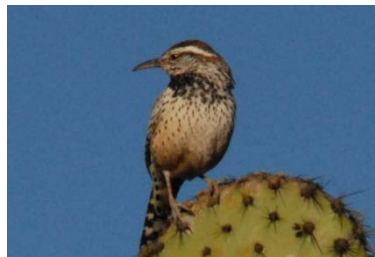


Coastal Cactus Wren (*Campylorhynchus brunneicapillus*) Citizen Science Monitoring 2017



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INTRODUCTION

The coastal cactus wren (*Campylorhynchus brunneicapillus*) (CAWR) on the Palos Verdes Peninsula is a special status species that lives exclusively in coastal sage scrub habitat areas. They prefer areas of at least one acre in size containing 30% prickly pear cactus (*Opuntia spp.*) and large specimens of coastal cholla (*Cylindropuntia prolifera*). Habitat preferences for nesting are strict, with nesting substrate almost entirely restricted to prickly pear and cholla (Rea and Weaver 1990). Ninety percent of their foraging time is spent on the ground, feeding on insects year-round, and feeding on fruit and plants during cooler months. Adult birds are highly sedentary and tend to return to the same breeding territory each year. In a 1993-1997 study on the Palos Verdes Peninsula, ornithologist Jon Atwood found that 65% of the juveniles dispersed less than one kilometer from their natal territory (Atwood 1998). The wren's natural tendency to stay close to its natal territory and not move great distances underscores the importance of having quality habitat throughout the preserves

Following the formal establishment of the Citizen Science Cactus Wren Program in 2014, volunteer work focused on assessing how CAWR utilize their habitat. The goal was to obtain data that would inform the Conservancy how to better manage cactus habitat for the bird and to build new habitat. Those two years were quite successful in meeting that goal, as we now have a better understanding of how close the wrens stay to their habitat (very close) and how much they explore developing habitat (infrequently, unless they are feeding growing chicks and need to expand their forage area).

Despite the ability of previous surveys to identify the CAWR behavior relating to dispersal, locating areas of CAWR inhabitation has proven challenging. As shown by ornithologist Dan Cooper, who conducted comprehensive triennial cactus wren surveys in 2009, 2012, and 2015, the numbers of CAWR has varied over time, counting the same number of territories in 2009 and 2015 (25) and more counted in 2012 (48). Because of the triennial frequency of the surveys, it is difficult to determine whether or not these trends are true or an artifact of sampling.

Participants in the Citizen Science Cactus Wren Program can help answer the question: Where are cactus wrens found in the preserves? To address this question, teams of volunteers regularly hike the trails, noting when CAWR are heard and/or seen, beginning in April and continuing through July. This period coincides with the more active period for the wrens when they are nesting and caring for newly fledged chicks. These repeated visits provide data that indicates where birds are likely to be, and the variation of their distribution year-to-year to augment the triennial surveys conducted by the Conservancy's ornithologist

METHODS

Study Area:

The study area was within seven reserves (Portuguese Bend, Alta Vicente, San Ramon, Ocean Trails, Forrester, Filiorum, and Three Sisters) of the Palos Verdes Nature Preserve located in the city of Rancho Palos Verdes, CA. The reserves surveyed were those which had been documented to support CAWR activity or extensive patches of prickly pear (*Opuntia littoralis* and *O. oricola*) and cholla (*Cylindropuntia prolifera*) (Cooper Ecological Monitoring 2013).

Figure 1. Study area within the Palos Verdes Peninsula Nature Preserve.



Data Collection:

Volunteers for the Citizen Science Program met prior to the start of the monitoring season to learn how to identify CAWR in their habitat, how to record field observations, and how to generate and send data electronically on Excel spreadsheets to the Conservancy. Teams were formed for the monitoring season, pairing more experienced volunteers with those having little or no birding experience. The enthusiastic volunteers then took to the field outfitted with binoculars, spotting scopes, and cameras equipped with telephoto lenses.

The volunteers conducted at least two surveys for each month of the survey period (April through July). Volunteers walked their predetermined trail route documenting visual or auidial observations of CAWR. This information was recorded on field data sheets (Figure 1). Additionally, weather and wind observations were included because the birds' presence is impacted unduly by weather. No surveys were conducted during rainy days and high winds greater than 19 mph (30 km/hr). Surveys were typically conducted during late morning. All electronic field observations were archived in the Conservancy's database, and maps depicting wren inhabtance were archived in PDF format on the Conservancy's server.

Data Analysis:

Collected data were analyzed on the basis of four criteria that describe the level of CAWR inhabtance specific to each cactus patches surveyed. These criteria allowed each cactus patch to receive a rating category reflecting the level of CAWR inhabtance observed. These ratings assist in the interpretation of survey data and specifically allow for the inference, in general terms, of potential CAWR behavior, habitat quality, and other factors relative to inhabtance. Categorization is also helpful in providing a scale of inhabtance for each cactus patch that can be mapped. Subsequent ratings associated with each patch were mapped using ArcMap 10.3 which allowed for a color gradient to describe the various

inhabitation ratings throughout the surveyed reserves (Figures 2-9) as well as a map depicting the highest rating found within each reserve (Figure 10).

Inhabitation Rating Categories

Categories were developed to assist in the interpretation of survey data and to infer in general terms potential CAWR behavior, habitat quality, and other factors related to CAWR inhabitation. This categorization is also helpful in providing a scale of inhabitation that can be mapped such that different levels of inhabitation may be compared to each other. Categorical ratings based on four descriptors were extracted from the data:

Inhabitation Descriptors (4):

1) **Observation Rate**

of visits with a CAWR observation / total number of visits

2) **Multiple Month Observation**

Sighting of a CAWR in more than one month of the survey period

3) **Multiple CAWR Observation**

Sighting of multiple CAWRs during a single survey or site visit.

4) **Nest**

Sighting of a nest that appears to have been used by CAWR within the survey period.

Inhabitation Rating Categories (5):

RARE

Indicates rare habitation of a cactus patch, which is defined by an observation rate below 25% and a lack of any additional inhabitation descriptor. Rare habitation is expected to include behaviors associated with short term inhabitation such as foraging or dispersal and suggests a lack of nesting. A patch categorized as “rare” may also indicate poor habitat quality or the presence of residence inhibiting factors (i.e. competition, predation, or disturbance).

OCCASSIONAL

Indicates occasional habitation of a cactus patch, which is defined as an observation rate below 25% and having one or more additional inhabitation descriptors associated with that patch. Occasional habitation is expected to include behaviors associated with short term inhabitation (i.e. foraging or dispersal) and suggests a lack of nesting. A patch categorized as “occasional” may also indicate poor habitat quality or the presence of residence-inhibiting factors.

PERIODIC

Indicates periodic habitation of a cactus patch, which is described by an observation rate of 26-50% and one or more additional inhabitation descriptors. Periodic habitation is expected to include behaviors such as repeated visitation for foraging and/or dispersal. This rating could be considered a weak indicator of nesting. A patch categorized as “periodic” may also indicate higher quality habitat and a decrease in residence inhibiting factors in compared to un-ranked or patches ranked patches or those ranked as “rare” or “occasional”.

REGULAR

Indicates regular habitation of a cactus patch, which is defined as an observation rate of 50-75% and at least two additional inhabitation descriptors. A patch categorized as “regular” may indicate CAWR nesting, high quality habitat, and a lack of residence-inhibiting factors.

CONSISTENT

Indicates consistent habitation of a cactus patch, which is defined as an observation rate of 75-100% and at least two additional inhabitation descriptors. A patch categorized as “consistent” may be a strong indicator of CAWR nesting, high quality habitat, and a lack of residence-inhibiting factors.

RESULTS

Table 1. Inhabitation criteria and rating of cactus patches where CAWR were observed in 2017.

| Reserve | Cactus Patch ID | Total # of Surveys | Surveys w/ CAWR Observations | Inhabitation Criteria | | | | Inhabitation Rating |
|---------------------|-----------------|--------------------|------------------------------|-----------------------|---------------------------|----------------------------|-----------|---------------------|
| | | | | Observation Rate (%) | Multiple CAWR Observation | Multiple Month Observation | CAWR Nest | |
| Alta Vicente | AV2 | 13 | 7 | 54 | X | X | - | regular |
| Alta Vicente | AV4 | 13 | 2 | 15 | X | - | - | occasional |
| Alta Vicente | AV5 | 13 | 4 | 31 | - | X | - | occasional |
| Alta Vicente | AV7 | 12 | 2 | 17 | - | X | - | occasional |
| Forrestal | FO7 | 9 | 1 | 11 | - | - | - | rare |
| Ocean Trails | OT8 | 14 | 3 | 21 | - | X | X | occasional |
| Ocean Trails | OT9 | 14 | 4 | 29 | X | X | - | occasional |
| Ocean Trails | OT10 | 14 | 3 | 21 | X | X | - | occasional |
| Ocean Trails | OT11 | 14 | 5 | 29 | X | X | X | periodic |
| Ocean Trails | OT12 | 14 | 2 | 36 | X | X | X | periodic |
| Ocean Trails | OT13 | 14 | 1 | 14 | - | - | X | occasional |
| Ocean Trails | OT15 | 11 | 1 | 9 | - | - | - | rare |
| Portuguese Bend | P1 | 4 | 1 | 25 | - | - | - | rare |
| Portuguese Bend | P2 | 8 | 1 | 13 | - | - | - | rare |
| Three Sisters | TS2 | 36 | 1 | 3 | - | - | - | rare |

Green rows indicate the high likelihood of cactus wren breeding within associated cactus patch.

Reserve Specific Results:

Alta Vicente

Alta Vicente reserve was surveyed each month of the 2017 survey period (March through July). A total of 13 surveys were conducted. CAWR were detected within four cactus patches (AV2, AV4, AV5, and AV7)(Table 1). Cactus patches AV4, AV5, and AV7 received an inhabitation rating of “occasional” based on inhabitation criteria (Table 1). These results indicate that CAWRs activity within these transects includes behaviors associated with relatively short-term inhabitation such as foraging and dispersal. This finding also indicates a lack of nesting within AV4, AV5, and AV7. Cactus patch AV2 received an inhabitation rating of “regular” based on inhabitation criteria (Table 1 and 2). These results indicate that CAWR activity within this transect includes behaviors associated with long-term inhabitation such as nesting and territorial defense. This finding also suggests high quality habitat within AV2. Five cactus patches (AV1, AV3, AV6, AV8, and AV9) were not found to be inhabited by CAWR, which suggests the presence of inhabitation-inhibiting factors (i.e. poor habitat quality, high predation pressure, and/or disturbance).

Filiorum

Filiorum reserve was surveyed during only one month (April) of the 2017 survey period (March through July). Most trails within Filiorum were impassible during much of the survey period due to rain closures, unsafe trail conditions, and high cover by invasive non-native plant species (*Brassica nigra*). One survey was conducted, which did not yield a cactus wren observation across any cactus patches (FII-7). The interpretation of these results is limited due to the lack of completed surveys, but may in very narrow terms describe the presence of inhabitation-inhibiting factors (i.e. poor habitat quality, high predation pressure, and/or disturbance).

Forrestal Reserve

Forrestal reserve was surveyed each month during the 2017 survey period (March through July), resulting in a total of 11 completed surveys. CAWR were detected within one cactus patch (FO7), which received an inhabitation rating of “rare” based on inhabitation criteria (Table 1). This result indicates that CAWR activity within this transect includes behaviors associated with short-term inhabitation such as foraging and dispersal. Five cactus patches (FO1-6) were not found to be inhabited by CAWR. A lack of CAWR observations with these cactus patches suggests the presence of inhabitation-inhibiting factors (i.e. poor habitat quality, high predation pressure, and/or disturbance).

Ocean Trails

Ocean Trails Section A

Ocean Trails Section A was surveyed four months (March through June) out of the 2017 survey period (March through July). Eight surveys were conducted. No cactus wren were detected within cactus patches of Ocean Trails Section A. This finding suggests the presence of inhabitation excluding factors (i.e. poor habitat quality, high predation pressure, and/or disturbance).

Ocean Trails Section B

Ocean Trails Reserve was surveyed each month of the 2017 survey period (March through July). A total of 14 surveys were conducted. Cactus wrens were detected within seven cactus patches (OT8, OT9, OT10, OT11, OT12, OT13 and OT15). Cactus patches OT9, OT11, and OT12 received a rating of “periodic” based on inhabitation criteria (Table 1). These results indicate that CAWR activity within this transect to include behaviors associated with long-term inhabitation such as nesting and territorial

defense. This finding also suggests high quality habitat within these transects. Cactus patches OT8, OT10, and OT13 received a rating of “occasional” based on inhabitation criteria (Table 1 and 2). Despite low observation rates (<25%), other inhabitation criteria (multiple cactus wren, multiple month, and/or nest observations) were associated with these transects indicating repeated use by multiple cactus wren individuals including the investment of nest building (Table 1). Breeding is not expected to occur within these transects, although it is likely that breeding is occurring in higher ranked cactus patches (OT9, OT11, and OT12) nearby.

Portuguese Bend

Portuguese Bend Section A

Portuguese Bend reserve was surveyed one month (March) of the 2017 survey period (March through July). One survey was conducted, which did not yield a cactus wren observation across any cactus patches (PB5 – PB8) within Portuguese Bend Reserve Section A.

Portuguese Bend Section C

Portuguese Bend Section C was surveyed two months (March and June) of the 2017 survey period (March through July). A total of four surveys were conducted. No cactus wren were observed across any cactus patches (PB3 and PB4).

Portuguese Bend Section D

Portuguese Bend Section D was surveyed three months (April, May, and June) of the 2017 survey period (March through July), resulting in a total of five surveys. CAWR were detected within two cactus patches (P1 and P2). Cactus Patches P1 and P2 received a rating of “rare” based on inhabitation criteria (Table 1 and 2). Low observation rates ($\leq 25\%$) and lack of any additional inhabitation descriptors indicates low CAWR occupation at these patches.

San Ramon

San Ramon Reserve was surveyed two months (March and April) of the 2017 survey period (March through July), resulting in a total four surveys. No CAWR were detected across any cactus patches (SR1) within San Ramon Reserve.

Three Sisters

Three Sisters Reserve was surveyed three months (March – June) of the 2017 survey period (March through July), resulting in a total of 36 surveys. Two CAWR observations were made, one within cactus patch TS2 and the other in the vicinity of cactus patches TS7, TS8, and TS9. The high density of cactus patches in Three Sisters makes it challenging to definitely associate an exclusively aural observation with a particular patch. Cactus patch TS2 was given a rating of “rare” based on inhabitation criteria (Table 1 and 2). These observations indicate a low level of CAWR inhabitation within the Three Sisters Reserve.

DISCUSSION

Results of the 2017 Cactus Wren Survey Project (project) describe varying levels of CAWR inhabitation across the seven reserves studied (Table 1). The project specifically identified several cactus patches of high habitat use that received inhabitation ratings of “periodic” and “regular” with observation rates between 29% and 54% (Table 1). These high-use patches were also associated with multiple months, multiple CAWR, and nest observations which further described the level of inhabitation and active breeding potential at each site. Alta Vicente and Ocean Trails were the only reserves to be considered breeding sites within the PVNP in 2017. Both reserves were also indicated by the 2016 survey as likely supporting CAWR breeding, with confirmed breeding at Alta Vicente and a nest observed in Ocean Trails along Gnatcatcher Trail (adjacent to cactus patches OT 11 and OT12). Despite continued CAWR breeding at Alta Vicente and Ocean Trails in 2017, inhabitation levels fell from 2016. In Alta Vicente observation rates were reduced by nearly half, from 100% in 2016 to 54% in 2017. Ocean Trails saw a similar, although less dramatic change in observation rate from 50% recorded along Gnatcatcher Trail to 29% and 36% at adjacent cactus patches OT 11 and OT12. Reductions in observed CAWR inhabitation was not exclusive to potential breeding areas as moderately ranked habitat areas saw equally drastic reductions. Several sites occupied in 2016 did not produce a CAWR observation during the 2017 survey. San Ramon reserve was one such location that did not have a cactus wren observation in 2017, yet was considered a likely area for CAWR breeding in 2016. Other former breeding areas, such as Three Sisters and Filiorum reserves, had reduced CAWR inhabitation levels in 2017.

Low observations of CAWR within formerly occupied and previous breeding sites is not uncommon across the southern California cactus wren management area. Regional monitoring projects have noted areas of “unoccupied suitable habitat” or those with adequate cactus cover to support long term CAWR inhabitation. (Merkel 2014). This lack of occupation has been explained in some management areas as biennial occupation (abandonment and return to a site every other year). Indeed, it appears that biennial occupation may be occurring on a small scale within adjacent reserves Ocean Trails and San Ramon where trade-offs in CAWR inhabitation were observed, particularly due to the close proximity of cactus patches within these reserves. Therefore, while it is possible that biennial occupation is occurring between Ocean Trails Reserve and San Ramon Reserve, it does not appear to be occurring across PVNP as a whole. The reduction of CAWR observations across most (six of seven) reserves surveyed suggests that an expansive impact of presence inhabitation-inhibiting factors, rather than a location-specific phenomenon such as biennial occupation.

Of the many potential drivers of decreased CAWR observations, only impacts due to changes in weather, more specifically rainfall, would likely equate to such a broad-reaching decrease. Intense winter weather, such as high rainfall and cold temperatures, can have damaging effects to CAWR nesting success and abundance by lowering available insect populations and promoting habitat-altering vegetation growth which would further reduce foraging potential. The 2017 survey did not include the monitoring of insect populations or vegetation dynamics of habitat areas, however, the increase in non-native plant cover (namely *Brassica nigra*) can be easily observed using annual photo point data of each reserve studied (Appendix B). The density and magnitude of the *Brassica nigra* infestation was so great that several trails of the survey route were impassable until cleared by mechanical equipment. 2017 saw a significant environmental shift from previous years in the form of heavy rainfall, which undoubtedly contributed to the influx *Brassica nigra* in previously bare areas. The large-scale reduction in CAWR observations during the 2017 is likely due to the large-scale impact of significantly higher rainfall, which

lead to *Brassica nigra* encroachment and a loss of necessary habitat characteristics (i.e. the reduction of bare ground) for CAWR.

Vegetation encroachment also appears to be occurring within the PVNP in the form of “overtopping” or encroachment by native shrubs on cactus plants. This was observed in (Preston 2012) as another factor effecting CAWR inhabitation and breeding success. The non-native tree, *Acacia cyclops* and the native shrub, *Rhus integrifolia* were commonly observed overtopping stands of cactus during the 2017 survey, thereby decreasing habitat quality at overtopped cactus patches. It seems apparent that changes in vegetation are acting as inhabitation-inhibiting factors, though further study is required to determine the severity of overtopping’s effect on CAWR inhabitation within the PVNP. Vegetative dynamics of cactus patches were not collected in the 2017 survey, making it difficult to statistically link the loss of bare ground or increased in non-native/native plant cover to declines in CAWR inhabitation. Despite this challenge, the synthesis of studies provides insight into the potential changes to CAWR habitat quality as a result the loss of bare ground and “overtop” encroachment by invasive non-native species such as *Brassica nigra* and expanding cover by native plants. The results of these studies may then inform future CAWR monitoring with the PVNP.

FUTURE STUDY

Recommended additions for the 2018 survey include the following:

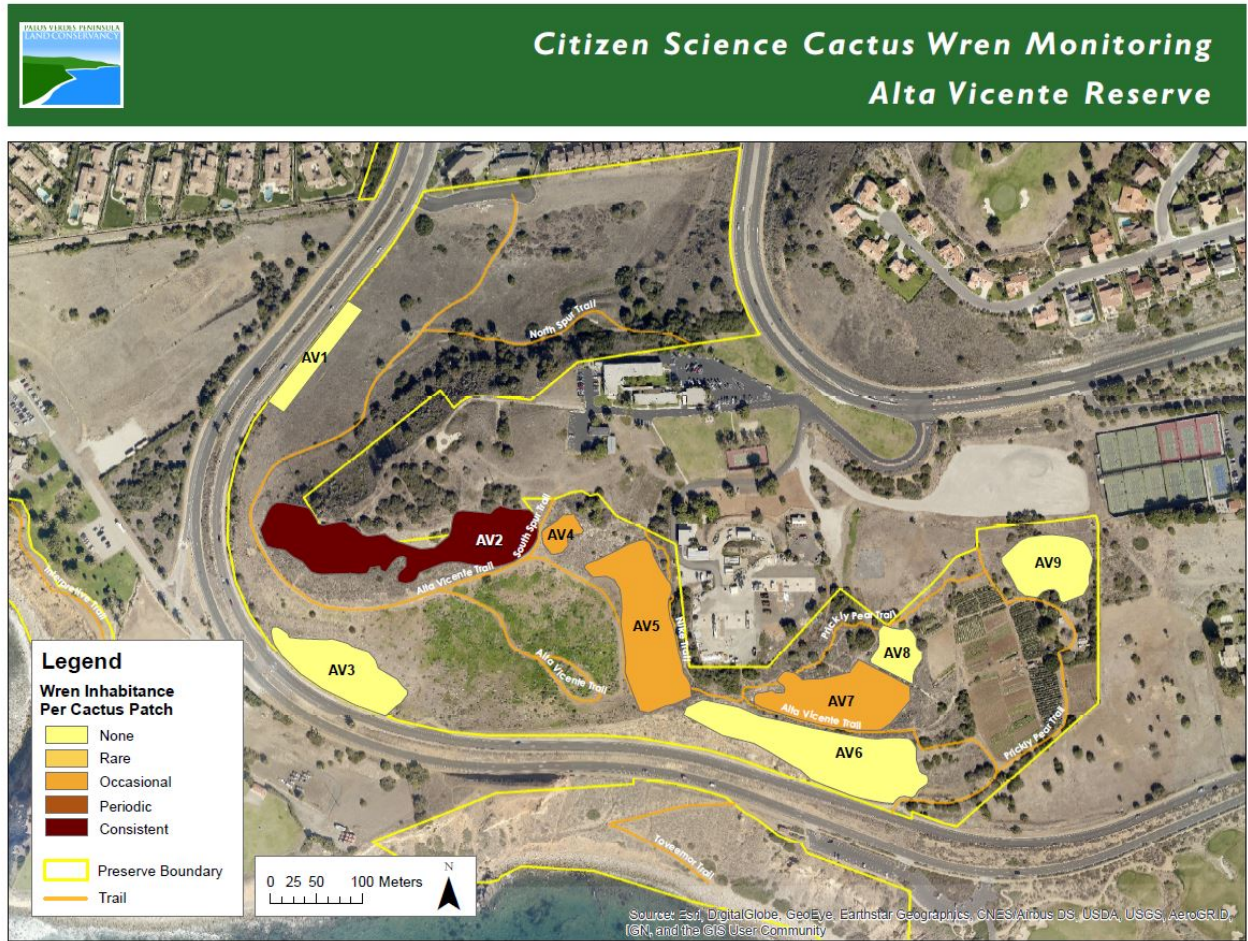
- 1) Survey degree of vegetation encroachment on cactus patches by both native and non-native species to examine effects on CAWR nesting potential.
- 2) Survey degree of vegetation encroachment on bare ground by both native and non-native species to examine effects on CAWR foraging potential.
- 3) Examine Ocean Trails Reserve and San Ramon Reserve for potential biennial occupation.
- 4) Consider monitoring of insect populations to clarify the relationship between insect populations, vegetation encroachment, and CAWR foraging potential.

LITERATURE CITED

- Atwood, J.L. 1998. "Studies of California gnatcatchers and cactus wrens in southern California." Monument Center for Conservation Sciences and the University of California Irvine.
- Cooper Ecological Monitoring, Inc. ("CEM") 2013. Palos Verdes Nature Preserve survey for the California gnatcatcher and the cactus wren (2012), Palos Verdes Peninsula Land Conservancy, Los Angeles County. Final report to the PVPLC. January 3, 2013.
- Merkel and Associates, Inc. (2014) Salt Creek Coastal Cactus Wren Habitat Restoration Project 4th Annual Monitoring Report. <https://portal.sdmmp.com/upload/projects/20160330_2357_194.pdf>
- Preston, K. and Kamada, D. (2012) Nature Reserve of Orange County: Monitoring Coastal Cactus Wren Reproduction, Dispersal and Survival, 2009-2011. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=46786>
- Rea, A. M. and K. Weaver. 1990. "The taxonomy, distribution, and status of coastal California Cactus Wrens." *Western Birds* 21: 81-126.

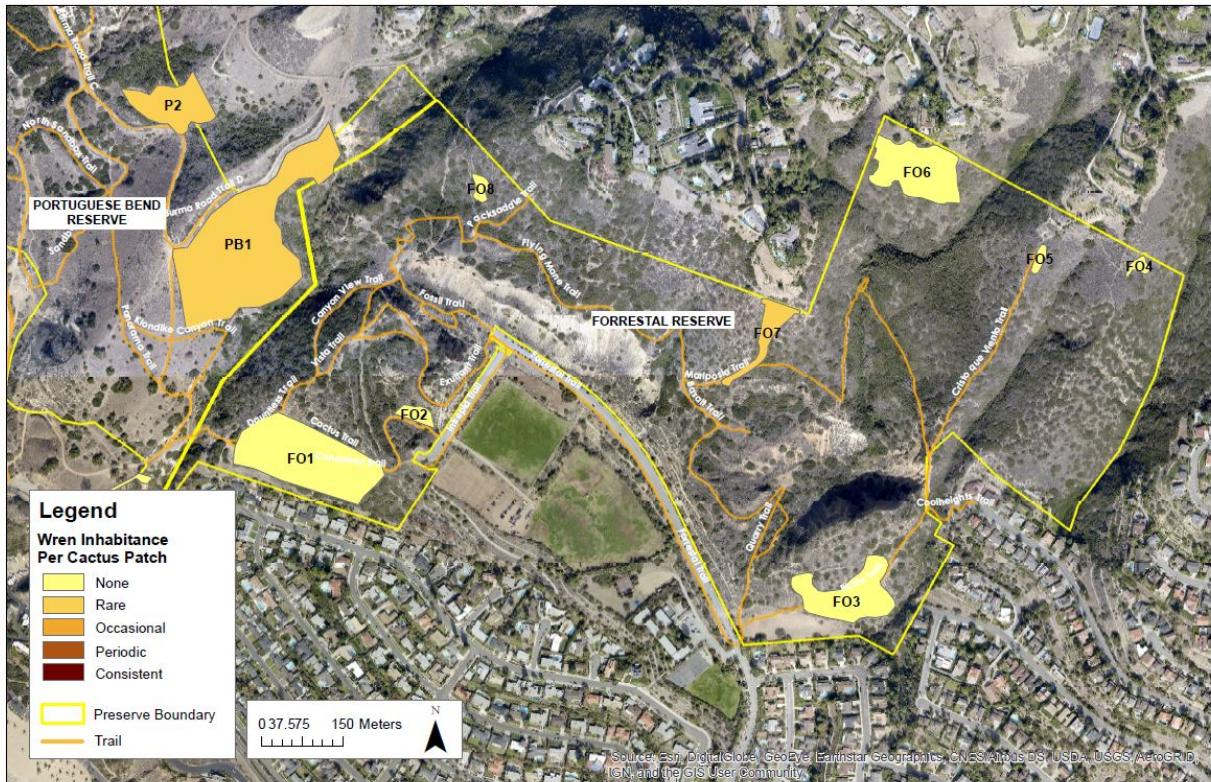
APPENDIX A

Mapped results of cactus inhabitation per cactus patch surveyed.



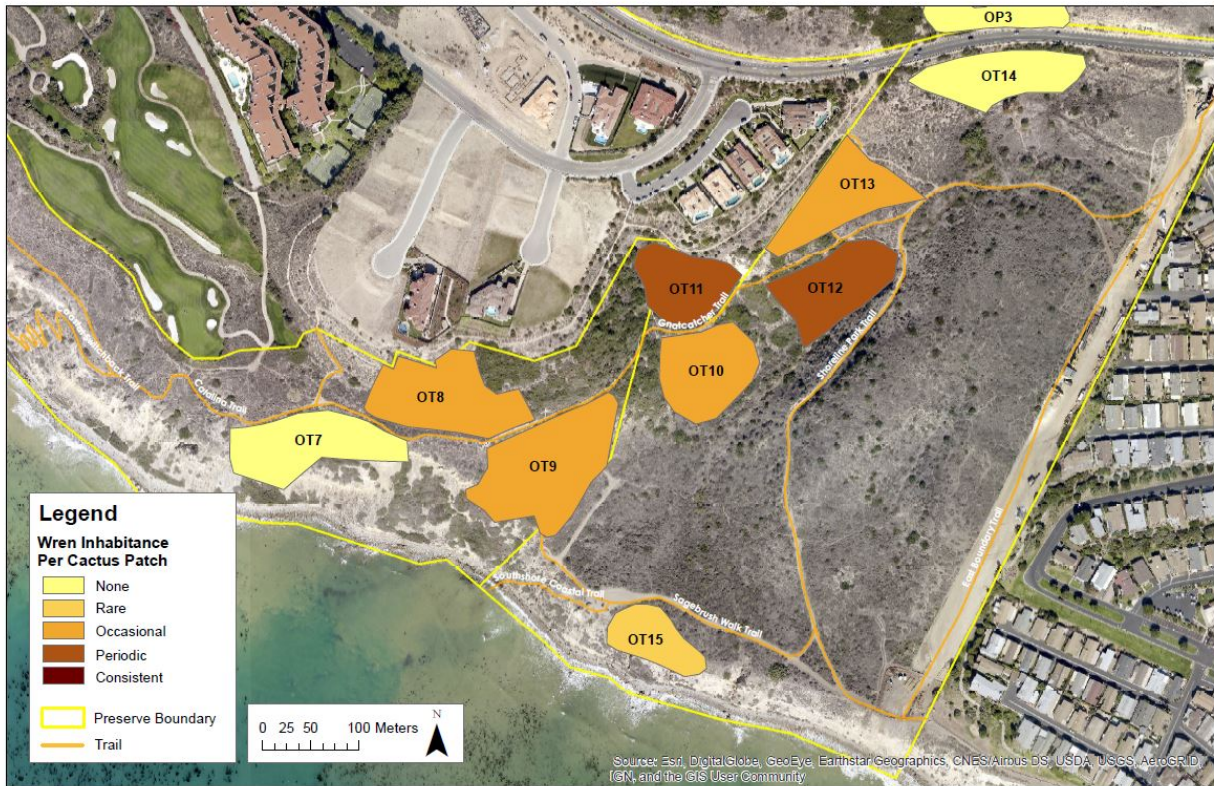


Citizen Science Cactus Wren Monitoring Forrestal Reserve



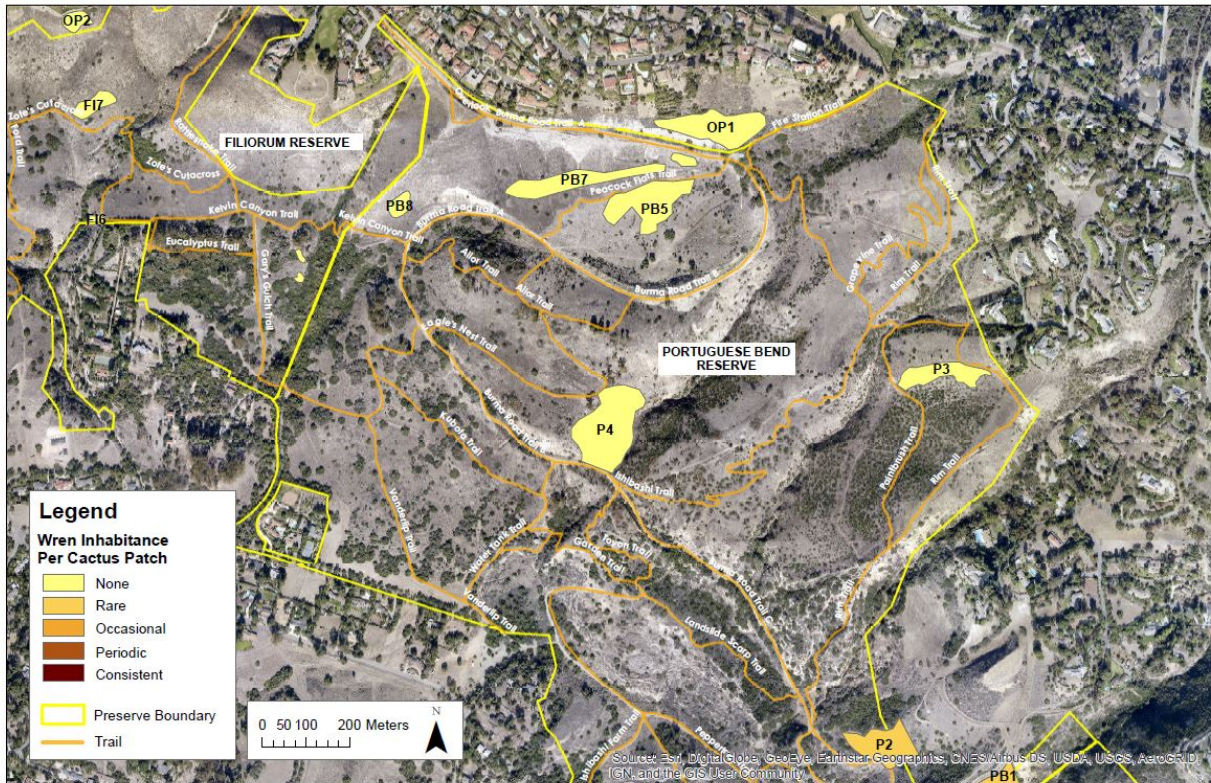


Citizen Science Cactus Wren Monitoring Ocean Trails Reserve (Section B)



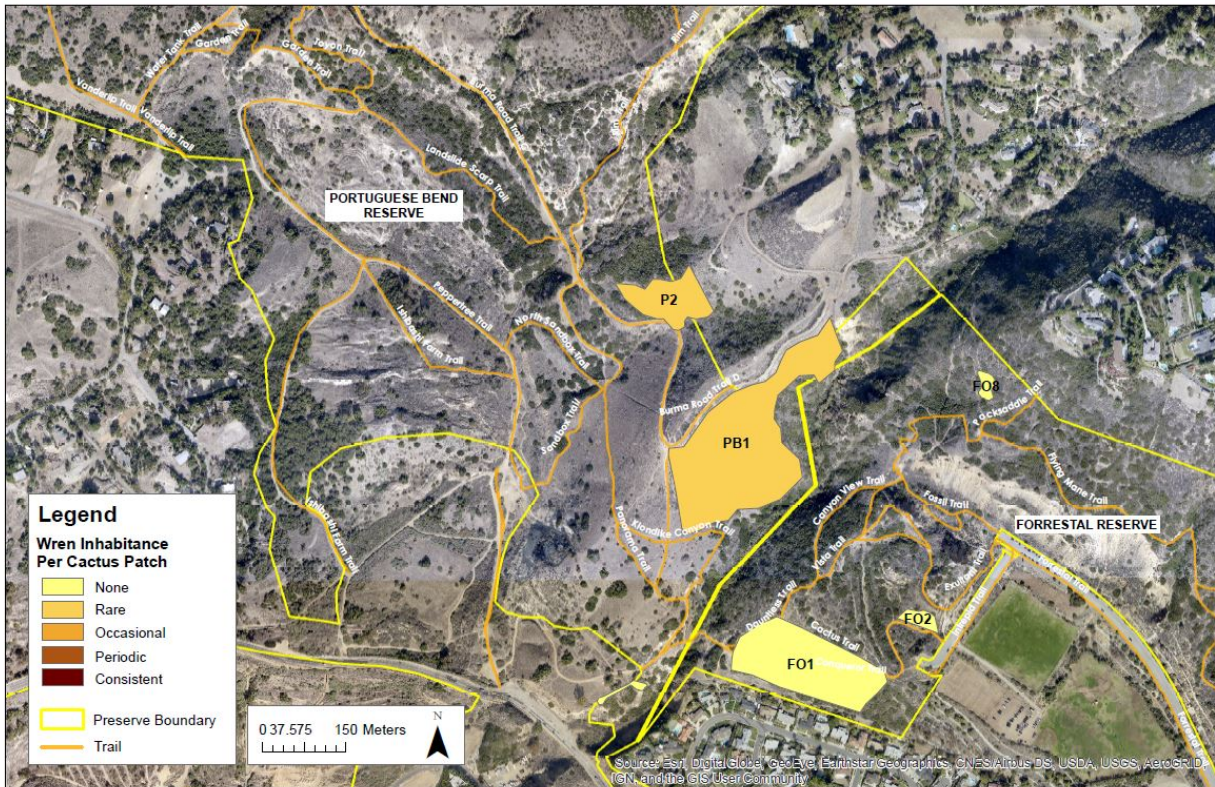


Citizen Science Cactus Wren Monitoring Portuguese Bend Reserve (Sections A, B, and C)



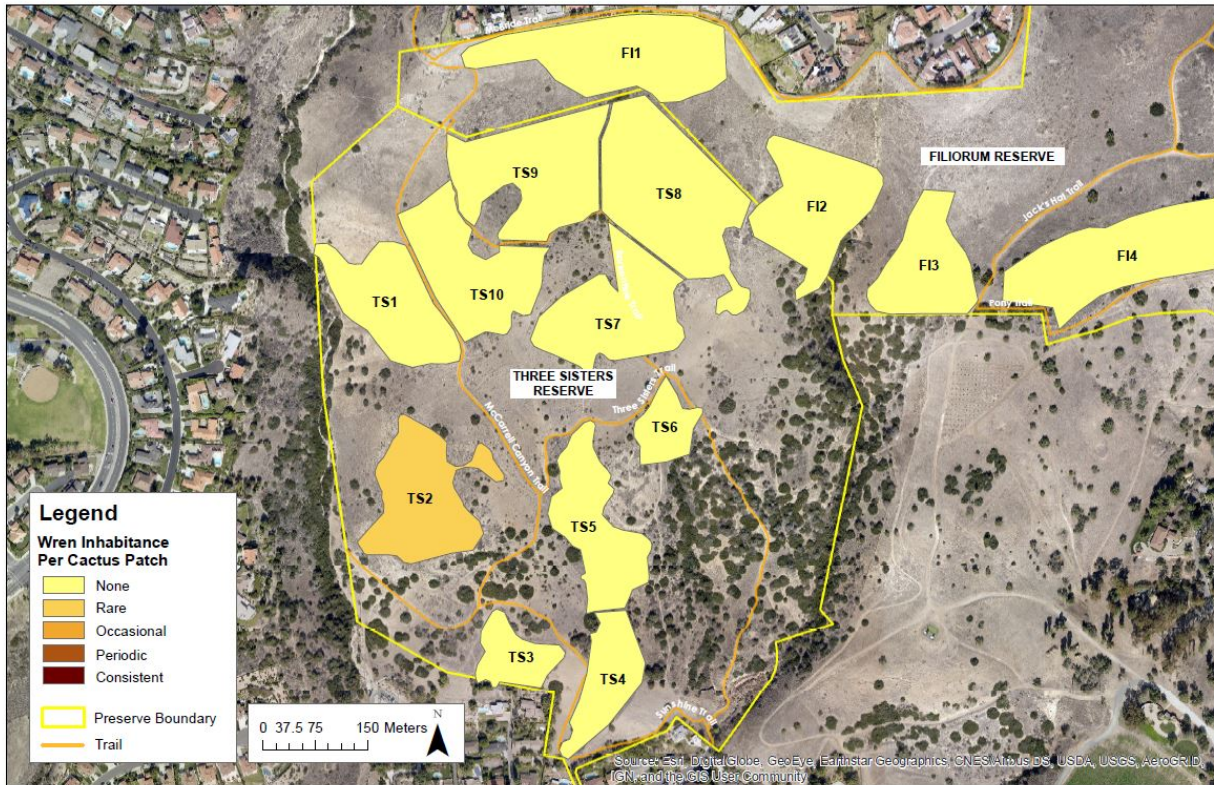


Citizen Science Cactus Wren Monitoring Portuguese Bend Reserve (Section D)





Citizen Science Cactus Wren Monitoring Portuguese Bend Reserve (Section D)



APPENDIX B

Photopoint comparison (2015 vs 2017) of cactus wren habitat.

Three Sisters Reserve

2015



2017



Portuguese Bend Reserve

2014



2017

