Restoration Guidelines for "Coastal" Cactus Wrens

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CONSERVATION BIOLOGY INSTITUTE

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The intent is that these guidelines never be regarded as final, but rather as a perpetual work-in-progress to be refined, improved upon, and expanded upon through new information contributed by researchers who review and comment on the guidelines via the ConserveOnline workspace.

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Atwood et al. (1998): On the Palos Verdes Peninsula ~65% of dispersing juvenile CACW moved less than 1 km from their natal territory. Mean dispersal distance 1.6 km (s.d. = 2.28; n=71). Mean dispersal distance "significantly smaller" than that of CAGN.

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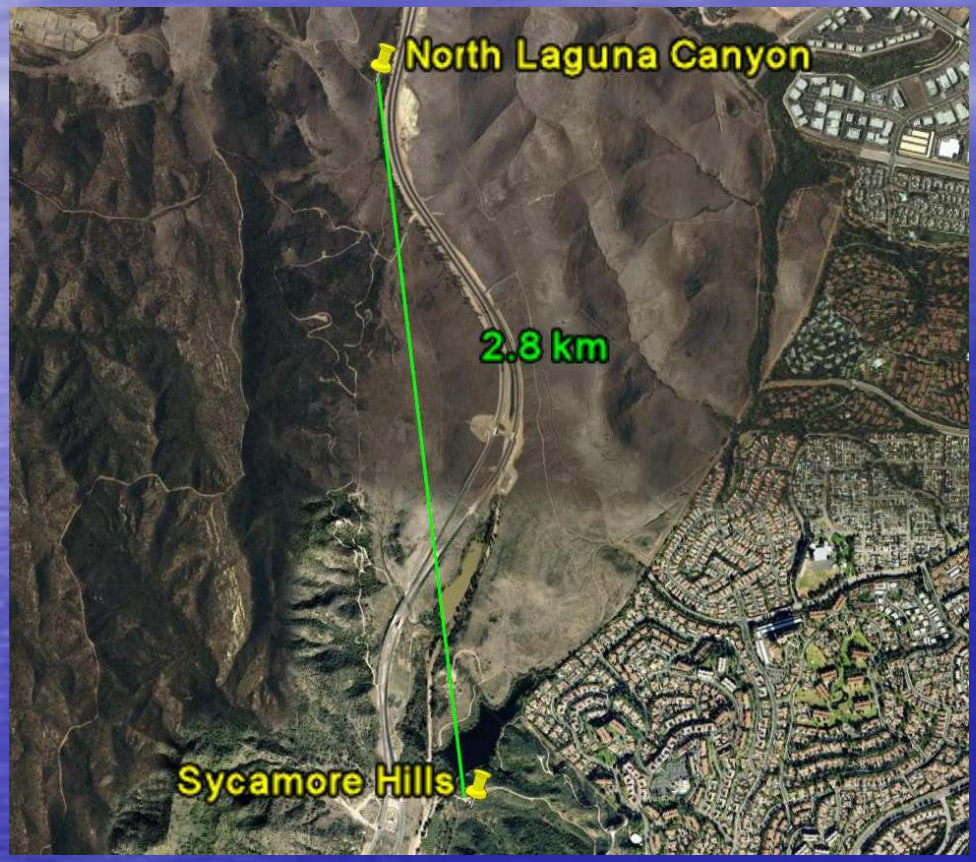
Harmsworth Associates (2000) hypothesized that the eight-lane San Joaquin Hills Transportation Corridor may represent an important barrier for dispersing juvenile CACW.

Parameters to Consider

1. Dispersal:



CACW not showing signs of recolonizing Sycamore Hills, roughly 2.8 km south of nearest presumed "source" population.

Parameters to Consider

1. Dispersal:

CACW have not colonized Upper Newport Bay in several decades, despite high-density CACW populations at UCI and Banning Ranch, only 3-4 km away. UCI CACW have line of sight to UNB.

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In 2006/2007, a translocated adult male CACW was able to move ~0.8 km to successfully pair with an adult female, also translocated there in 2006 as part of a family group. Among juveniles, females expected to disperse farther than males.

Parameters to Consider

1. What is the maximum distance that juvenile CACW can be expected to disperse between adjacent cactus patches to establish a territory and find a mate?

Evidence suggests that restored cactus scrub should preferably be < 1 km – and not more than 1.6 km – from the nearest occupied habitat.

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1. What is the maximum distance that juvenile CACW can be expected to disperse between adjacent cactus patches to establish a territory and find a mate?

Evidence suggests that restored cactus scrub should preferably be < 1 km – and not more than 1.6 km – from the nearest occupied habitat.

Ideally, CACW would be able to see and hear CACW in adjacent patches of cactus scrub.

Parameters to Consider

2. What is the smallest area of cactus scrub that can be expected to provide habitat sufficient for a CACW pair to successfully breed during a year with moderately below-average, rainfall?

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Minimum useful patch-size standards should be developed that benefit CACW without ignoring budgetary considerations.

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2. What is the smallest area of cactus scrub that can be expected to provide habitat sufficient for a CACW pair to successfully breed during a year with moderately below-average, rainfall?

Minimum useful patch-size standards should be developed that benefit CACW without ignoring budgetary considerations.

In identifying a "minimum useful patch size" for cactus scrub intended for use by CACW, it is assumed that the birds will forage in other nearby natural habitats in addition to the cactus scrub habitat that is to be restored.

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In identifying a "minimum useful patch size" for cactus scrub intended for use by CACW, it is assumed that the birds will forage in other nearby natural habitats in addition to the cactus scrub habitat that is to be restored.

Note that quantifications of "territory size," "home range," "core use area," etc., can be expected to vary greatly according to the number of weeks or months birds are observed, the frequency of observations, and the mapping methods used (see, e.g., Atwood et al. 1995a pp. 12-13).

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2. What is the smallest area of cactus scrub that can be expected to provide habitat sufficient for a CACW pair to successfully breed during a year with moderately below-average, rainfall?

Rea and Weaver (1990): 13 territories in south Escondido ranged from 2.0 to 4.9 acres, averaged 3.2 acres.

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Solek (unpublished): home ranges in Los Angeles County from 0.5 to 2.7 acres, averaged 1.7 acres.

Hamilton (unpublished): six presumed "core use areas" in coastal OC ranged from 1.5 to 3.7 acres, averaged 2.4 acres.

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2. What is the smallest area of cactus scrub that can be expected to provide habitat sufficient for a CACW pair to successfully breed during a year with moderately below-average, rainfall?

More data should be gathered, but a minimum of 2 acres near the coast and 3 acres > 10 km inland seem like reasonable approximations of "minimum useful patch sizes."

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UCI Reserve in Irvine, Orange County: minimum of ~5 pairs for decades in ~45 acres of cactus scrub mixed with grassland (see, e.g., Hamilton and Mitrovich 2007).

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Banning Ranch in Newport Beach, Orange County: 6–14 pairs for 18 years in ~65 acres of upland scrub containing ~40 acres of cactus-containing scrub (unpubl. studies by LSA Associates and Glenn Lukos Associates).

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40-acre isolated parcel in San Pasqual Valley, San Diego County: 6 pairs in 2008 using ~33 acres of southern cactus scrub and ~5 acres of other CSS (Hamilton 2009).

Parameters to Consider

3. How extensive an area of cactus scrub is required to support a colony of at least five Cactus Wren pairs over a period of decades?

Other data should be evaluated, but evidence suggests that approximately 40 acres of scrub, most of it cactus-containing, is needed to support a colony of this size.

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Flaagan (1997): Average dimensions for cactus patches with CACW nests in Chino Hills: 3.3 m x 4.5 m. Slightly larger than for patches lacking CACW nests.

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May be worthwhile to study the northern half of the UC Irvine Reserve, where CACW use stands of knee-high prickly-pear. It is unknown whether the birds nest in the low cactus or only use it as foraging habitat, but the stands in this part of the reserve are very extensive. It is possible that planting extensive patches could decrease the number of years needed before CACW are able to use restored cactus scrub.

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4. Within an expanse of cactus scrub, how large an area should each individual cactus patch cover?

Evidence suggests a minimum patch size of 3.3 m x 4.5 m. Patches larger than this may be preferable, especially if the intent is for CACW to be able to use the restored habitat as soon as possible.

Parameters to Consider

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Dodero (2008): Depends on local soil conditions; trial and error needed to determine optimal planting density at a given site.

In good quality native soil, cholla cuttings can be planted at 2-3/m^2. At sites with very low natural organic content, up to 5 cuttings/m^2.

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Prickly pear cuttings typically planted at lower density than cholla. One pad/m^2 may be adequate, but site conditions and project goals are important.

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Experimental trials would be useful for determining optimal planting densities for cholla and prickly-pear in different situations.

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Hamilton (2004): Estimates of cactus cover within CACW territories usually 11–25% in central and coastal Orange County. Areas with 25–50% cactus cover relatively uncommon in survey area but were more consistently occupied by CACW.

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Expanses of scrub strongly dominated by cactus are often densely packed with Cactus Wrens, suggesting that restored scrub should include as much cactus as can be feasibly obtained.

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Cactus should represent no less than 40–50% areal cover upon maturity of the habitat.

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Rea & Weaver (1990): "Our breeding bird and winter censuses [mainly in San Diego County] indicate that the wrens prefer areas dominated by California Sagebrush [*Artemisia californica*] and Flat-top Buckwheat [*Eriogonum fasciculatum*] and tend to avoid locations dominated by sages [*Salvia* spp.] ."

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Gallagher (1997): Cited personal communication from David Bontrager that , in six Orange County parks ,"intensive 1992 surveys" found CACW in the following seven communities: sagebrush-buckwheat scrub (33.1%), mixed scrub (20.8%), southern cactus scrub (19.2%), scalebroom scrub (12.7%), sagebrush (6.5%), mixed chaparral (4.5%), sagebrush-black sage (2.0%) and black sage (1.2%).

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7. What non-cactus plant species should be installed along with the cactus at a given cactus scrub restoration site to create habitat of high value to CACW?

Flaagan (1999): "Coastal CACW [in the Chino Hills] were often observed gleaning for insects from *S. mexicana* and *O. littoralis* and on the berries of these plants when in season."

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But the average distance from CACW nest to nearest Mexican Elderberry was not found to be a significant factor in the selection of nest sites.

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Hamilton (2004): Weighted ranking of dominant plants in CACW territories, 1999–2004: *Artemisia californica* by far most abundant non-cactus shrub in both central and coastal NROC.

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In central reserve, *Rhus integrifolia* was the second most common non-cactus dominant; in coastal reserve, *Eriogonum fasciculatum*.

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In central reserve, *Malosma laurina* and *Eriogonum fasciculatum* tied for third; in coastal reserve, *Rhus integrifolia*.

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Mitrovich and Hamilton (2007): "Of the 421 cactus scrub sites [in the NROC in 2006], 103 included both Mexican elderberry (*Sambucus mexicana*) and Class I *Opuntia* and/or *Cylindropuntia* patches."

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Class I *Opuntia* = ≥ 1 contiguous acre with ≥ 20% estimated areal cover of mature cactus (generally ≥ 1 m tall).

Class I *Cylindropuntia* = at least one cluster of cholla fully developed, standing ≥ 1.3 m tall and in good health with extensive branching.

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Mitrovich and Hamilton (2007): "... wren occupancy was better explained by the presence and absence this combination of vegetative characteristics relative to any other singular descriptors. According to the highest ranging model, CACW were 8.0 times (± SE = 2.4) more likely to be found at 'Combination' sites that at any other sites."

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"**We show the presence of lemonade berry (*Rhus integrifolia*) is of little value when attempting to predict the presence or absence of wrens."**

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Hamilton (2009): At 33 CACW territories in the San Dieguito River Valley near Escondido, San Diego County, the most abundant and widespread non-cactus species were *Eriogonum fasciculatum* and *Artemisia californica*.

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Also prevalent, but much less abundant, were *Sambucus mexicana*, *Brickellia californica*, and *Malosma laurina*.

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Evidence suggests that restored cactus scrub should include *Sambucus mexicana*, *Artemisia californica*, and *Eriogonum fasciculatum*. *Sambucus* should be established in normal densities, in areas with moist microclimates. *Sambucus* does not grow naturally on the Palos Verdes Peninsula.

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***Rhus integrifolia* and *Malosma laurina* should be used, generally sparingly, in areas where they naturally occur.**

***Salvia* spp. should probably be avoided or used sparingly.**

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Flaagan (1999): "Coastal Cactus Wrens prefer prickly pear cactus with a minimal percent cover of shrubs wtihin the cactus. Nests were found in patches with shrub growth, however, the average height of shrubs within the patch was below the height of the nest."

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8. Should non-cactus plant species be planted liberally among cactus patches, or should they be largely restricted to the perimeters of cactus patches?

Dodero (2008): "If cuttings are planted in close proximity to dense shrubs, then more labor will be required to maintain the cactus patch over time. Potential competition with surrounding shrubs for light and water can affect the health of the cactus. Having dense shrub cover immediately adjacent to the restored patches will also likely make the cactus more susceptible to damage by intense fires."

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8. Should non-cactus plant species be planted liberally among cactus patches, or should they be largely restricted to the perimeters of cactus patches?

Plantings of non-cactus plants, especially the taller shrubs, typically should be limited to the perimeters of cactus patches. This is because (1) CACW prefer cactus patches that do not have other tall plant species growing up through the cactus; (2) tall shrubs can outcompete cactus for light and water; and (3) planting cactus close to more flammable shrubs increases the potential for the restored cactus to be consumed in wildfire.

Parameters to Consider

9. What are the elevational limits of coastal CACW?

Rea and Weaver (1990): "We have found them as high as 400 m [1312 ft.] in San Diego County, while Schneebeck (1978) recorded the birds in Orange County at the upper limits of the coastal sage scrub at 450 m [1476 ft.] above sea level."

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Small (1994): Elevational range in California "up to about 1500 feet on the southern coastal slopes."

Solek and Szijj (1999): "Coastal populations of the CACW are . . . found only in coastal and near-coastal portions of the state, generally below 3000 ft." This is twice as high as the upper limit for coastal populations cited by Rea and Weaver.

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The great majority of coastal CACW are found below 1500 feet elevation. Small numbers may occur up to 2000 feet, and any records from higher elevation would be noteworthy.

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Most descriptions of cactus scrub habitat specify south- or southwest-facing slopes, but many southeast-facing slopes also support cactus scrub.

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Rea and Weaver (1990): "San Diego Cactus Wrens we studied centered their territories on narrow draws, where cacti tend to be more abundant and taller than on adjacent slopes. Most territories tend to be roughly elliptical, corresponding to the downslope flow of the draws. Thus, there is a vertical as well as a spatial requirement for hillside-inhabiting wrens, a factor that has not been taken into consideration in mitigation efforts."

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Many CACW-occupied habitats outside of Rea and Weaver's study area do not conform to this description.

Parameters to Consider

10. What are the most important physical considerations, in terms of slope, aspect, soil type, etc.?

Restored cactus scrub should generally be limited to slopes with a southerly aspect. In areas with seasonal streambeds, consideration should be given to preferentially restoring areas along streambeds consistent with Rea and Weaver (1990).

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Cactus plants can be expected to grow faster in deeper soils, but weeds will also be more of a problem. See Dodero (2008) for discussion of soils and other physical considerations.

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- Non-cactus plant species should generally be installed around perimeters of cactus patches.