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August 9, 2018

Ms. Love,

I certify that the information in this survey report and attached exhibits fully and accurately represents my work.

Daniel S. Cooper
President, CEM, Inc.
USFWS Permit #TE 100008-3

Palos Verdes Nature Preserve Survey for the California Gnatcatcher and the
Cactus Wren
Palos Verdes Peninsula Land Conservancy
Los Angeles County

2018
Final Report



San Ramon Reserve, Palos Verdes Peninsula, Feb. 17, 2018

This image is illustrative of the challenging conditions for the two focal bird species, showing essentially no foliage on the native shrubs (*Encelia californica* in the foreground), no forbs along footpaths and between shrubs, and dried weeds from 2016-17 (here *Brassica nigra*) overtopping the remaining cactus patches

Photo by Daniel S. Cooper

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Introduction and Summary

We report on a single-season survey of two sensitive bird species, the (coastal) California gnatcatcher *Poliophtila californica californica* (Federally Threatened) and the coastal-slope population of the cactus wren *Campylorhynchus brunneicapillus* (formerly a Candidate for federal listing; now treated as a California Bird Species of Special Concern¹) on the Palos Verdes peninsula in 2018. Our study area extended across nine reserves covering a combined 1,225 acres managed by the Palos Verdes Peninsula Land Conservancy (Figures 1a and 1b). Our survey may be compared with previous surveys for these two birds conducted at most of the same sites in 2006, 2009, 2012 and 2015 (Dudek 2007, Hamilton 2009, CEM 2013, CEM 2015), as well as with more limited surveys conducted at various locations on the peninsula since 2010 (e.g., CEM 2011, 2013, and 2014).

For 2018, we estimate 19 territories of California gnatcatcher this year, and just five territories of cactus wren. Compared with previous surveys, the estimate of California gnatcatcher territories for 2018 is down by roughly half, and for cactus wrens is down roughly 75%. This unprecedented drop is extremely alarming, particularly for cactus wren, which may not survive many more years. Both California gnatcatcher and cactus wren were present together at three reserves early in the year, but only at two reserves, Three Sisters/Filiorum, by late spring (vs. five reserves in 2015). The California gnatcatcher was absent (or presumed absent) at two (vs. one in 2015), and the Cactus wren absent at seven of the nine reserves²; and unlike in prior years, neither focal species was detected at Agua Amarga Reserve. We attribute these declines to the combination of prolonged drought, cold/wet spring conditions in 2018, the continued degradation of native scrub habitat through growth in invasive shrubs, and an increase in local predators. However, it is not clear which of these factors is driving the decline, nor is it clear that any change in (human) management of the habitat would be able to reverse it.

Methods

We conducted targeted surveys for the California gnatcatcher and the cactus wren on 19 days to eight of nine reserves managed by Palos Verdes Peninsula Land Conservancy (collectively known as the Palos Verdes Nature Preserve) at the southwestern tip of the Palos Verdes peninsula (Table 1; Figures 1a, 1b) between 17 Feb. and 13 June 2018 (Tables 1 and 2). More than one site was visited on most days, for a total of c. 47 survey hours (Table 2). We used a two-visit protocol, with surveys spread at least one week apart, with one early-

¹ In 2008, coastal populations of the cactus wren north of southern Orange County were deemed distinct from those in southern Orange County (termed *C. b. sandiegensis*) by the most recent publication of California Bird Species of Special Concern (Shuford and Gardali 2008). However, this view is not widely held within the ornithological community, and due to their extreme isolation and a life history that is essentially identical with coastal-slope populations to the south into San Diego County, we, as well as regulatory agencies like the Calif. Dept. of Fish and Game (CDFG; L. Comrack, pers. comm., April 2008), treat the Palos Verdes birds as a sensitive species under state law. In addition, CDFG requires that all playback surveys for the cactus wren in coastal-slope Los Angeles Co. (and Ventura Co.) be conducted under a Memorandum of Understanding reserved for special-status species.

² We elected not to survey Vista del Norte in 2018; we have not detected either target species in the 10+ years of focal surveys on the peninsula, and there are no verifiable records of either from this reserve (e.g., www.ebird.org), and virtually no coastal sage scrub.

season visit from late Feb. to early April (“Round 1”) and one late-season visit during mid-May to mid-June (“Round 2”)³. Data from a popular online bird sighting reporting platform (eBird; www.ebird.org) were incorporated into our analysis, as applicable, since many of the reserves were visited by competent birders during the same survey windows.

Following established protocol for California gnatcatcher surveys (USFWS 1997), visits were made between 6:00 a.m. and noon, typically beginning late morning when ambient morning temperatures were above (or were predicted to rise above) 55 degrees F. Surveys were not conducted under extreme weather (temperature, wind) conditions. Taped vocalizations of each species were employed on all surveys, as outlined in guidelines provided by PVPLC and approved by U.S. Fish and Wildlife Service/Department of Fish and Game (“7.3.2 Animal Species Monitoring”). A “zigzag” walking route was used to cover each reserve, following as closely to the most recent (2009) survey as possible (Appendix A). No more than 80 acres of coastal sage scrub was surveyed on any single day, following USFWS (1997) guidelines. The survey routes used in 2018 were intended to follow those used by previous surveyors (Dudek 2007, Hamilton 2009, etc.), though portions of several reserves contained only scattered patches of coastal sage scrub, or had inaccessible areas that could not be reached during the survey; these were generally skipped in 2018 to focus most efficiently on prime coastal sage scrub and cactus habitat within the preserve network, as was done in prior years (Appendix A).

Most surveys were carried out by Daniel S. Cooper (TE 100008-3; SC-10615), assisted by Robert A. Hamilton (TE 799557). Both Cooper and Hamilton have extensive experience with California gnatcatcher surveys throughout Los Angeles and other counties, and have conducted similar target bird surveys at the Portuguese Bend Reserve in prior years for the Palos Verdes Peninsula Land Conservancy.

In addition to recording aural detections of both species, visual scans (using Leica 8x42 Ultravid binoculars) were made of all cactus habitat for cactus wren nests, and sightings of the brown-headed cowbird (*Molothrus ater*), a known parasite of songbird nests, as well as other sensitive species were noted. Basic weather conditions were observed at the start and end of each visit (Table 2). All observations of the two target species were recorded directly onto aerial photographs, with special attention paid to documenting the number and breeding/territorial status of each in notes. For each sighting of a target species, we recorded:

- Date and start time of sighting (sightings were typically very brief, so stop times were typically not recorded unless more than a few seconds);
- Sex/age of individual(s) (if known);
- Banding information (color-banded, metal-banded, etc.);
- Habitat type where found (only if not coastal sage scrub for California gnatcatcher or cactus scrub for cactus wren);
- Number of birds associated with individual (e.g., family group, pair, etc.); and
- Breeding activity observed

³ The 2006 preserve-wide surveys had used a 3-visit protocol; a reduction in effort for 2009 and 2012 was made per the NCCP guidelines for RPV.

Locations of all target/special-interest species were transferred from field maps onto Google Earth maps and converted to digital files (.kmz). These are presented in Appendix B.

From these sightings, we estimated the number of territories for each reserve, cognizant that two visits were insufficient to provide a confident estimate of either territory boundaries. Therefore, our territory numbers should be treated as rough approximations, rather than indications of actual population estimates. To allow for the most useful comparisons with prior surveys, we follow Hamilton's (2009) definition of a "territory" to include any discrete location where a territorial bird (male, in the case of the gnatcatcher) or pair was present on at least one visit. Locations where we detected an unmated adult bird of either species, or juvenile(s) of either species away from adults, were not considered "territories". In mapping locations of birds, we noted movements with arrows on our field maps, but mapped only the site of initial detection on the digital maps (otherwise, they would be nearly impossible to read, particularly given multiple visits).

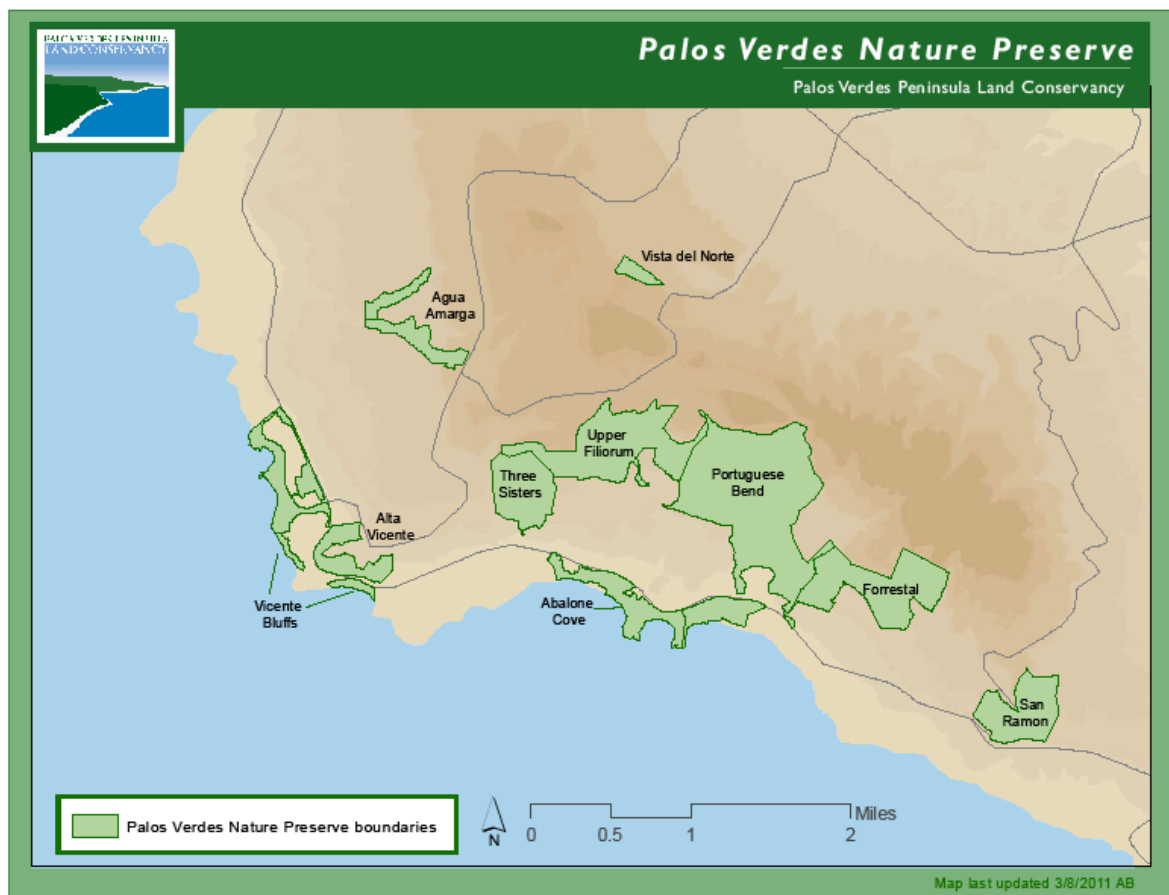


Figure 1a. Reserves in the Palos Verdes Nature Preserve in Rancho Palos Verdes (indicated in top of legend) surveyed during this study (and prior ones). Figure courtesy PVPLC.



Figure 1b. Aerial view of reserves. Clockwise, from upper left: L = Agua Amarga (formerly “Lunada Cyn.”); N = Vista del Norte, U = Filiorum; C = Portuguese Bend (formerly “Canyons”); F = Forrestal; R = San Ramon; A = Abalone Cove (east and west); T = Three Sisters; B = Vicente Bluffs (upper and lower); V = Alta Vicente. Figure from Hamilton 2009, courtesy of PVPLC.

Table 1. Reserve acreage and total survey hours, 2012-18. Note that multiple sites were surveyed on some days (see Table 2 for additional detail).

Reserve	Acres	Days surveyed 2012	Time afield 2012	Days surveyed 2015	Time afield 2015	Days surveyed 2018	Time afield 2018
Abalone Cove	64	3	7:10	6	5:17	4	4:28
Agua Amarga	59	2	5:05	3	3:21	3	3:26
Alta Vicente	55	2	4:35	4	4:52	2	6:04
Forrestal	155	4	8:40	4	4:05	2	6:02
Portuguese Bend	399	4	12:00	5	6:51	2	11:42
San Ramon	95	3	4:10	2	2:05	2	3:07
Three Sisters/Filiorum (combined)	300	4	10:35	7	9:43	2	10:01
Vicente Bluffs	84	2	4:40	2	2:42	2	2:28
Vista del Norte	14	2	1:05	1	0:20	0	0
TOTAL	1,225	26	58 hrs	34	c. 40 hrs⁴	19	c. 47 hrs⁵

⁴ Actual time surveying: 39:16

⁵ Actual time surveying: 46:58

Table 2. Summary and description of survey effort in 2018. Number of birds listed is the maximum number of adults estimated (both visits). Letters after the reserve names refer to the abbreviations in Figure 1b.

Date	Survey round	Time	T. start (F)	T. end (F)	Sky/Wind	Subarea	# CAGN	# CACW	
Abalone Cove (A)									
9 March	1	9:15-12:15	61	63	OC/3-5 mph		1	0	RAH
28 March	1	10:50-11:40	67	67	Clear/calm		4	0	DSC
18 May	2	10:34-10:54	N/A	N/A	N/A		3	0	DSC
31 May	2	10:26-11:44	62	67	PC/calm		2	0	DSC
Agua Amarga (L)									
17 Feb	1	11:03-11:15	69	60	Clear/calm	Eastern	0	0	DSC
28 Mar	1	7:42-9:01	57	57	Clear/calm		0	0	DSC
7 June	2	10:41-12:13	64	64	PC/calm		0	0	DSC
Alta Vicente (V)									
23 Feb	1	8:15-11:15	48	53	Clear/4-8 mph		4	2	RAH
24 May	2	8:20-11:24	58	59	Fog/calm		6	0	DSC
Forrestal (F)									
4 Apr	1	7:48-10:56	55	55	OC/calm		2	0	DSC
31 May	2	7:21-10:15	59	62	PC/0-3 mph		5	0	DSC
Portuguese Bend (C)									
21 Feb	1	8:20-11:20	50	57	Clear/3-5 mph	North	0	0	RAH
21 Feb	1	8:07-11:05	50	57	Clear/3-8 mph	South	2	0	DSC
18 May	2	8:20-11:40	61	66	OC/3-5 mph	North	2	0	RAH
18 May	2	7:56-10:20	60	65	OC/calm	South	3 ⁶	0	DSC
San Ramon (R)									
17 Feb	1	9:01-10:46	61	61	Clear/calm		2	0	DSC
7 June	2	9:04-10:26	62	64	OC/5-0 mph		2	0	DSC
Three Sisters (T)									
29 Mar	1	8:20-11:05	53	60	PC/3 mph		2	4	RAH
13 June	2	8:10-10:20	64	66	Fog/3-5 mph		6	3	RAH
Filiorum (U)									
29 Mar	1	8:13-10:51	58	58	Clear/calm		10	2	DSC
13 June	2	8:04-10:32	64	68	PC/calm		5	2	DSC
Vicente Bluffs (B)									
28 Mar	1	9:09-10:39	61	64	Clear/3-5 mph		4	0	DSC
24 May	2	11:33-12:31	59	61	OC/calm		6	0	DSC
Vista del Norte (N)									
N/A									

⁶ An apparent family group (3-4 birds) was observed just south of the reserve boundary as the survey ended, which likely wandered down from the mapped territory in the southern portion of the reserve, and is not included here.

Results

We estimate 19 territories of California gnatcatcher, and five territories of cactus wren, during the 2018 breeding season (Table 3). This represents a drop of 54% and 74%, respectively, from the prior survey in 2015, and an even larger drop from the 2009-2015 average. Cactus Wren territories have never been estimated to be in the single-digits since monitoring began, and we only had birds survive the season at two (adjacent) reserves, Three Sisters and Filiorum. A former stronghold of the species on the peninsula, Alta Vicente reserve (13 territories estimated in 2012) had zero active territories by June 2018 (the single pair observed in February appeared to be absent as of March 2018). Agua Amarga Reserve, which had at least three territories each of California gnatcatcher and cactus wren in both 2009 and 2015, had zero territories in 2018 (we surveyed there on three separate days, and visited each “arm” of the reserve at least twice). The pattern noted in 2015 held in 2018, that cactus wren was not recorded at any reserve where absent on the prior survey. This year we can add three “new” extirpation locations for the species, Alta Vicente, Agua Amarga, and San Ramon. Maps showing all locations of California gnatcatcher and cactus wren observations, including nests, from the 2018 survey are provided in Appendix B, and are detailed in a table in Appendix C. No brown-headed cowbirds were noted during the 2015 (just one was detected in 2012).

Table 3. Estimates of territories of California gnatcatcher (CAGN) and cactus wren (CACW), by reserve.

		Abalone Cove	Agua Amarga	Alta Vicente	Forrestal	Port. Bend	San Ramon	Three Sisters	Filiorum ⁷	Vicente Bluffs	Vista del Norte
2006 (65 CAGN/c. 30 CACW⁸)											
	CAGN	8	4	8	12	14	7	8	N/A	4	0
	CACW	9 ad.	4 ad.	4 pr, 7 ad.	6 ad.	4 ad.	10 ad.	7 pr., 1 ad.	N/A	0	0
2009 (40 CAGN/18 CACW)											
	CAGN	3	3	5	5	7	4	4	N/A	10	0
	CACW	0	4	4	2	2	1	5	N/A	0	0
2012 (33 CAGN/38 CACW)											
	CAGN	5	1	5	9	6	1	2	0	4	0
	CACW	3	6	13	1	3	2	10	9	0	0
2015 (33 CAGN/19 CACW)											
	CAGN	1	3	4	7	6	2	2	4	4	0
	CACW	0	3	5	0	0	3	8	6	0	0
2018 (19 CAGN/5 CACW)											
	CAGN	2	0	2	2	3	1	2	4	3	0
	CACW	0	0	0 ⁹	0	0	0	3	2	0	0

⁷ Filiorum was not censused prior to 2012; 10 territories of cactus wrens were detected on Filiorum in 2012 (preserve-wide total: 48).

⁸ Assuming two adults per territory. Note that Dudek (2007) conducted three visits during the 2006 survey, while subsequent surveys made two.

Discussion

Overall, 2018 found the lowest numbers of both California gnatcatchers and cactus wrens since required every-three-year monitoring began in 2006. The reasons for this are not entirely clear, but it likely a combination of the following factors¹⁰:

- Crippling drought that started after 2012 and which has continued into 2018, which resulted in virtually no new foliage or flowering on shrubs/forbs by spring 2018 (and which likely reduced the available food tremendously);
- A relatively wet winter in 2016-17 that resulted in an explosion of weedy growth across the peninsula (esp. black mustard *Brassica nigra*) that altered the structure of the native low scrub habitat and rendered it less suitable for the two focal species;
- Unseasonably cool (and wet) conditions during early spring 2018 (in 2018, temperature data indicate that no survey date reached an air temperature in the 70s, only five days saw end temperatures >65F, and rain canceled several survey dates; by contrast, in 2015, 10 survey dates ended with temperatures at or above 70F);
- The continuing decline of cactus plants from drought and insect pests;
- The continued growth of invasive shrubs such as acacia (*Acacia* spp.) and others; and
- The continuing increase in predators such as Cooper's hawk (*Accipiter cooperii*) peninsula-wide.

It is also possible that the dramatic loss of cactus wrens is being accelerated by a genetic bottleneck, where viable young are not being produced at a rate that would sustain the population, and with essentially no immigration of new individuals, we're simply waiting for the remaining adults to die. Thus, these seemingly adverse environmental conditions may not be operating on a "normal" population, but one already struggling with low population size.

The following is a more detailed description of observations of California gnatcatcher and cactus wren by site, with reference to results from prior surveys.

Abalone Cove

Following the pattern of steep decline observed in 2015 when just a single California gnatcatcher territory (and no cactus wren) was noted, with one breeding territory again in the restored coastal sage scrub on the point near the center of the reserve (adult bringing in food to a likely nest site in May) (Figure 2). Encouragingly, this year (2018), we also noted a pair in a newer restoration area of the reserve west of here, where the PVPLC had been clearing weeds and planting native shrubs. The area around the main parking lot, and the trail down to the beach, continues to be unsuitable for either species, due to invasion by both non-

⁹ A pair of cactus wrens were recorded here during the February survey (23 Feb. 2018); however, they were not observed during the subsequent survey (24 May 2018), and no reports beyond March 2018 have been entered into eBird.

¹⁰ We base these insights on our own combined 70 year of birding/surveying experience in the Los Angeles region, and on conversations over the years with local biologists who have also worked with cactus wrens, including Dana Kamada, Barbara Kus, Milan Mitrovich, Kristine Preston, Tom Ryan, and Trish Smith.

natives such as acacia and large evergreen native shrubs such as lemonadeberry (*Rhus integrifolia*)¹¹.

For cactus wrens, we note that while wrens were absent in 2009, they recolonized in 2012, so it is probable that Abalone Cove is a somewhat peripheral site, supporting the species when the population on the peninsula is high, and winking out when fewer pairs are around. It is possible that (at least during “good years”) it supports spillover pairs from the adjacent Filiorum Reserve, located just to the north across Palos Verdes Dr. However, we noted again that the cactus stands at Abalone Cove look even more sickly and sparse than in prior years, and clearly unsuitable for nesting wrens at this time¹². The last pair of birds reported to ebird from Abalone Cove was in May 2013 (<https://ebird.org/view/checklist/S14162696>).



Figure 2. California gnatcatcher territories (white boxes), Abalone Cove. Note: far eastern portion of reserve was not visited in 2018.

¹¹ The far eastern area of the reserve adjacent to Portuguese Bend is no longer part of the Nature Preserve, yet had at least one bird in 2006, was graded in 2009, and had recovered enough to support at least one territory in 2012. So, it is possible another pair was present here in 2018. Elsewhere on the reserve, again in 2018 essentially none of the archery range area appeared suitable for gnatcatcher, either because of vegetation clearing or due to drought causing the scrub to be extremely sparse.

¹² While vegetation was not quantitatively measured or assessed, the stands of cactus here were fairly short (i.e., 1-meter tall or lower), did not cover large, impenetrable blocks (as at Filiorum Reserve, for example), and appear to have shrunk in extent, based on “standing dead” individuals observed.

Agua Amarga

With no territories of either species, not much may be said about Agua Amarga. The habitat looks essentially unchanged here, though a relatively large area of weeds had been cleared within northern “arm” of Lunada Canyon (part of Agua Amarga Reserve), and the cactus stands throughout the reserve appear to have suffered due to weed invasion and drought (a phenomenon noted peninsula-wide). On a possibly positive note, a pair of cactus wrens was reported to ebird in April 2018 (<https://ebird.org/view/checklist/S44439942>), but the exact location was not noted.

Alta Vicente

Perhaps the most surprising change at all the reserves was at Alta Vicente, which had supported a relatively robust population of both California gnatcatchers and cactus wrens in prior years, but in 2018 was down to two – and possibly just one – territory of gnatcatchers and zero wrens (Figure 3); one of the two gnatcatcher pairs (“CAGN 2” at Alta Vicente) was not noted during the June visit, and while it may have fledged young and dispersed by the second survey round, it is possible that only a single (successful) gnatcatcher pair nested at Alta Vicente in 2018 (juveniles noted in June). The loss of cactus wren from this site seems part of a trend since 2012; as we wrote in the 2015 report, “several areas with fresh nests in 2012 were found to not support either nests or birds; thus, the drop in numbers is likely real, and was more similar to the estimate for 2009 (4 territories), and well below that estimated in 2006 (4 pairs plus 7 individuals).” The last pair reported to ebird at Alta Vicente was in March 2018 (<https://ebird.org/view/checklist/S43840127>).

It is likely that the continuing invasion of the cactus patch areas by weeds (including *Echium*) and acacia is not helping; as noted in 2015, “substantial stands of both cholla and prickly-pear cactus remain here, and while acacia shrubs continue to expand and overtake these native stands, wrens are continuing to build nests in cactus at the edge of these shrubs.” It appears that these shrubs may have altered the cactus scrub community to such a degree that these birds could not persist. The increase in Cooper’s hawk (*Accipiter cooperii*) may also be a factor, and multiple Cooper’s hawks were noted each survey day throughout the study area, including directly over cactus wren habitat.



Figure 3. California gnatcatcher territories (white boxes), Alta Vicente (right) and Vicente Bluffs (left).

Forrestal

One of the steepest declines of either species came from Forrestal in 2018, when just two active California gnatcatcher territories were mapped (Figure 4), down from the 5-12 territories estimated since 2006. These territories appear to be in similar areas as in prior years, and at least one had young (female bringing in food 31 May) suggesting that several “peripheral” territories may have been lost, leaving only the highest-quality areas occupied, split between the western and eastern halves of the reserve.

As in 2015, cactus wren was entirely missed here, and the species therefore considered extirpated from the reserve, with no old or new wren nests observed. The last pair reported to ebird was in March 2011 (<https://ebird.org/view/checklist/S7806016>), with the last single here in March 2016.

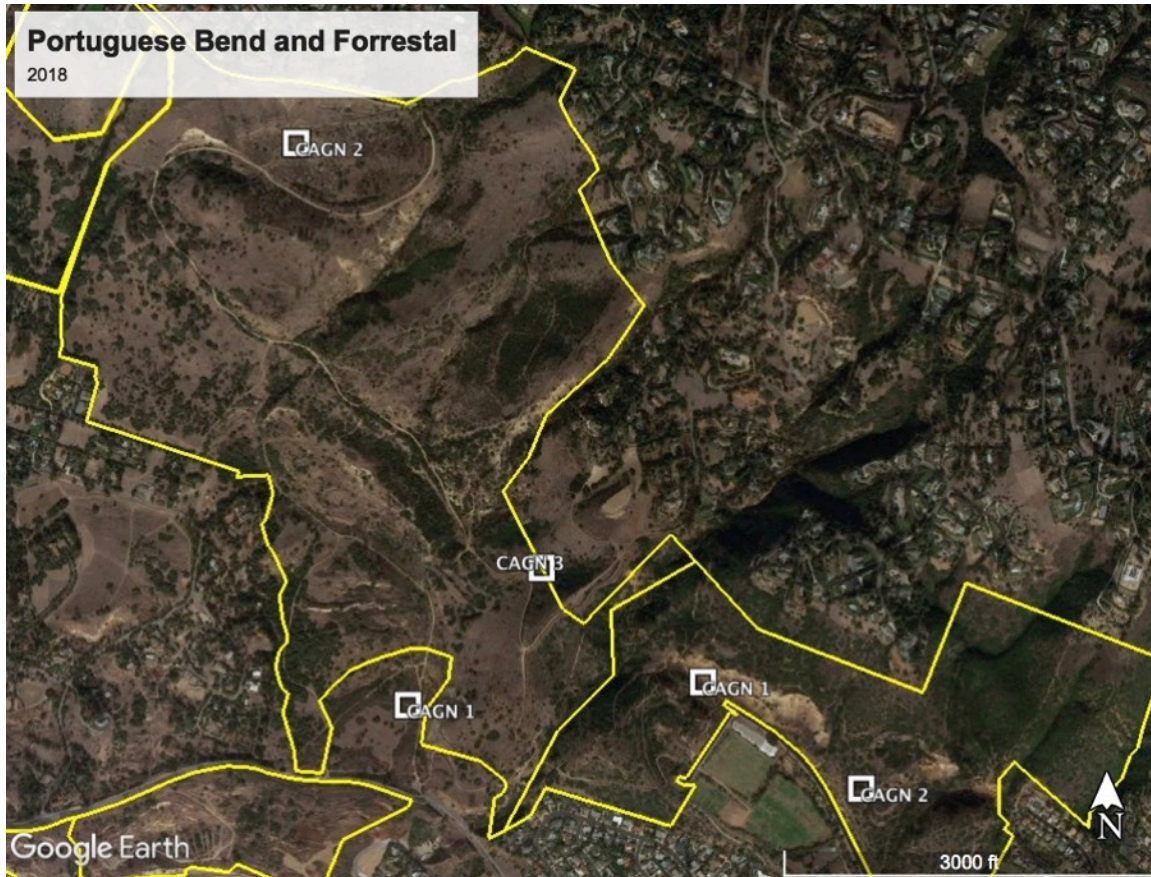


Figure 4. California gnatcatcher territories (white boxes), Forresteral (right) and Portuguese Bend (left).

Portuguese Bend

Unlike in prior surveys, the 2018 survey documented just 2-3 territories of California gnatcatchers (Figure 4) from what had been a local stronghold for the species (from 2015: the pattern of 5-7 territories, most in the southern half, with a smattering of sightings in the northern half, has held since (2009)". Interestingly, one of the two documented/potential nesting areas was within the large restoration area in the northern half of the reserve, which had not had regular sightings in prior surveys.

We note that active gnatcatcher territories were almost concentrated in restoration areas in other reserves, with both of the Abalone Cove territories in restored habitat, Alta Vicente one of the 1-2 territories in an active restoration area, and all three of the Vicente Bluffs territories in restoration habitat. This suggests that birds may be finding scarce resources in these "artificially productive" (via irrigation, weeding) zones.

The pair of cactus wrens noted along the "Barn Owl Trail" at the far eastern edge of Portuguese Bend on July 9, 2015 (CEM 2015) appear to have been the last known record of the species from the reserve (none have been reported to ebird since 2013).

San Ramon

One of the smallest reserves with relatively little coastal sage scrub, San Ramon was down to a single pair of California gnatcatcher 2018 (Figure 5), which was showing no indication of nesting. Therefore, this species – along with cactus wren, which went undetected here – may be vanishing from the reserve. While restoration planting evaluation was not part of our study, very little successfully restored habitat was noted. Whether traffic noise was a factor in this decline (as speculated on in 2015) is unknown, but given the steep declines at every other reserve, it would only be a contributing factor at most.



Figure 5. California gnatcatcher territories (white boxes); cactus wren territories (yellow boxes), San Ramon.

Three Sisters/Filiorum

Note: These reserves are directly adjacent to one another, and so will be discussed together here.

Together, these two adjacent reserves appear to support the last remaining pairs of cactus wrens on the peninsula, as well as an estimated six territories of California gnatcatchers. Additional gnatcatchers may be present in inaccessible areas that border each of these reserves (due to their loud calls, it is unlikely we missed any cactus wrens, however). Most troubling, however, is the loss of multiple pairs of cactus wrens at Three Sisters similar to the situation at Alta Vicente (from six pairs in 2015 to one pair in the upper portion of the

reserve in 2018, and the outright loss of all four pairs in the canyon between the two reserves since 2012) despite the persistence of extensive cactus scrub.

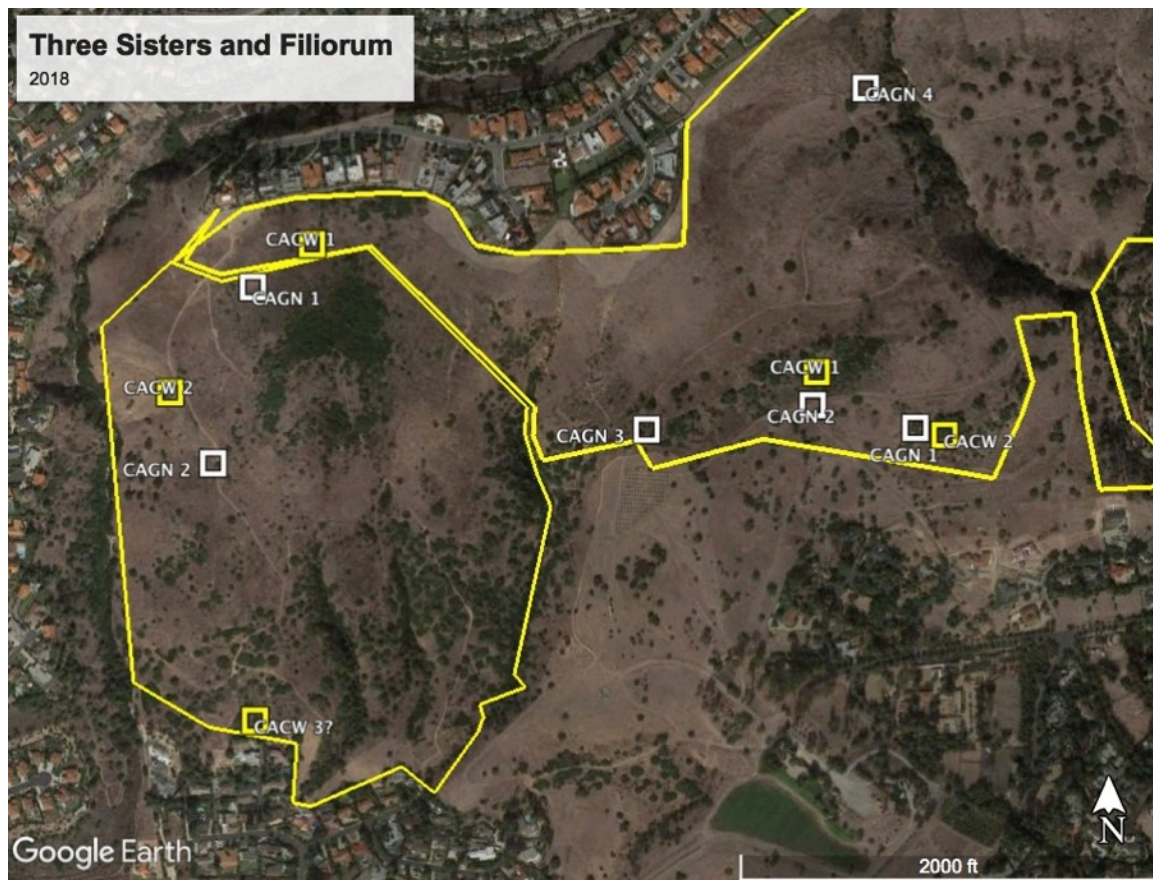


Figure 6. California gnatcatcher territories (white boxes); cactus wren territories (yellow boxes), Three Sisters (left) and Filiorum (right).

Vicente Bluffs

Unlike virtually any other reserve, Vicente Bluffs saw its population of California gnatcatcher remain stable, as in prior years, with three pairs in the main restoration area (Figure 2). The eastern portion of the reserve (located c. 100 meters east of the main reserve, and just west of Palos Verdes Dr., adjacent to a small debris basin; see Figure B-2) that supported a single territory in prior years (“territory 4” in 2015) was inaccessible in 2018 so was not surveyed (a “forest” of black mustard *Brassica nigra* blocked entry to the area that had supported coastal sage scrub in prior years). Cactus wren were again absent here, and with no large cactus patches, will remain so.

Additional notes

Reviewing what we wrote about the 2012 survey (Cooper 2013):

“The apparent declines in gnatcatcher territories and increases in cactus wren territories should be interpreted with caution. These were based on as few as four visits, over four years, for many reserves, which is far too few to make claims of population trends. So, while these surveys are probably sufficient for presence/absence information – such as that neither species has colonized Vista del Norte reserve, or that California gnatcatcher may be nearing extirpation at Agua Amarga – numbers of both species vary naturally annually, and from decade to decade.”

And,

“Atwood et al. (1998b) noted [gnatcatcher] population swings of c. 50% during annual surveys on the peninsula from 1993-1997, ranging from a high of 56 in 1994 to a low of 26 pairs the following year (1995); our 2012 [and 2015] estimate of 33 pairs fits within this range, as does Hamilton’s in 2009 (40 pairs) which used similar methodology. Therefore, only through repeated surveys over multiple years will we be able to assess trends with any confidence.”

The 2018 estimate of 19 territories of gnatcatchers falls below Atwood’s low of 26 pairs in 1995, though a handful of pairs are present on the peninsula in areas not visited by our survey (e.g., Trump National Golf Course/Ocean Trails, Terranea, and Shoreline Park, etc.). Still, it could be said that 2018 may be a very low ebb of a low period for the species. It is also clear that they are not “holding their own” at Agua Amarga or San Ramon, as suggested in 2015, but rather have retreated to a handful of the densest, most extensive vegetation at a handful of restoration areas (e.g., Vicente Bluffs) and in the most extensive blocks of natural habitat such as Three Sisters/Filiorum.

For cactus wrens, the situation can only be described as dire. A population down to five pairs – of any bird or animal species – is mathematically unlikely to sustain itself without immediate immigration of new individuals. In the case of the Palos Verdes peninsula, given its isolation, this seems essentially impossible in the long term (coastal cactus wren sightings away from nesting territories are virtually unknown in the Los Angeles area, even though stray gnatcatchers are fairly regular and widespread, albeit in low numbers). Even if there is still a pair or two in patches of cactus away from the reserves (e.g., at Ocean Trails, where a single bird was reported to eBird into June 2018), a population below c. 10 pairs is probably unsustainable.

Reversing this trend will be challenging, since these birds only breed in spring/early summer, and tend to occur in small, highly social groups that construct numbers of nests throughout large, adjacent patches of cactus. Having single pairs – much less individuals – at widely-spaced patches may not result in new young produced. Still, we would recommend the following measures be considered to attempt to save this population:

- Immediate and permanent removal (i.e., including the roots) of large acacia, *Caesalpinia*, *Echium*, and other invasive non-native trees and shrubs at Three Sisters, Filiorum, and Alta Vicente (the three last reserves that support/supported cactus wren);

- Installation of cactus wren nest boxes (e.g., similar to those deployed by Irvine Ranch Conservancy and other reserves in Orange County);
- Limiting human use of certain trails that run through prime cactus wren habitat, such as at Alta Vicente and Three Sisters, to reduce stress on the remaining pairs;
- Reducing supplemental irrigation of restoration zones near areas of recent cactus wren use (since this *may* be supporting/encouraging more weeds, more rodents, and possibly more raptors/predators);
- Removal of tall (non-native) trees on the periphery of the preserve known or likely to support nesting Cooper's hawks (e.g., pines, ficus); and
- (if necessary) Translocation of birds from Orange County or Ventura County populations to supplement the breeding population on the peninsula.

Translocation has proven successful in other parts of the birds' range, including Upper Newport Bay, where a population vanished and has subsequently been reestablished, and we will provide PVPLC with information on this as soon as we compile it.

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APPENDICES

Appendix A. Approximate walking routes taken by surveyor (Cooper) in 2015. Different colors represent routes taken on different survey days.

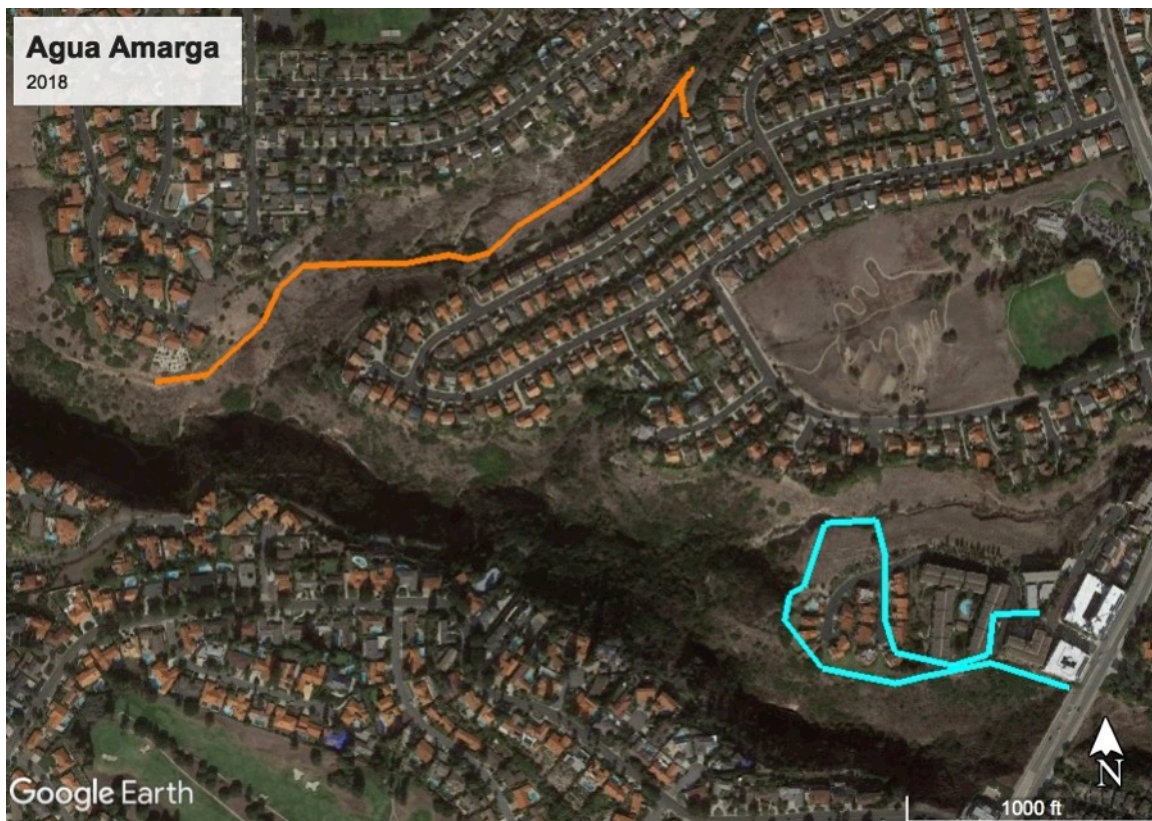


Figure A-1. Agua Amarga routes.



Figure A-2. Abalone Cove routes.

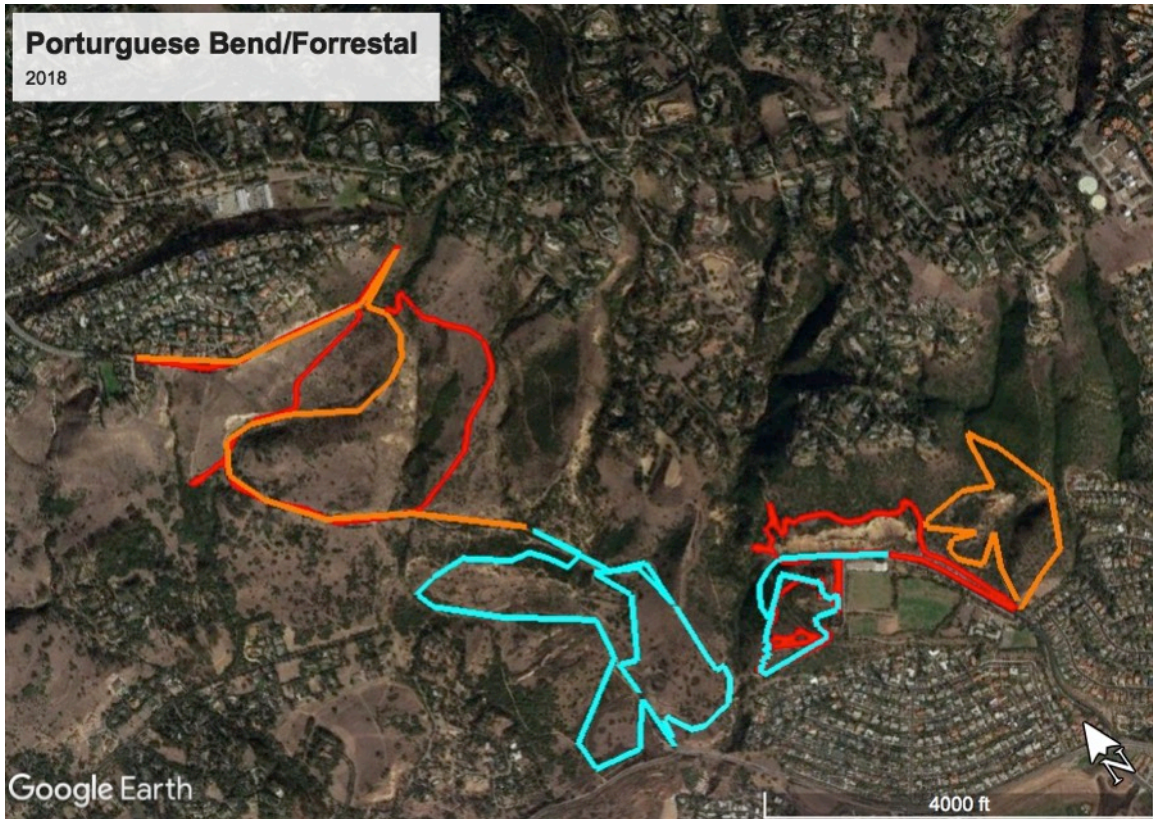


Figure A-3. Forrestal/Portuguese Bend routes.



Figure A-4. San Ramon route.

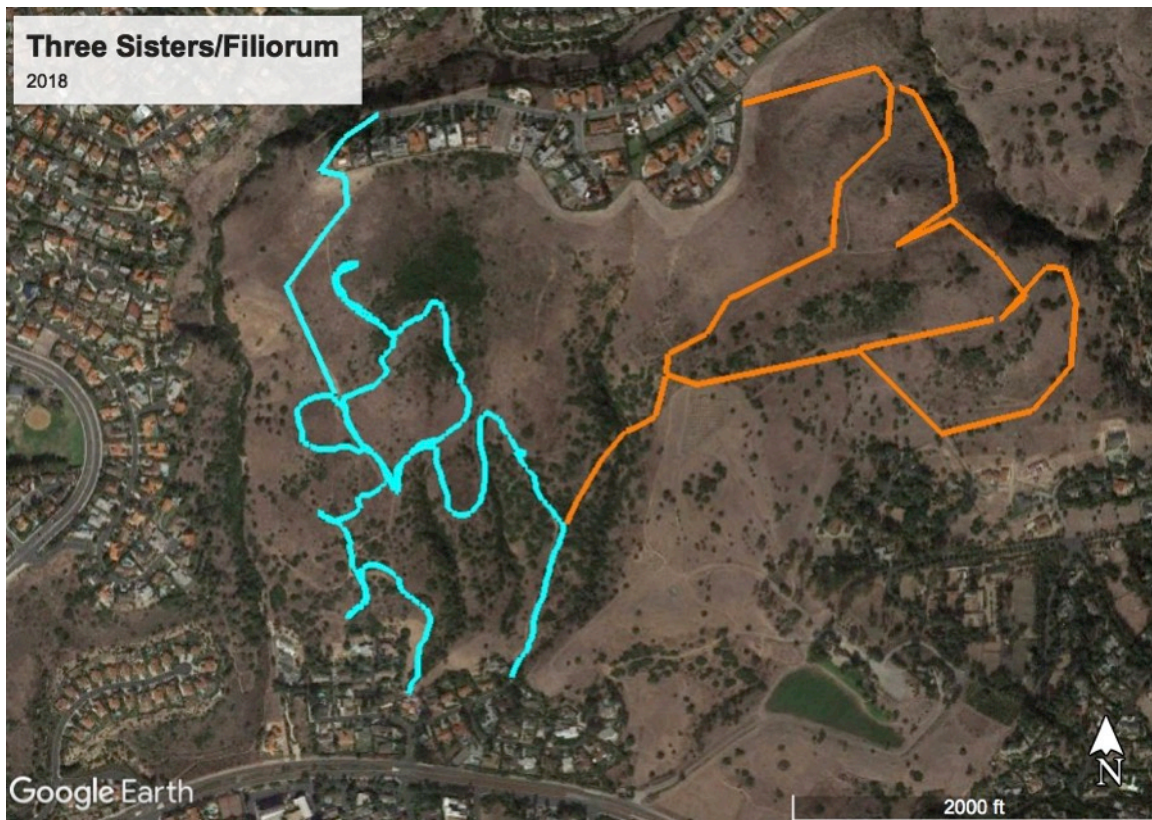


Figure A-5. Three Sisters/Filiorum routes.

Appendix B. Maps of all California gnatcatcher/cactus wren detections, including nests, 2018. Yellow pins represent gnatcatchers, green pins represent cactus wrens. Please refer to Appendix C for additional details on each.



Figure B-1. California gnatcatcher and cactus wren observations, Abalone Cove.



Figure B-2. California gnatcatcher and cactus wren observations, Alta Vicente (right) and Vicente Bluffs (left). Note that Vicente Bluffs is split into a main reserve and an “eastern extension”.

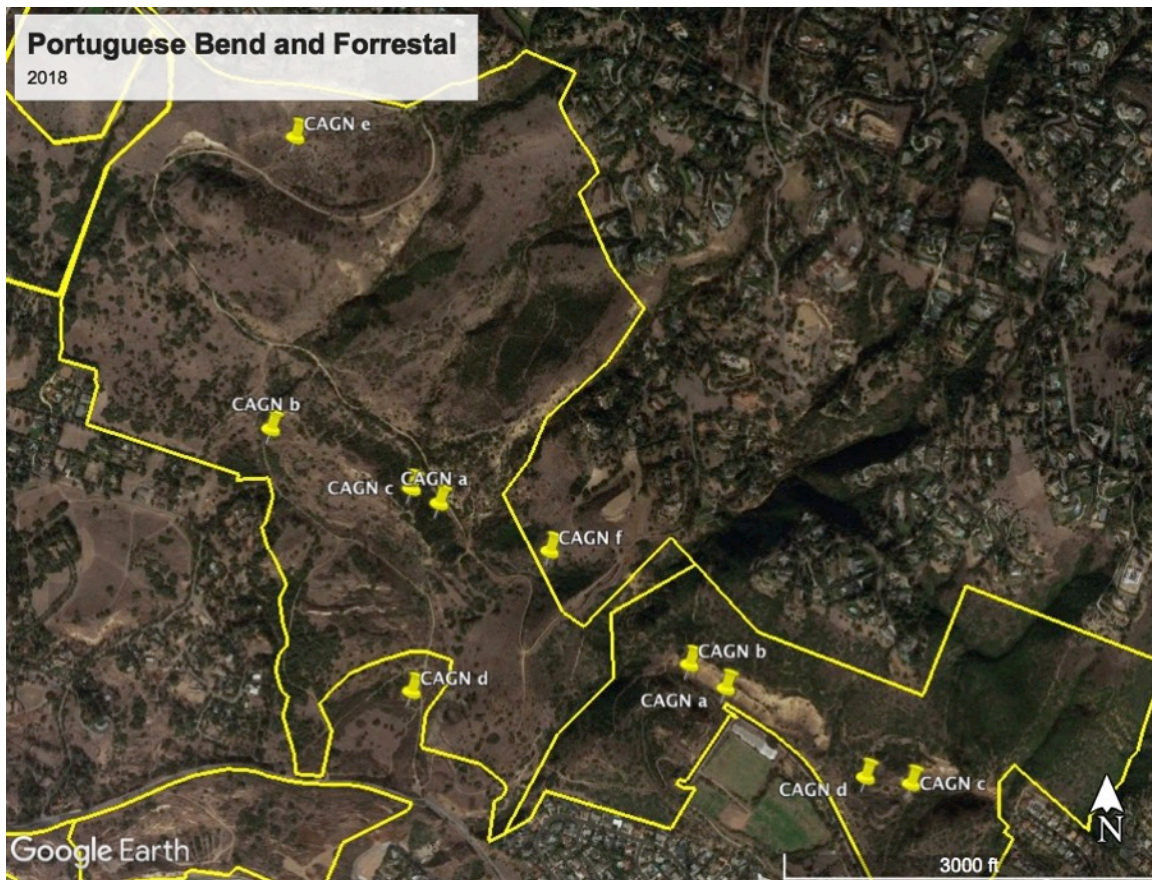


Figure B-3. California gnatcatcher and cactus wren observations, Forrester and Portuguese Bend.



Figure B-4. California gnatcatcher and cactus wren observations, San Ramon.

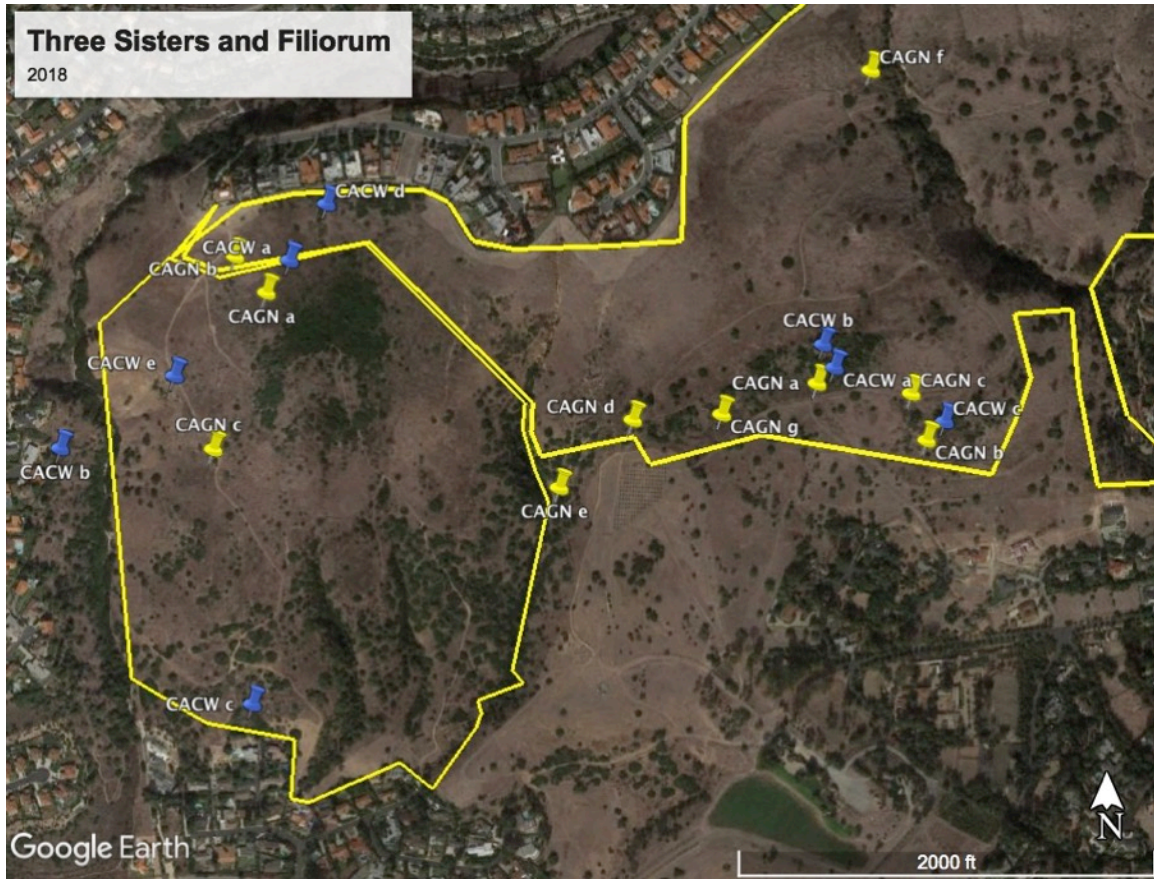


Figure B-5. California gnatcatcher and cactus wren observations, Three Sisters and Filiorum.

Appendix C. List of all California gnatcatcher (“CAGN” shaded) and coastal cactus wren (CACW) observations during 2015 survey, by reserve.

“Status”: P = Pair; S = Single; F = Family group; J = Juvenile; N = Nest m/f = male/female; CF = Carrying food; NM = (Carrying) nesting material

Abalone Cove						
Subarea	Date	Species	Status	Time	Notes	
	19 Mar.	CAGN g	Sm	N/A		33.742252°, -118.376977°
	28 Mar.	CAGN a	P	10:58	Calling; male giving ‘chuck’ notes (nest?)	33.737537°, -118.374510°
	28 Mar.	CAGN b	Sm?	11:03	Poss. alarm calls (unseen)	33.738523°, -118.373875°
	28 Mar.	CAGN c	S	11:13	Loud mewing (heard from archery gate)	33.740415°, -118.366707°
	18 May	CAGN d	S?	10:39	Silent, foraging; same or different bird called from slope just to north	33.738794°, -118.373269°
	18 May	CAGN e	P, N?	10:53	Female flew in w/ food	33.7380, -118.3740
	31 May	CAGN f	P	10:47	Flew in to rec., foraging; 3 rd bird seen?	33.7401, -118.3753
Agua Amarga						
Subarea	Date	Species	Status	Time	Notes	
No CAGN or CACW were detected at Agua Amarga Reserve during 2018 survey						
Alta Vicente						
Subarea	Date	Species	Status	Time	Notes	
	23 Feb	CAGN d	P	N/A		33.743617°, -118.406280°
	23 Feb	CAGN e	P	N/A		33.742807°, -118.403049°
	24 May	CAGN a	P	8:42	“Frantically foraging”; made long flight north to main trail (heard again @ 11:07)	33.7428, -118.4065
	24 May	CAGN b	J (2), S	9:07	2 quiet J’s, occ. calls; male seen same area 9:31.	33.7441, -118.4080
	24 May	CAGN c	Sm	10:28	Calling; long flight to east	33.7440, -118.4013
	23 Feb	CACW b	P			33.744148°, -118.406690°
	24 May	CACW a	N	N/A	Single fresh nest ¹³	33.7425, -118.4033
Filiorum						
Subarea	Date	Species	Status	Time	Notes	
	29 Mar.	CAGN a	P, Sm	9:10	Mewing pair @ fence corner (male w/ line above eye); 2 nd male (partial cap) just south of pair called 1x and flew c. 80 m south into	33.751876°, -118.378685°

¹³ This appears to have been the last Cactus Wren nest in the reserve, presumably built in early spring (March?) 2018 and then unused as the last remaining pair was extirpated. At least 3 old/dilapidated nests observed 5/24 in the northeastern corner of the reserve (near the tennis courts), but not in use, and no birds were detected during the May survey.

					pepper.	
	29 Mar.	CAGN b	S(f)	9:26	Mewing, flying around	33.751129°, -118.376957°
	29 Mar.	CAGN c	P	9:32	Single, then 2 nd bird joined from north side of cactus patch	33.751744°, -118.377200°
	29 Mar.	CAGN d	P	10:09	Resp. to call	33.7514, -118.3816
	29 Mar.	CAGN e	P	10:27	Foraging slowly up cyn.; atypical habitat	33.7503, -118.3828
	13 June	CAGN f	P?	8:10	Two birds, one possibly CF, quiet mewing; no resp. to rec., moved east	33.7560, -118.3778
	13 June	CAGN g	F	9:30	1 st heard from distance, then narrowed-down loc. Male (alarm call) + 1-2 others	33.7515, -118.3802
	29 Mar.	CACW a	P, N	9:10	Adult w/ NM, 2 nd adult calling c. 20 m west.	33.7521, -118.3784
	13 June	CACW b	S, N	9:00	Ad. calling @ (old?) nest. 2 nd bird possibly heard calling same patch @ 10:03.	33.7524, -118.3786
	13 June	CACW c	S, N	9:24	Strong response to recording; 2 nests in patch, one old, the other fair condition	33.751372°, -118.376679°
Forrestal						
Subarea	Date	Species	Status	Time	Notes	
West	4 Apr	CAGN a	P	9:22	Male w/ full cap	33.742073°, -118.351733°
West	31 May	CAGN b	P	8:31	Flew in to rec.	33.7426, -118.3527
East	31 May	CAGN c	Sf	9:39	Foraging constantly, didn't resp. to rec.	33.739953°, -118.346801°
East	31 May	CAGN d	P, N?	10:02	Female CF	33.7401, -118.3480
Portuguese Bend						
South	21 Feb	CAGN a	S ²¹⁴	09:58	See note	33.746171°, -118.359365°
South	21 Feb	CAGN b	S	10:18	Distant mew heard from general area	33.747818°, -118.363846°
South	18 May	CAGN c	S	9:16	Mewing	33.7465, -118.3601
South	18 May	CAGN d	S,S (J?)	9:52	Both probable J, 1 w/ odd alarm-type call	33.7420, -118.3601
North	18 May	CAGN e	Sm, N	N/A	Male at nest	33.754285°, -118.363195°
North	18 May	CAGN f	Sm	N/A		33.745111°, -118.356422°
Vicente Bluffs						
Subarea	Date	Species	Status	Time	Notes	
	28 Mar.	CAGN a	P,Sm	9:37	Pair (quiet, furtive) plus single active/vocal male	33.747049°, -118.412482°
	28 Mar.	CAGN b	Sm	9:49	Calling, unresponsive	33.750979°, -118.412948°
	24 May	CAGN c	P, FL?	11:40	Flew in from north (across trail), frantically foraging, FL possibly heard nearby (faint buzzing calls)	33.7467, -118.4130
	24 May	CAGN d	P	12:02	Resp. to call (2 nd pair?);	33.7477, -118.4121

¹⁴ "Gnatcatcher sp." flew across trail (twice), called once (equivocal as to species), and vanished.

					flew in from northeast	
	24 May	CAGN e	P	12:23	Flew in in resp. to call	33.7520, -118.4134
San Ramon						
Subarea	Date	Species	Status	Time	Notes	Lat/Long
	17 Feb	CAGN a	P	10:08	Foraging quietly	33.728661°, -118.332498°
	7 June	CAGN b	P	9:46	No CF observed; male flew in to rec. and did odd wing-tremble display; silent; neither actively foraging	33.7285, -118.3337
Three Sisters						
Subarea	Date	Species	Status	Time	Notes	
	29 Mar	CAGN a	P	N/A		33.753067°, -118.387376°
	13 June	CAGN b	F	N/A		33.753540°, -118.387870°
	13 June	CAGN c	P	N/A		33.751010°, -118.388215°
	29 Mar	CACW a	P	N/A		33.753487°, -118.387016°
	29 Mar	CACW b	S	N/A	Male, calling	33.751018°, -118.390635°
	29 Mar	CACW c	S	N/A	Male, calling	33.747658°, -118.387603°
	13 June	CACW d	S	N/A	Male	33.754227°, -118.386432°
	13 June	CACW e	P	N/A		33.751969°, -118.388832°