVEY: RESULTS OF BERNARDO MOUNTAIN RESTORATION SITE SURVEY, 17 May 2014

Latitude-Longitude	Species	Comments	Time Obs.	Map Number
N33.06265 W-117.09673	CACW (260)	Male	0630 h	1
N33.06055 W-117.09398	CACW (239)	Singing male, nest building (2 nests)	0639 h	2
N33.06013 W-117.09405	CAGN (240)	Male	0644 h	2
N33.06127 W-117.09510	CACW (241)	Pair upslope 75', same singing male as 239; nest likely nearby	0653 h	2
N33.06047 W-117.09341	CAGN (242)	Female	0727 h	3
N33.06019 W-117.09247	CAGN (243)	Pair, first spotted downslope at 75' then flew 75' upslope	0743 h	3
N33.05965 W-117.09099	CAGN (244)	Male	0759 h	3
N33.05922 W-117.09136	CAGN (245)	Female first obs. on trail, then flew far (>150') upslope	0810 h	4
N33.05884 W-117.09058	CAGN (246)	Pair 75' upslope; same female as 245	0815 h	4
N33.05837 W-117.08992	CACW (247)	Singing individual, 100' upslope	0829 h	4
N33.05772 W-117.08958	CAGN (248)	Pair, first obs. 75' downslope then flew ca. 100' upslope	0834 h	4
N33.05759 W-117.08860	CACW (249)	Pair, first obs. 75' downslope; banded male (pink RL, yel/blue LL)	0852 h	5
N33.05803 W-117.08845	CAGN (*)	Female, upslope	?	5
N33.05774 W-117.08751	RDRA (250)	~ 3' individual	0914 h	5
N33.05762 W-117.08745	CAGN (251)	Vacant nest; photos	0921 h	5
N33.05732 W-117.08727	CAGN (252)	Pair with 4 young	0927 h	5
N33.05859 W-117.08638	CAGN (253)	Female, obs. 50' downslope	0945 h	6
N33.05863 W-117.08646	CACW (254)	Singing male, same banded individual as 249; obs 25' downslope	0955 h	6
N33.05918 W-117.08499	CAGN (**)	individual noted, same as *	?	6
N33.06051 W-117.08463	CAGN (255)	Pair	1015 h	6
N33.06184 W-117.08304	CAGN (256)	Male, obs. 75 downslope in drainage between 6 & 7	1029 h	7
N33.06259 W-117.08278	CAGN (257)	Pair	1037 h	7
N33.05863 W-117.08645	CACW (***)	Singing male, same banded individual as 249	?	6
N33.06077 W-117.09338	CACW (258)	Singing male, same as 239 & 241	1130 h	3
N33.06077 W-117.09367	CACW (259)	occupied nest, female flew from nest	1137 h	3

SDRP AVIAN SURVEY: RESULTS OF BERNARDO MOUNTAIN RESTORATION SITE SURVEY, 23 May 2014

Latitude-Longitude	Species	Comments	Time Obs.	Map Number
N33.06052 W-117.09161	CAGN (261)	Male upslope 75', 2nd ind. heard on return to zone 3	0623 h	3 & 4
N33.06036 W-117.09204	CAGN (262)	Pair	0627 h	3
N33.05780 W-117.08839	CAGN (263)	Male obs. w/#265	0645 h	5
N33.05762 W-117.08814	CACW (264)	Male, banded (same); nest building	0651 h	5 & 4
N33.05764 W-117.08740	CAGN (265)	Pair w/three young; young flew ca 100' downslope	0658 h	5
N33.05828 W-117.08671	CAGN (266)	Male, moved up and downslope/drainage ca 100'	0718 h	4 & 5
N33.05862 W-117.08642	CAGN (267)	Pair with three young	0728 h	6
N33.05930 W-117.08587	CAGN (268)	Male, moved up and downslope ca 200'	0746 h	6
N33.06221 W-117.08392	CAGN (269)	Male	0816 h	7
N33.06138 W-117.08313	CAGN (*)	Pair 200' downslope from trail	?	7
N33.06289 W-117.08241	CAGN (270)	Individual heard, faint	0839 h	7
N33.05814 W-117.08733	CAGN (271)	Male, probably same as #266	0931 h	5
N33.05757 W-117.08865	CACW (272)	Male, same as #264, banded; flew 100' west	0947 h	4
N33.05843 W-117.08993	CACW (273)	Male, singing 125' upslope from trail	1000 h	4
N33.05787 W-117.09029	CAGN (274)	Pair obs. w/pair #275 10' upslope	1009 h	4
N33.05819 W-117.09031	CAGN (275)	Pair obs. w/pair #274 30' downslope	1014 h	4
N33.06045 W-117.09347	CACW (276)	Pair, female on nest; male flew upslope toward road from GPS point	1058 h	2 & 3
N33.06084 W-117.09542	CAGN (277)	Male, likely same as 278; flew west over 100'	1124 h	2
N33.06143 W-117.09592	CAGN (278)	Pair, feeding young	1134 h	1 & 2

SDRP AVIAN SURVEY: RESULTS OF BERNARDO MOUNTAIN RESTORATION SITE SURVEY, 31 May 2014

Latitude-Longitude	Species	Comments	Time Obs.	Map Number
N33.06036 W-117.09216	CAGN (280)	Pair + male; pair flew 70' downslope from coordinates	0621 h	3
N33.05851 W-117.08668	CACW (281)	Male sang near nest site	0646 h	6
N33.05815 W-117.08555	CAGN (1)	Individual heard near riparian border, probably same as #3	0658 h	6
N33.06053 W-117.08513	CAGN (282)	Male observed upslope w/ 10 Bushtits	0721 h	6
N33.06267 W-117.08316	CAGN (283)	Male noted carrying food	0757 h	7
N33.06289 W-117.08298	CAGN (284)	Pair, same male as #283	0804 h	7
N33.06304 W-117.08284	CAGN (285)	Same pair as above feeding two young	0833 h	7
N33.06322 W-117.08327	CAGN (286)	Same male as #283, flew 100' upslope	0837 h	7
N33.05910 W-117.08608	CAGN (287)	Pair, male flew to west	0855 h	6
N33.05836 W-117.08687	CAGN (288)	Pair + two young; pair same as #287	0914 h	5
N33.005781 W-117.08691	CAGN (289)	Pair, flew to large draw separating zone 5 and 6	0921 h	5
N33.05817 W-117.08675	CAGN (2)	Same pair as #289 observed simultaneously w/male #288	0925 h	5
N33.05802 W-117.08554	CAGN (3)	Male observed at riparian border	0930 h	6
N33.05726 W-117.08607	CAGN (4)	Two juveniles noted	0938 h	5
N33.05680 W-117.08696	CAGN (5)	Male	0948 h	5
N33.05729 W-117.08774	CAGN (6)	Male w/three young	0955 h	5
N33.05804 W-117.08716	CACW (290)	Pair, male on nest in white sage	1002 h	5
N33.05955 W-117.08753	CAGN (7)	Male observed on old (reused) nest in white sage from 23 April (photo)	1008 h	5
N33.05780 W-117.08822	CACW (8)	Male sang downslope; male CAGN noted in same bush as CACW	1016 h	5
N33.05780 W-117.08822	CAGN (8)	Male noted in same bush as CACW, flew upslope	1016 h	5
N33.05797 W-117.08998	CACW (9)	Male sang 120' upslope	1032 h	4
N33.05797 W-117.08998	CAGN (9)	Male flew 20' upslope, then 70' downslope, then 50 downslope with female, then 100' upslope; nest likely upslope of road	1032 h	4
N33.05894 W-117.09124	CAGN (291)	Male, flew 30' downslope	1052 h	4
N33.05879 W-117.09053	CAGN (292)	Male, same as #291	1055 h	4
N33.06005 W-117.09212	CAGN (293)	Male, part of pair #280, flew west to wpt 294	1105 h	3
N33.06026 W-117.09275	CAGN (294)	Male same as #293	1110 h	3
N33.06085 W-117.09365	CACW (10)	Pair, female observed exiting nest; male sang 60' to west	1112 h	2 & 3
N33.06084 W-117.09479	CAGN (295)	Male 50' upslope flew east and out of sight	1122 h	2

SDRP AVIAN SURVEY: RESULTS OF BERNARDO MOUNTAIN RESTORATION SITE SURVEY, 7 June 2014

Latitude-Longitude	Species	Comments	Time Obs.	Map Number
N33.06048 W-117.09138	CAGN (296)	Male, flew 50' upslope	0818 h	3
N33.06083 W-117.09366	CACW (297)	Male feeding young in nest; obs carrying food twice from 50' downslope	0845 h	2
N33.06099 W-117.09433	CACW (298)	Male flew 225' east to nest #297	0855 h	2
N33.06117 W-117.09487	CAGN (299)	Pair obs downslope, agitated; flew west ca. 100'; may be same pair as #	0859 h	2
N33.06263 W-117.09581	CAGN (300)	Vacant nest approx. 2' above ground in white sage	0928 h	1
N33.06245 W-117.09573	CAGN (301)	Female singing near nest #300 in white sage	0931 h	1

Abbreviated survey 0745h - 0945h

SDRP AVIAN SURVEY: RESULTS OF BERNARDO MOUNTAIN RESTORATION SITE SURVEY, 21 June 2014

Latitude-Longitude	Species	Comments	Time Obs.	Map Number
N33.05804 W-117.08716	CAGN (290)	Nest (#290) destroyed/removed from <i>Salvia apiana</i> ; remnants only**	0715 h	5
N33.05781 W-117.08723	CAGN (312)	Male singing, flew downslope approx. 150ft	0724 h	5
N33.05676 W-117.08742	CAGN (313)	Male flew west carrying nesting material to wpt 315	0738 h	5
N33.05701 W-117.08774	CAGN (314)	Male (#313), flew downslope >200ft	0746 h	5
	CAGN (314)	Male (#313), flew upslope with nesting material to wpt 315; female present		5
N33.05705 W-117.08784	CAGN (315)	Male and female at nest site building new nest ~2.5ft above ground	0757 h	5
N33.05915 W-117.08753	CAGN (7)	Three eggs observed in nest; nest completely exposed without veg cover; observed same pair (#315) building nest and frequenting used nest site containing three eggs; pair moving approx. 200ft up and downslope	0805 h	5
	CACW	Singing west and downslope of trail heard from #7		4
N33.05802 W-117.08731	CAGN (316)	On the spot coordinates of nest site #290	0819 h	5
N33.06098 W-117.09308	CAGN (317)	Pair; female carrying food or nesting material 75-100ft upslope	0919 h	3
N33.06065 W-117.09171	CAGN (318)	Sex unknown; heard upslope	0938 h	3
N33.06083 W-117.09366	CACW (297)	Cactus wren nest unoccupied; none heard or observed; no fledglings obs.	0905 h	2
N33.06263 W-117.09581	CAGN (300)	Vacant nest obs on 7Jun14; <2ft above ground and exposed	0950 h	1

Abbreviated survey 0710h - 1000h

**nest predation; nest <2ft above ground

Appendix 3| 2014 Avian survey dates, time of surveys, and weather conditions at north shore Lake Hodges, Bernardo Mountain Preserve, San Dieguito River Park.

Date	Time		Temperature (°F)		Wind Speed (avg mph)		Cloud Cover (%)		Relative Humidity (%)	
	Begin	End	Begin	End	Begin	End	Begin	End	Begin	End
18 Mar	0700	1212	57	78	0	2	100	0	-	-
9 Apr	0657	1144	56	90.8	0	3.5	100	0	70.4	14.1
16 Apr	0655	1205	60.5	76.2	3.2	5.4	100	0	69.9	43.1
23 Apr	0645	1217	56.6	76.1	0	5	100	25	70.7	32.3
3 May	0554	1254	40	79	5	10	0	0	76	56.2
7 May	0558	1112	58	88	0	2	0	0	46	17
17 May	0602	1158	61.8	90	0	6.8	40	0	67.8	34.2
23 May	0557	1200	64.2	75.7	0	2	100	100	65.6	47.9
31 May	0547	1150	57.7	84.2	0	3.7	0	0	85.3	28.5
7 Jun	0745	0945	64	72.5	0	0	100	0	71.4	61.2
21 Jun	0710	1000	66.3	80.4	0	2.3	100	0	77.2	50.1

Appendix 4. Additional photos of wildlife.



Figure 15. Red Diamond Rattlesnake observed at the Bernardo Mountain Preserve on 3 May 2014.



Figure 16. Greater Roadrunner with the tail of a Tiger Whiptail observed at the Bernardo Mountain Preserve on 23 May 2014.



Figure 17. Juvenile Rock Wren observed on 7 May 2014, Bernardo Mountain Preserve. This species appears to be a recent inhabitant of the preserve, following the Witch Fire of 2007.



Figure 18. Male of California Gnatcatcher pair #7 incubating its second clutch of eggs in the same nest as used for its first brood. Photo taken 31 May 2014.