



## HAMILTON BIOLOGICAL

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February 25, 2012

Mr. Darren Bradford  
San Diego Regional Water Quality Control Board  
9174 Sky Park Court, Suite 100  
San Diego, CA. 92123-4340

**SUBJECT: COMMENTS ON FINAL HABITAT MITIGATION AND MONITORING  
PLAN FOR THE TESORO EXTENSION PROJECT**

Dear Mr. Bradford,

At the request of the Endangered Habitats League, Hamilton Biological has reviewed the Habitat Mitigation Monitoring Plan (HMMP) for the Tesoro Extension Project, prepared by NewFields for the Foothill/Eastern Transportation Corridor Agency. My qualifications are provided in the attached Curriculum Vitae. During the brief period I had available to review the HMMP and other supporting documents, I identified two main flaws in the HMMP.

### **SAN DIEGO CACTUS WREN**

My main concern is that the HMMP fails to analyze the extent to which the Tesoro Extension Project would impact the San Diego Cactus Wren (*Campylorhynchus brunneicapillus sandiegensis*), a California Species of Special Concern that occurs in the area that would be affected by construction of this proposed roadway. I was not able to find any recent survey results for the San Diego Cactus Wren in the HMMP or in any supporting documentation.

In recent years, this subspecies of the Cactus Wren, along with all of its other "coastal" populations, has been the subject of intense interest among state and federal resource agencies, the Nature Reserve of Orange County, Irvine Ranch Conservancy, The Nature Conservancy, and other major land managers throughout the region. This is because populations of the Cactus Wren west of the interior deserts are in steep decline (Hamilton, R. A., Proudfoot, G. A., Sherry, D. A., and Johnson, S. 2011. Cactus Wren *Campylorhynchus brunneicapillus*, in *The Birds of North America Online* [A. Poole, ed.]. Cornell Lab of Ornithology, Ithaca, NY). Various organizations, agencies, and numerous volunteers have been surveying populations of Cactus Wrens across the coastal slope of southern California since the mid-to-late 2000s, and these surveys are demonstrating that coastal populations of the Cactus Wren require immediate and effective conservation measures to avoid the potential extirpation of this species from the region.

As an example of the level of decline, focused Cactus Wren surveys that I conducted across the Coastal Reserve of the Nature Reserve of Orange County (NROC) in 2006 de-

terminated that the population had declined from approximately 282 pairs in 1992 to 71±6 pairs (Mitrovich, M. J. and R. A. Hamilton. 2007. Status of the Cactus Wren *Campylorhynchus brunneicapillus* within the Coastal Subregion of Orange County, California. Unpublished report. NROC, Irvine, CA.). Following the exceptionally dry rainy season of 2006/2007, focused surveys across the Coastal Reserve in 2007 documented further decline to approximately 25 pairs, with very few juveniles detected (R. A. Hamilton and NROC unpubl. data). This is a decline of more than 90% within a natural preserve that was established specifically to conserve populations of Cactus Wrens. Surveys of the NROC's Central Reserve in 2008 documented similarly major declines of the Cactus Wren population in the wake of the 2007 Santiago Fire (NROC unpubl. data). In 2009, a volunteer survey effort produced a maximum estimate of 200 pairs remaining on the coastal slope of Los Angeles County, and documented the loss of several historical populations in this area (Cooper, D. S., R. A. Hamilton, and S. D. Lucas. 2012. A population census of the Cactus Wren in coastal Los Angeles County. *Western Birds* 43:151-163).

In light of the alarming data that have been accumulating in recent years, the HMMP must analyze impacts to the Cactus Wren from the Tesoro Extension Project. The HMMP refers to focused surveys for the California Gnatcatcher that were conducted in 2009 and 2012, but there is no mention of the Cactus Wren, or of the potential effects on the Cactus Wren of removing 118 acres of coastal sage scrub vegetation for road construction, or of measures that would be taken in the restoration plans to mitigate the project's impacts to this species. The wren's populations continue to crash throughout the region. This fact *must* be recognized and addressed in the HMMP prepared for this project. The habitat requirements of the gnatcatcher are not those of the wren, and so it would be disastrous to plant more gnatcatcher habitat while literally ignoring the wren and its specific habitat requirements.

The Coastal Cactus Wren Conservation Network, established in recent years, has a web page providing extensive information on the species and its conservation needs, including specific recommendations for cactus scrub planting programs directed toward conserving this species. Under contract to the Conservation Biology Institute, I developed specific, detailed restoration recommendations based upon extensive research into the specialized habitat needs of the coastal Cactus Wren, including input from restoration specialists. I have attached a copy of these guidelines, which are also available online:

<http://conserveonline.org/workspaces/cacwnetwork/documents/restoration-guidelines-for-coastal-cactus-wrens/view.html>

The recommendations are summarized as follows:

- Distance from existing Cactus Wren populations should be < 1 km and not > 1.6 km, preferably in line of sight of existing Cactus Wrens; elevation ≤ 1500 feet.
- Restoration site should cover ≥ 2 acres near coast and ≥ 3 acres inland.

- Approximately 40 acres of cactus-containing scrub is needed to support 5+ Cactus Wren territories for a period of decades.
- Each restored cactus patch should be  $\geq 3.3$  m x 4.5 m, typically on a slope with southerly aspect or along a seasonal streambed.
- Cactus planting density 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 per square meter. At sites with very low natural organic content, up to 5 cuttings per square meter. Prickly pear cuttings should typically be planted at lower density than cholla. One pad per square meter may be adequate, but site conditions and project goals are important.
- Cactus should provide  $\geq 40$ -50% areal cover upon maturity.
- Other important plant species include *Sambucus nigra* ssp. *caerulea*, *Artemisia californica*, and *Eriogonum fasciculatum*. *Brickellia californica*, *Rhus integrifolia*, and *Malosma laurina* are appropriate where they naturally occur. *Salvia* spp. should probably be avoided. Non-cactus plant species should generally be installed around perimeters of cactus patches.

The HMMP does not follow these guidelines, and in my opinion the HMMP's approach to scrub restoration is very unlikely to provide habitat of value to the Cactus Wren. For example, the HMMP's specification of 180 cactus pads per acre of restored coastal sage scrub is much lower than the density of cactus in which one typically finds Cactus Wrens in coastal southern California. But this is only the most obvious deficiency of the proposed mitigation approach. As indicated above, there are many items that should be taken into consideration when devising a restoration plan directed at providing habitat for Cactus Wrens. Implementing the HMMP as proposed would represent a lost opportunity to effectively mitigate this project's significant impacts to the San Diego Cactus Wren. This major deficiency in the project's mitigation approach must be addressed at this time.

## ARROYO TOAD

The HMMP makes no mention of the Arroyo Toad (*Anaxyrus californicus*), a species federally listed as endangered that is known to occur in the project vicinity, in and around San Juan Creek. As stated by Arroyo Toad specialist Robert Lovich in written comments to the California Coastal Commission dated August 16, 2007:

Arroyo toads are known to occupy upland habitats in Cristianitos Creek as far as 1175 meters from the edge of riparian habitat (Holland, D. C. and N. R. Sisk. 2000. Habitat Use and Population Demographics of the Arroyo Toad *Bufo californicus* on MCB Camp Pendleton, San Diego County, California: Final Report for 1998-1999). Not only were they documented at nearly 1.2 km from the edge of riparian habitat, but these were the farthest that arrays were placed for the study. Findings of Holland Sisk (2000) determined that there is no natural limiting factor to preclude them from moving even greater distances than 1.2 km from the riparian edge.

As noted in the 2011 Revised Critical Habitat for the Arroyo Toad (Federal Register 76 No. 27 pp. 7246-7467):

“Arroyo toads must be able to move between the stream and upland foraging sites . . . Juveniles and adult arroyo toads require and spend much of their lives in riparian and upland habitats adjacent to breeding locations” (Page 7254).

“Riparian and adjacent upland habitats, particularly low-gradient (typically less than 6 percent) stream segments and alluvial streamside terraces with sandy or fine gravel substrates that support the formation of shallow pools and sparsely vegetated sand and gravel bars for breeding and rearing of tadpoles and juveniles; **and adjacent valley bottomlands that include areas of loose soil where toads can burrow underground, to provide foraging and living areas for juvenile and adult arroyo toads**” (Page 7255; emphasis added).

“Maintaining the physical and biological features essential to the conservation of the arroyo toad may require special management considerations or protection to reduce effects that may result from the following threats, among others: Habitat destruction and alteration due to short and long-term changes in river hydrology, including construction of dams and water diversions that alter natural water flow regimes; agriculture and urbanization; **construction of roads** . . . These threats may cause habitat alteration, degradation, or fragmentation and the direct or indirect loss of arroyo toad eggs, juveniles, or adults” (Page 7255; emphasis added).

The HMMP for this proposed project must analyze impacts on the Arroyo Toad population in San Juan Creek, immediately south of the proposed terminus, taking into account the wide-ranging use of upland habitats described above.

## CONCLUSION

Thank you for the opportunity to review these documents. If you have any questions, please call me at 562-477-2181 or send e-mail to [robb@hamiltonbiological.com](mailto:robb@hamiltonbiological.com).

Sincerely,



Robert A. Hamilton  
President, Hamilton Biological, Inc.  
<http://hamiltonbiological.com>

cc: Dan Silver, Endangered Habitats League

Attachments: Curriculum Vitae  
Restoration Guidelines for Coastal Cactus Wrens

# Robert A. Hamilton

## *President, Hamilton Biological, Inc.*

### Expertise

Endangered Species Surveys  
General Biological Surveys  
CEQA Analysis  
Population Monitoring  
Bird Banding  
Vegetation Mapping  
Noise Monitoring  
Open Space Planning  
Natural Lands Management

### Education

1988. Bachelor of Science degree in  
Biological Sciences,  
University of California,  
Irvine

### Professional Experience

1994 to Present. Independent  
Biological Consultant, Hamilton  
Biological, Inc.

1988 to 1994. Biologist, LSA  
Associates, Inc.

### Permits

Federal Permit No. TE-799557 to  
survey for the Coastal California  
Gnatcatcher and Southwestern  
Willow Flycatcher

Federal Bird Banding Subpermit No.  
20431

MOUs with the California Dept. of  
Fish and Game to survey for Coastal  
California Gnatcatcher and  
Southwestern Willow Flycatcher

California Scientific Collecting  
Permit No. SC-001107

Robert A. Hamilton has been providing biological consulting services in southern California since 1988. He spent the formative years of his career at the firm of LSA Associates in Irvine, where he was a staff biologist and project manager. He has worked as a full-time independent consultant since 1994, incorporating the enterprise as Hamilton Biological, Inc., in 2009. His consultancy specializes in the practical application of environmental policies and regulations to land management and land use decisions in southern California.

A recognized authority on the status, distribution, and identification of birds in California, Mr. Hamilton is the lead author of two standard references describing aspects of the state's avifauna: *The Birds of Orange County: Status & Distribution* and *Rare Birds of California*. Mr. Hamilton has also conducted extensive studies in Baja California, and for seven years edited the Baja California Peninsula regional reports for the journal *North American Birds*. He served ten years on the editorial board of *Western Birds* and regularly publishes in peer-reviewed journals. He is a founding member of the Coastal Cactus Wren Working Group and in 2011 updated the Cactus Wren species account for *The Birds of North America Online*. Mr. Hamilton's expertise includes vegetation mapping. He served for a decade as Conservation Chair for the Orange County chapter of the California Native Plant Society and has a working knowledge of native plant restoration. He is a current member of the Los Angeles County Significant Ecological Areas Technical Advisory Committee (SEATAC).

Mr. Hamilton conducts general and focused biological surveys of small and large properties as necessary to obtain various local, state, and federal permits, agreements, and clearances. He also conducts landscape-level surveys needed by land managers to monitor songbird populations. Mr. Hamilton holds the federal and state permits and MOUs listed to the left, and he is recognized by federal and state resource agencies as being highly qualified to survey for the Least Bell's Vireo. He also provides nest-monitoring services in compliance with the federal Migratory Bird Treaty Act and California Fish & Game Code Sections 3503, 3503.5 and 3513.

## **Curriculum Vitae for Robert A. Hamilton**

### **Board Memberships, Advisory Positions, Etc.**

Los Angeles County Significant Ecological Areas Technical Advisory Committee (SEATAC) (2010–present)

Coastal Cactus Wren Working Group (2008–present)

American Birding Association: Baja Calif. Peninsula Regional Editor, North American Birds (2000–2006)

Western Field Ornithologists: Associate Editor of Western Birds (1999–2008)

California Bird Records Committee (1998–2001)

Nature Reserve of Orange County: Technical Advisory Committee (1996–2001)

California Native Plant Society, Orange County Chapter: Conservation Chair (1992–2003)

### **Professional Affiliations**

American Ornithologists' Union

Cooper Ornithological Society

Institute for Bird Populations

California Native Plant Society

Southern California Academy of Sciences

Western Foundation of Vertebrate Zoology

Mr. Hamilton monitors noise as it relates to nesting or roosting birds using an advanced Quest SoundPro unit that can provide second-by-second logging of noise levels at the nest; this allows documentation of the varying sound pressure levels that nesting birds are exposed to during construction and evaluation of any effects associated with different levels. He is an expert photographer, and typically provides photo-documentation and/or video documentation as part of his services.

Drawing upon a robust, multi-disciplinary understanding of the natural history and ecology of his home region, Mr. Hamilton works with private and public land owners, as well as governmental agencies and interested third parties, to apply the local, state, and federal land use policies and regulations applicable to each particular situation. Mr. Hamilton has amassed extensive experience in the preparation and critical review of CEQA documents, from relatively simple Negative Declarations to complex supplemental and recirculated Environmental Impact Reports. In addition to his knowledge of CEQA and its Guidelines, Mr. Hamilton understands how each Lead Agency brings its own interpretive variations to the CEQA review process.

### **Representative Project Experience**

From 2007 to 2010, reviewed biological resources sections of CEQA documents submitted to the County of Los Angeles Department of Regional Planning. Work included evaluating the accuracy and adequacy of consultants' biological reports, developing impact analyses and mitigation measures, and recommending findings of significance. Under the same contract, prepared a list of drought-tolerant native plants, hyperlinked to web-based information, for use in landscaping in Los Angeles County. The County later revised the list, with some loss of information, but the original list and accompanying map of seven planting zones in the county are available for free download at: <http://hamiltonbiological.com/resources-publications.html>.

## **Curriculum Vitae for Robert A. Hamilton**

### **Insurance**

\$3,000,000 professional liability policy (Axis)

\$2,000,000 general liability policy (The Hartford)

\$1,000,000 auto liability policy (State Farm)

### **Other Relevant Experience**

Field Ornithologist, San Diego Natural History Museum Scientific Collecting Expedition to Central and Southern Baja California, October/November 1997 and November 2003.

Field Ornithologist, Island Conservation and Ecology Group Expedition to the Tres Marías Islands, Nayarit, Mexico, 23 January to 8 February 2002.

Field Ornithologist, Algalita Marine Research Foundation neustonic plastic research voyages in the Pacific Ocean, 15 August to 4 September 1999 and 14 to 28 July 2000.

Field Assistant, Bird Banding Study, Río Nambí Reserve, Colombia, January to March 1997.

### **References**

Provided upon request.

In 2010, under contract to CAA Planning, served as principal author of the Conservation & Management Plan for Marina del Rey, Los Angeles County, California. The project was undertaken in collaboration with Dan Cooper in response to a Periodic Review by the California Coastal Commission of Marina del Rey's certified Local Coastal Program. It is a comprehensive planning document with two overarching goals: (1) to promote the long-term conservation of all native species that exist in, or that may be expected to return to, Marina del Rey, and (2) to diminish the potential for conflicts between wildlife populations and both existing and planned human uses of Marina del Rey (to the benefit of humans and wildlife alike). The Plan underwent extensive peer-review and was accepted by the Coastal Commission as an appropriate response to the varied challenges posed by colonial waterbirds and other biologically sensitive resources colonizing urban areas once thought to have little resource conservation value.

In 2009, under contract to the Palos Verdes Peninsula Land Conservancy, surveyed for the California Gnatcatcher and Cactus Wren across nine habitat reserves that constitute nearly all of the Portuguese Bend Natural Preserve in coastal Los Angeles County. The services provided included mapping and classifying all cactus scrub resources in the areas surveyed.

In 2008, under contract to the Conservation Biology Institute in San Diego County, conducted reconnaissance of those portions of the San Dieguito River Valley that were unburned or partially burned during the massive Witch Fire, which consumed nearly 200,000 acres in October 2007. Three-pass surveys conducted at 14 sites between Lake Hodges and the San Pasqual Valley determined the presence or absence of Cactus Wrens and California Gnatcatchers. Work products included maps of all unburned and partially burned scrub communities, maps of weed infestations, and complete lists documenting the numbers of each vertebrate wildlife species detected during the surveys.

Worked with study-design specialists and resource agency representatives to develop a long-term passerine bird monitoring program for the 37,000-acre Nature Reserve of Orange County, and directed its implementation from 1996 to 2001 with subsequent contract work. Tasks have

## **Curriculum Vitae for Robert A. Hamilton**

included (1) annual monitoring of 40 California Gnatcatcher and Cactus Wren study sites, (2) oversight of up to 10 constant-effort bird banding stations from 1998 to 2003 under the Monitoring Avian Productivity and Survivorship (MAPS) program, and (3) focused surveys for the Cactus Wren, and detailed mapping of cactus scrub habitat, across the NROC's coastal reserve in 2006 and 2007.

Under contract to the City of Orange, prepared the Biological Resources section of a hybrid Supplemental EIR/Draft EIR for the 6,900-acre Santiago Hills II/East Orange Planned Community project in central Orange County. This complicated document covered one proposed development area that already had CEQA clearance, but that required updating for alterations to the previously approved plan, and a much larger area that was covered under an existing Natural Communities Conservation Plan (NCCP). The SEIR/EIR was certified in November 2005.

### **Third Party Review of CEQA Documents**

Under contract to cities, conservation groups, homeowners' associations, and other interested parties, have reviewed EIRs and other project documentation for the following projects:

- The Ranch Plan (residential/commercial, County of Orange)
- Southern Orange County Transportation Infrastructure Improvement Project (Foothill South Toll Road, County of Orange)
- Sunset Ridge Park (proposed city park, City of Newport Beach)
- Gregory Canyon Landfill Restoration Plan (proposed mitigation, County of San Diego)
- Montebello Hills Specific Plan EIR (residential, City of Montebello)
- Cabrillo Mobile Home Park Violations (illegal wetland filling, City of Huntington Beach)
- Newport Hyatt Regency (timeshare conversion project, City of Newport Beach)
- Lower San Diego Creek "Emergency Repair Project" (flood control, County of Orange)

## **Curriculum Vitae for Robert A. Hamilton**

- Tonner Hills (residential, City of Brea)
- The Bridges at Santa Fe Units 6 and 7 (residential, County of San Diego)
- Villages of La Costa Master Plan (residential/commercial, City of Carlsbad)
- Whispering Hills (residential, City of San Juan Capistrano)
- Santiago Hills II (residential/commercial, City of Orange)
- Rancho Potrero Leadership Academy (youth detention facility/road, County of Orange)
- Saddle Creek/Saddle Crest (residential, County of Orange)
- Frank G. Bonelli Regional County Park Master Plan (County of Los Angeles)

### **Contact Information**

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<http://hamiltonbiological.com>

## **Curriculum Vitae for Robert A. Hamilton**

### **Selected Presentations**

Hamilton, R. A. 2012. Identification of Focal Wildlife Species for Restoration, Coyote Creek Watershed Master Plan. Twenty-minute multimedia presentation given at the Southern California Academy of Sciences annual meeting at Occidental College, Eagle Rock, 4 May. Abstract published in the Bulletin of the Southern California Academy of Sciences No. 111(1):39.

Hamilton, R. A. Six Legs Good. 2012. 90-minute multimedia presentation on the identification and photography of dragonflies, damselflies, butterflies, and other invertebrates, given at various Audubon Society chapter meetings and similar gatherings.

Hamilton, R. A., and Cooper, D. S. 2009-2010. Conservation & Management Plan for Marina del Rey. Twenty-minute multimedia presentation given to different governmental agencies and interest groups.

Hamilton, R. A. 2008. Cactus Wren Conservation Issues, Nature Reserve of Orange County. One-hour multimedia presentation for Sea & Sage Audubon Society, Irvine, California, 25 November.

Hamilton, R. A., Miller, W. B., Mitrovich, M. J. 2008. Cactus Wren Study, Nature Reserve of Orange County. Twenty-minute multimedia presentation given at the Nature Reserve of Orange County's Cactus Wren Symposium, Irvine, California, 30 April 2008.

Hamilton, R. A. and K. Messer. 2006. 1999-2004 Results of Annual California Gnatcatcher and Cactus Wren Monitoring in the Nature Reserve of Orange County. Twenty-minute multimedia presentation given at the Partners In Flight meeting: Conservation and Management of Coastal Scrub and Chaparral Birds and Habitats, Starr Ranch Audubon Sanctuary, 21 August 2004; and at the Nature Reserve of Orange County 10<sup>th</sup> Anniversary Symposium, Irvine, California, 21 November.

### **Publications**

Cooper, D. S., R. A. Hamilton, and S. D. Lucas. 2012. A population census of the Cactus Wren in coastal Los Angeles County. *Western Birds* 43:151-163.

Hamilton, R. A., J. C. Burger, and S. H. Anon. 2012. Use of artificial nesting structures by Cactus Wrens in Orange County, California. *Western Birds* 43:37-46.

Hamilton, R. A., Proudfoot, G. A., Sherry, D. A., and Johnson, S. 2011. Cactus Wren (*Campylorhynchus brunneicapillus*), in *The Birds of North America Online* (A. Poole, ed.). Cornell Lab of Ornithology, Ithaca, NY.

Hamilton, R. A. 2008. Cactus Wrens in central & coastal Orange County: How will a worst-case scenario play out under the NCCP? *Western Tanager* 75:2-7.

Erickson, R. A., R. A. Hamilton, R. Carmona, G. Ruiz-Campos, and Z. A. Henderson. 2008. Value of perennial archiving of data received through the North American Birds regional reporting system: Examples from the Baja California Peninsula. *North American Birds* 62:2-9.

## Curriculum Vitae for Robert A. Hamilton

- Erickson, R. A., R. A. Hamilton, and S. G. Mlodinow. 2008. Status review of Belding's Yellowthroat *Geothlypis beldingi*, and implications for its conservation. *Bird Conservation International* 18:219–228.
- Hamilton, R. A. 2008. Fulvous Whistling-Duck (*Dendrocygna bicolor*). Pp. 68-73 in *California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California* (Shuford, W. D. and T. Gardali, eds.). *Studies of Western Birds* 1. Western Field Ornithologists, Camarillo, CA, and California Department of Fish and Game, Sacramento, CA.
- California Bird Records Committee (R. A. Hamilton, M. A. Patten, and R. A. Erickson, editors.). 2007. *Rare Birds of California*. Western Field Ornithologists, Camarillo, CA.
- Hamilton, R. A., R. A. Erickson, E. Palacios, and R. Carmona. 2001–2007. *North American Birds* quarterly reports for the Baja California Peninsula Region, Fall 2000 through Winter 2006/2007.
- Hamilton, R. A. and P. A. Gaede. 2005. Pink-sided × Gray-headed Juncos. *Western Birds* 36:150–152.
- Mlodinow, S. G. and R. A. Hamilton. 2005. Vagrancy of Painted Bunting (*Passerina ciris*) in the United States, Canada, and Bermuda. *North American Birds* 59:172–183.
- Erickson, R. A., R. A. Hamilton, S. González-Guzmán, G. Ruiz-Campos. 2002. Primeros registros de anidación del Pato Friso (*Anas strepera*) en México. *Anales del Instituto de Biología, Universidad Nacional Autónoma de México, Serie Zoología* 73(1):67–71.
- Hamilton, R. A. and J. L. Dunn. 2002. Red-naped and Red-breasted sapsuckers. *Western Birds* 33:128–130.
- Hamilton, R. A. and S. N. G. Howell. 2002. Gnatcatcher sympatry near San Felipe, Baja California, with notes on other species. *Western Birds* 33:123–124.
- Hamilton, R. A. 2001. Book review: *The Sibley Guide to Birds*. *Western Birds* 32:95–96.
- Hamilton, R. A. and R. A. Erickson. 2001. Noteworthy breeding bird records from the Vizcaíno Desert, Baja California Peninsula. Pp. 102-105 in *Monographs in Field Ornithology* No. 3. American Birding Association, Colorado Springs, CO.
- Hamilton, R. A. 2001. Log of bird record documentation from the Baja California Peninsula archived at the San Diego Natural History Museum. Pp. 242–253 in *Monographs in Field Ornithology* No. 3. American Birding Association, Colorado Springs, CO.
- Hamilton, R. A. 2001. Records of caged birds in Baja California. Pp. 254–257 in *Monographs in Field Ornithology* No. 3. American Birding Association, Colorado Springs, CO.
- Erickson, R. A., R. A. Hamilton, and S. N. G. Howell. 2001. New information on migrant birds in northern and central portions of the Baja California Peninsula, including species new to Mexico. Pp. 112–170 in *Monographs in Field Ornithology* No. 3. American Birding Association, Colorado Springs, CO.

## Curriculum Vitae for Robert A. Hamilton

- Howell, S. N. G., R. A. Erickson, R. A. Hamilton, and M. A. Patten. 2001. An annotated checklist of the birds of Baja California and Baja California Sur. Pp. 171–203 in *Monographs in Field Ornithology* No. 3. American Birding Association, Colorado Springs, CO.
- Ruiz-Campos, G., González-Guzmán, S., Erickson, R. A., and Hamilton, R. A. 2001. Notable bird specimen records from the Baja California Peninsula. Pp. 238–241 in *Monographs in Field Ornithology* No. 3. American Birding Association, Colorado Springs, CO.
- Wurster, T. E., R. A. Erickson, R. A. Hamilton, and S. N. G. Howell. 2001. Database of selected observations: an augment to new information on migrant birds in northern and central portions of the Baja California Peninsula. Pp. 204–237 in *Monographs in Field Ornithology* No. 3. American Birding Association, Colorado Springs, CO.
- Erickson, R. A. and R. A. Hamilton, 2001. Report of the California Bird Records Committee: 1998 records. *Western Birds* 32:13–49.
- Hamilton, R. A., J. E. Pike, T. E. Wurster, and K. Rademaker. 2000. First record of an Olive-backed Pipit in Mexico. *Western Birds* 31:117–119.
- Hamilton, R. A. and N. J. Schmitt. 2000. Identification of Taiga and Black Merlins. *Western Birds* 31:65–67.
- Hamilton, R. A. 1998. Book review: Atlas of Breeding Birds, Orange County, California. *Western Birds* 29:129–130.
- Hamilton, R. A. and D. R. Willick. 1996. The Birds of Orange County, California: Status and Distribution. Sea & Sage Press, Sea & Sage Audubon Society, Irvine.
- Hamilton, R. A. 1996–98. Photo Quizzes. *Birding* 27(4):298-301, 28(1):46-50, 28(4):309-313, 29(1): 59-64, 30(1):55–59.
- Erickson, R. A., and Hamilton, R. A. 1995. Geographic distribution: *Lampropeltis getula californiae* (California Kingsnake) in Baja California Sur. *Herpetological Review* 26(4):210.
- Bontrager, D. R., R. A. Erickson, and R. A. Hamilton. 1995. Impacts of the October 1993 Laguna fire on California Gnatcatchers and Cactus Wrens. in J. E. Keeley and T. A. Scott (editors). *Wildfires in California Brushlands: Ecology and Resource Management*. International Association of Wildland Fire, Fairfield, Washington.
- Erickson, R. A., R. A. Hamilton, S. N. G. Howell, M. A. Patten, and P. Pyle. 1995. First record of Marbled Murrelet and third record of Ancient Murrelet for Mexico. *Western Birds* 26: 39–45.
- Erickson, R. A., and R. A. Hamilton. 1993. Additional summer bird records for southern Mexico. *Euphonia* 2(4): 81–91.
- Erickson, R. A., A. D. Barron, and R. A. Hamilton. 1992. A recent Black Rail record for Baja California. *Euphonia* 1(1): 19–21.

# Restoration Guidelines for “Coastal” Cactus Wrens



CONSERVATION  
BIOLOGY  
INSTITUTE



Robert A. Hamilton  
Hamilton Biological



The Nature  
Conservancy



Protecting nature. Preserving life.™

Updated 5-14-09

# Purpose & Need

The Conservation Biology Institute and The Nature Conservancy commissioned these guidelines, which pull together and summarize life history information relevant to specialists in the region planning restoration projects intended to benefit "coastal" Cactus Wrens (CACW).



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**The Conservation Biology Institute and The Nature Conservancy commissioned these guidelines, which pull together and summarize life history information relevant to specialists in the region planning restoration projects intended to benefit “coastal” Cactus Wrens (CACW).**

**Cactus scrub restoration projects that do not incorporate relevant findings of “coastal” CACW studies may be partially or totally ineffective in fulfilling the bird’s ecological needs.**

# Purpose & Need



**The Conservation Biology Institute and The Nature Conservancy commissioned these guidelines, which pull together and summarize life history information relevant to specialists in the region planning restoration projects intended to benefit “coastal” Cactus Wrens (CACW).**

**Cactus scrub restoration projects that do not incorporate relevant findings of “coastal” CACW studies may be partially or totally ineffective in fulfilling the bird’s ecological needs.**

**PDF’s of most papers cited here, and of many other CACW articles, are posted at the Coastal Cactus Wren Conservation Network (<http://conserveonline.org/workspaces/cacwnetwork>).**

# Purpose & Need



The Conservation Biology Institute and The Nature Conservancy commissioned these guidelines, which pull together and summarize life history information relevant to specialists in the region planning restoration projects intended to benefit “coastal” Cactus Wrens (CACW).

Cactus scrub restoration projects that do not incorporate relevant findings of “coastal” CACW studies may be partially or totally ineffective in fulfilling the bird’s ecological needs.

PDF’s of most papers cited here, and of many other CACW articles, are posted at the Coastal Cactus Wren Conservation Network (<http://conserveonline.org/workspaces/cacwnetwork>).

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.

# 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?



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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.

# Parameters to Consider

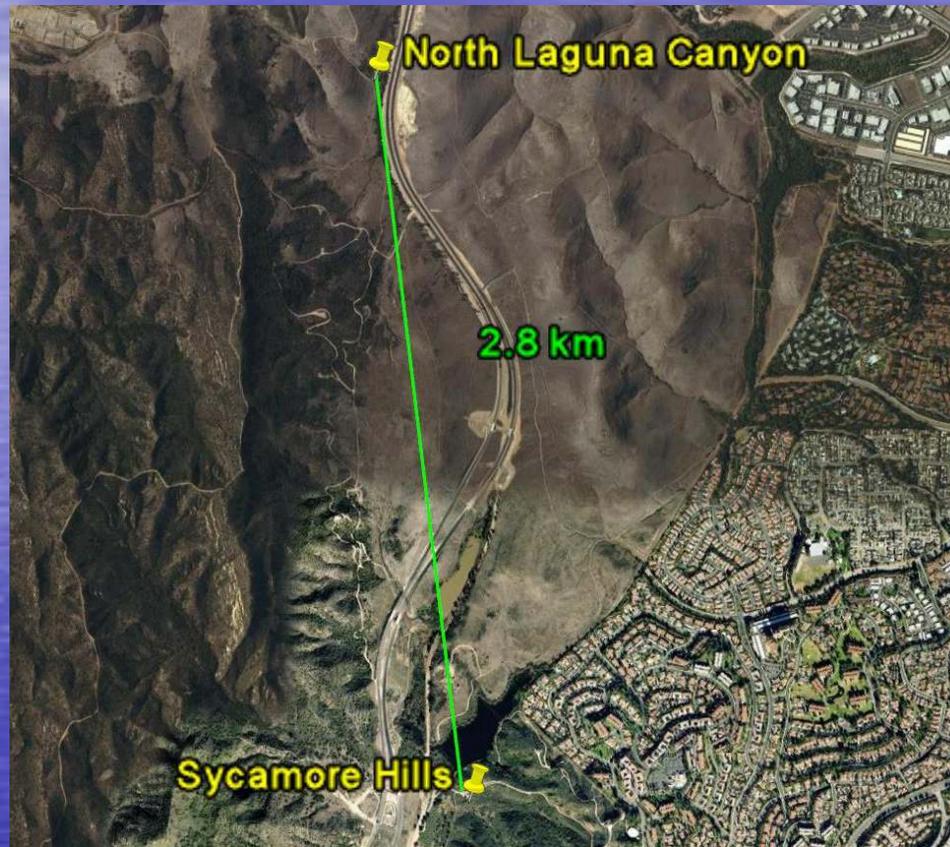


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**Harmsworth Associates (2000)** hypothesized that the eight-lane San Joaquin Hills Transportation Corridor may represent an important barrier for dispersing juvenile CACW.

# 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.**

# Parameters to Consider

## 1. Dispersal:



**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.**

# 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.**

**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).**

# 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?**

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

# 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?



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."

# 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?



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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.**

# Parameters to Consider

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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.



# Parameters to Consider



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

**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.**

**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.**

# Parameters to Consider

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

5. How many cholla or prickly-pear plants/pads/joints should be installed to form each individual cactus patch?



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

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**5. How many cholla or prickly-pear plants/pads/joints should be installed to form each individual cactus patch?**

**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<sup>2</sup>. At sites with very low natural organic content, up to 5 cuttings/m<sup>2</sup>.**

# Parameters to Consider



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

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

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**5. How many cholla or prickly-pear plants/pads/joints should be installed to form each individual cactus patch?**

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**Dodero (2008) provides good direction that should be followed in current restoration projects.**

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

# Parameters to Consider

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**Wheeler (1997):** Prickly-pear cover of 27–63% (mean 40%) at four CACW populations in Los Angeles County.

**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.

# Parameters to Consider

**6. How many individual cactus patches should be installed per acre of restored scrub?**



**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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**6. How many individual cactus patches should be installed per acre of restored scrub?**

**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.**

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

# Parameters to Consider

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?



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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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**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?**

**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%).

# Parameters to Consider



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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**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."

**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*.

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

# Parameters to Consider



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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* =  $\geq 1$  contiguous acre with  $\geq 20\%$  estimated areal cover of mature cactus (generally  $\geq 1$  m tall).**

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**Class I *Cylindropuntia* = at least one cluster of cholla fully developed, standing  $\geq 1.3$  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 ( $\pm$  SE = 2.4) more likely to be found at ‘Combination’ sites than 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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**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*.

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

# Parameters to Consider



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?

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

# Parameters to Consider

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



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**Flaagan (1999): "Coastal Cactus Wrens prefer prickly pear cactus with a minimal percent cover of shrubs within 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."**

# Parameters to Consider



**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."

# Parameters to Consider



**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.

# Parameters to Consider



## 9. What are the elevational limits of coastal CACW?

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.

# Parameters to Consider

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



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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.**



# Parameters to Consider



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

**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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**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).**

**Cactus plants can be expected to grow faster in deeper soils, but weeds will also be more of a problem. See Doderer (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.