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CACTUS WRENS IN CENTRAL & COASTAL ORANGE COUNTY: HOW WILL A WORST-CASE SCENARIO PLAY OUT UNDER THE NCCP?

—BY ROBERT A. HAMILTON

A friend who reviewed a draft of the following essay suggested that some readers might interpret my comments mainly as a plea to feather the nests of Cactus Wren biologists, myself included. Such a critique may seem reasonable, but it is my experience that biological consultants most concerned about money typically seek to arouse as little public notice as possible. This is especially true of consultants who frequently work on projects and initiatives with potential for public controversy. The problem, of course, is that this practice tends to stifle public airing of important policy issues that could benefit from judicious exposure to light. I have prepared the following essay in the belief that members of Los Angeles Audubon and others who read the Western Tanager would appreciate an update on the Cactus Wren's precarious situation in Orange County as well as an evaluation of possible implications for the NCCP process.

For the past dozen years I have spent most of my springs and summers monitoring Cactus Wren populations in the Nature Reserve of Orange County (NROC). Operating under a Board of Directors that consists of representatives from public and quasi-public agencies, conservation groups, and The Irvine Company, the NROC is a nonprofit corporation responsible for managing roughly 37,000 acres of public and private land set aside in 1996 under terms of the Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) for Central and Coastal Orange County. In exchange for setting aside the land—roughly 17,000 acres in the coastal reserve and 20,000 acres in the central reserve—and funding an endowment to pay for its long-term stewardship, the participating land owners received a streamlined development process for parcels within the central and coastal planning areas that supported more than 7,000 acres of coastal sage scrub.

The NCCP/HCP identifies the Cactus Wren, California Gnatcatcher, and Orange-throated Whiptail lizard as its “target species.” The reserve was designed to meet the ecological requirements

of these species and many other “Identified Species,” with the understanding that the three target species would serve as “surrogates” for the broader suite of organisms that depend upon coastal sage scrub



Figure 1. Photo taken on 19 July 2006 of a young Cactus Wren in California Buckwheat (*Eriogonum fasciculatum*) at the UC Irvine open space, Nature Reserve of Orange County. This fragment of cactus scrub and ruderal (weedy) habitats, located along the NROC's northwestern edge, covers approximately 70 acres and typically supports roughly five pairs of Cactus Wrens. Amazingly, this may be the largest concentration of Cactus Wrens remaining in the NROC's coastal reserve. Photo by Robert A. Hamilton

for their continued survival in the central and coastal Orange County NCCP planning area. The NCCP/HCP specifies that the populations of the target species shall be subject to long-term monitoring and that these taxa shall be treated as if they were listed under the California Endangered Species Act and the Federal Endangered Species Act (the gnatcatcher is, of course, federally listed as threatened).

From 1999 to 2003 the NROC contracted with the Institute for Bird Populations to conduct constant-effort mist netting at several sites within the central and coastal reserves. This effort demonstrated broad-based declines in the populations of several bird species dependent upon coastal sage scrub (annual percentage change in population size of -8.1% for all bird species pooled)¹. In general, the declines appeared to be related to drought conditions that prevailed during the years in question, but the overall conclusion of DeSante et al. was that “several more years of data will likely be required to confirm that the overall declines in landbird breeding populations now observed at NROC are real, and determine if there is an actual trend to productivity.”

From 1999 to 2004 I monitored Cactus Wren and California Gnatcatcher populations at 40 sites scattered across the NROC. During this six-year period, detections of territories per site declined by 33% for California Gnatcatchers in the central reserve, 17% for California Gnatcatchers in the coastal reserve, 26% for Cactus Wrens in the central reserve, and 68% for Cactus Wrens in the coastal reserve². Extrapolating these results yielded a population estimate of 55 ± 40 Cactus Wren territories in the coastal reserve in

2004. The first three declines were in line with the broad-based, short-term declines that DeSante et al. (2003) documented for several scrub-dependent bird populations in the NROC. It seemed likely that these moderate short-term declines represented part of a long-term cycle of boom and bust in response to weather patterns, particularly the amount and timing of precipitation. The much larger drop in detections per site for Cactus Wrens in the coastal reserve, however, provided obvious cause for concern, especially since the detection rate declined by 25% between 2003 and 2004, a period when detection rates for Cactus Wrens in the central reserve and California Gnatcatchers in both reserves increased in response to a good rainy season.

The coastal reserve’s Cactus Wren population had been of heightened conservation interest ever since the Laguna Beach Fire of October 1993 burned approximately 13,000 acres—nearly 75% of the reserve area. As reported by Bontrager et al.³, pre-fire surveys yielded an estimate of 282 Cactus Wrens within the fire’s perimeter, and surveys conducted in spring 1994 documented 79 pairs remaining in partially burned scrub within the burn perimeter. But cactus grows very slowly, and the wrens need extensive patches of meter-tall cactus in order to successfully breed. By 2001, Cactus Wrens could be found at only 31 sites within the burn perimeter⁴. In order to get a better handle on the situation throughout the coastal reserve, the NROC contracted with me to map and classify all of the reserve’s cactus resources in 2006 and to simultaneously conduct focused surveys; I found finding 46 Cactus Wren territories. I repeated these

surveys in 2007 and could find only 23 territories in the entire coastal reserve. Not only were the birds doing poorly within the burn perimeter, but for reasons not truly understood they were blinking out of areas like the Sycamore Hills (east of Laguna Canyon Road and north of El Toro Road), where wrens were thick only a few years ago and where the cactus scrub never looked better. Page II-37 of the EIR/EIS prepared for the Central and Coastal Orange County NCCP/HCP reports that 421 “sites” were known to be occupied by Cactus Wrens within the NCCP coastal planning area during the early 1990s. Thus my 2007 count represents about 5% of the pre-NCCP total.

Page II-37 of the NCCP/HCP EIR/EIS reports that 612 “sites” were known to be occupied by Cactus Wrens within the NCCP central planning area during the early 1990s, and my final reserve-wide sampling effort in 2004 yielded an estimate of 374 ± 113 territories in the central reserve. Although reduced from the earlier reported level, the Cactus Wren population in the NROC’s central reserve was generally regarded as reasonably stable and secure until 2007, when the Windy Ridge and Santiago fires consumed more than 28,000 acres in the Lomas de Santiago and the Santa Ana Mountains, including 16,000 acres within the central reserve. The NROC responded in early 2008 by contracting with a team of biologists to map and survey all of the cactus resources in the central reserve. One of them, Brian Leatherman (pers. comm.), estimates that roughly 67 Cactus Wren territories now exist in the entire central reserve, a decline of 89% from the pre-NCCP figure. This bad situation would, of course, become dire if the central reserve’s

wren population undergoes a post-fire decline similar to that documented in the coastal reserve during the past 15 years.

The NROC's stated mission is: "To ensure the persistence of the Reserve's natural communities, including the full spectrum of native plant and animal species, through the protection, study and restoration of native habitats and natural processes."⁵

The terms "study" and "restoration" both fall under the NCCP's *adaptive management* provisions. As set forth in the NCCP/HCP's Implementation Agreement: "Adaptive Management" shall mean a flexible, iterative approach to long-term management of biotic resources that is directed over time by the results of ongoing monitoring activities and other information. Biological management techniques and specific objectives are regularly evaluated in light of monitoring results and other new information. These periodic evaluations are used over time to adapt both the management objectives and techniques to better achieve overall management goals."⁶

The U.S. Department of the Interior has put together a worthwhile, seven-part technical guide to adaptive management that includes the following introductory language: "It is thought by many that merely by monitoring activities and occasionally changing them, one is doing adaptive management. Contrary to this commonly held belief, adaptive management is much more than simply tracking and changing management direction in the face of failed policies, and, in fact, such a tactic could actually be maladaptive."⁷

Among numerous published definitions for the general concept of

adaptive management, Wikipedia's is reasonably complete and concise: "Adaptive management (AM), also known as adaptive resource management (ARM), is a structured, iterative process of optimal decision making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring. In this way, decision making simultaneously maximizes one or more resource objectives and, either passively or actively, accrues information needed to improve future management. AM is often characterized as "learning by doing."⁸

The article further explains that *active* adaptive management involves testing various specific hypotheses to determine which management approach works best, as when a manager tests and compares various restoration techniques on a single weedy hillside. Monitoring and managing bird populations across expansive landscapes would generally use a *passive* approach, described as follows: "Passive adaptive management **begins by using predictive modeling** based on present knowledge to inform management decisions. As new knowledge is gained, the models are updated and management decisions adapted accordingly [Emphasis added]."

It is notable that the NCCP/HCP's definition of adaptive management does not mention modeling, and that modeling played no role setting reserve boundaries. Instead, the reserve design process largely consisted of biologists, planners, and other representatives of various public agencies and private interests poring over the 1991-92 distributions of coastal sage scrub and the three target species and reaching a compact under which most—but not all—of the most important populations of target species would be preserved in a two-

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Figure 2. Photo taken on 15 September 2006 showing cactus scrub at the UC Irvine open space. The view is to the west. Evident in the photo are Coast Prickly-Pear (*Opuntia littoralis*), California Buckwheat (*Eriogonum fasciculatum*), Chalk Dudleya (*Dudleya pulverulenta*), and California Sagebrush (*Artemisia californica*). Also conspicuous are a big new parking lot, the San Joaquin Hills Toll Road, Bonita Creek (on the far side of the toll road), exotic landscaping, and suburban residences. Cactus Wrens thrive at this location yet show no ability to colonize seemingly attractive cactus scrub at Upper Newport Bay, two miles to the west. This suggests very poor dispersal abilities, at least across a landscape intensely modified by humans. Photo by Robert A. Hamilton. Photo by Robert A. Hamilton

part habitat reserve (central and coastal) that represented a compromise acceptable to all parties. The reserve designers possessed relevant information on the locations of “hot spots” for the three target species and for various other sensitive species, but they lacked long-term monitoring data for the target species that might have, for example, tracked cyclical population fluctuations in response to short-term weather patterns, identified locations of “source” and “sink” populations, or observed the long-term responses of populations to large-scale fires. As stated on Page II-298 of the EIR/EIS that covered establishment of the reserve: “The overall strategy of the NCCP/HCP is to provide a viable

ecosystem which minimizes the need for active intervention to support viable populations of the “Target Species.” However, some ongoing active management will be necessary (e.g., for pest control and fire management).”

Thus, the central and overriding prediction of the EIR/EIS preparers—sometimes stated as a *fait accompli*—was that the agreed-upon reserve system would, *with proper adaptive management*, be adequate to ensure the persistence of the Reserve’s natural communities and associated native species over the long term. See, for example, Pages II-295 and II-296 of the EIR/EIS: “Implementation of the subregional adaptive management program

maintains “net long-term habitat value” in the subregion in two ways:

- first, creation of the Reserve System will provide the essential habitat necessary to sustain the “target and Identified Species” within the subregion. [. . .]
- second, significant opportunities for restoration and enhancement have been identified and are created within the Reserve System. [. . .]”

To be fair, the EIR/EIS goes on to acknowledge that “a habitat area’s future suitability may be affected by a number of factors,” including successional dynamics, widespread catastrophic events, and changes in competing organisms. Nevertheless, the language quoted above connotes a level of certainty about the NCCP/HCP’s ability to sustain biodiversity that seems naïve 12 years later, as one of the plan’s three target species flirts with extirpation in both the central and coastal reserves.

Rather than going into details of the monitoring program outlined on Page II-298 to II-302 of the EIR/EIS, let me simply note that the NCCP/HCP’s prescribed monitoring approach did not lend itself toward gathering the depth or breadth of ongoing field data required to develop predictive models or otherwise provide for legitimate adaptive management. Instead, the approach seemed geared toward providing enough ongoing data to show that the NCCP/HCP was meeting its conservation goals. Once biologists started implementing this limited monitoring approach and trying to draw inferences about population trends that could be extrapolated to the two reserves at large, or cull information that could prove useful in an adaptive management framework, the monitoring scheme’s inadequacy was manifest.

Under the guidance of Trish Smith of The Nature Conservancy, the program underwent a thorough re-evaluation and overhaul before the 1999 field season. It is not clear to me that even the retooled and vastly improved monitoring approach would be adequate for use in developing a reliable predictive model for the three target species, but the results obtained between 1999 and 2004 did establish convincingly that Cactus Wrens in the coastal reserve were declining on a scale and following a pattern unlike that shown by Cactus Wrens in the central reserve or by California Gnatcatchers anywhere in the NROC. With an even larger percentage of the central reserve having burned in 2007 than burned in the coastal reserve in 1993, and with the combined number of Cactus Wren pairs in both reserves having perhaps fallen into double digits, it is fair to suggest that wren populations in central and coastal Orange County have entered a period of crisis.

The worst-case scenario that I have described requires consideration of two controversial aspects of the NCCP/HCP that its architects must have hoped would never be invoked. First is the federal government's Habitat Conservation Plan Assurances ("No Surprises") Rule, which was set forth by the Secretary of the Interior on 11 August 1994 and ultimately codified, after additional public review and input, on 23 February 1998⁹. Boiled down to its essence, "No Surprises" means the following: "Once an HCP permit has been issued and its terms and conditions are being fully complied with, the permittee may remain secure regarding the agreed upon cost of conservation and mitigation. If the status of a species addressed under an HCP unexpectedly

worsens because of unforeseen circumstances, the primary obligation for implementing additional conservation measures would be the responsibility of the Federal government, other government agencies, or other non-Federal landowners who have not yet developed an HCP.¹⁰

...
If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, the Services may require additional measures of the permittee where the conservation plan is being properly implemented, but only if such measures are limited to modifications within conserved habitat areas, if any, or to the conservation plan's operating conservation program for the affected species, and maintain the original terms of the conservation plan to the maximum extent possible. Additional conservation and mitigation measures will not involve the commitment of additional land, water or financial compensation or restrictions on the use of land, water (including quantity and timing of delivery), or other natural resources otherwise available for development or use under the original terms of the conservation plan, without the consent of the permittee."

Section 8.9 of the NCCP/HCP Implementing Agreement is long and legalistic, but the gist is that the U.S. Fish & Wildlife Service (USFWS) may reach a finding of Extraordinary Circumstances (now referred to as "Unforeseen Circumstances") if it identifies a "significant and substantial adverse change in the population of an Identified Species [such as the Cactus Wren] within the Central/Coastal Subregion, which was not contemplated by the NCCP/HCP." Before making such a finding, the USFWS must consider

several specified factors, consult with the California Department of Fish & Game, and "consider any responses submitted by any other Parties." If, after completing many steps, the Director of the USFWS determines that a finding of Unforeseen Circumstances is warranted, the terms of the NCCP/HCP may be modified in an effort to provide for recovery of the population(s) in question, and the No Surprises rule is invoked.

Before I am accused of crystal clear hindsight, or of failing to recognize the many valid reasons why this NCCP/HCP turned out the way it did, let me provide the following context for my criticisms.

First, I believe that nearly all who have participated in developing the NCCP/HCP for central and coastal Orange County, and my colleagues who have also participated in its implementation, have done so honestly, thoughtfully, and constructively. At the time the NCCP/HCP was finalized in 1996, I myself would have thought it extremely unlikely that the NROC's Cactus Wren populations could or would collapse as precipitously as they have. I am unaware of any expert on the species or on reserve design who warned that such a rapid collapse was anything but a theoretical possibility.

With regard to predictive modeling, I quote from the Scientific Review Panel assembled by the California Department of Fish & Game to review the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), which was adopted in 2003: "The plan is constrained by data limitations and the need to protect appropriate habitats before they disappear. Many of the most useful models of habitat connectedness,

viability analyses based on metapopulation dynamics, and multiple-species approaches to planning have come only from the theoretical literature and are very recent. Most tests of those ideas are only beginning and largely being undertaken in areas exclusively within federal lands that can be surveyed. Thus, even the concept of “Best Available Science” is difficult to assess. The “best available data” was integrated. The “best available models” could not adequately be parameterized.”¹¹

That such a statement was issued seven years after adoption of the NCCP/HCP suggests that, as a practical matter, predictive modeling probably could not have been “adequately parameterized” for use in designing the reserve system for central and coastal Orange County.

I regard the NCCP/HCP’s land set-asides, conservation plans, and operating endowment as better conservation outcomes than would have been likely to be attained through the project-by-project approach to coastal sage scrub conservation planning that was the previous norm in central and coastal Orange County, and that is still practiced in many jurisdictions in southern California. Because the wren populations in question are classified as part of *Campylorhynchus brunneicapillus anthonyi*, the widespread subspecies found in California’s deserts and surrounding areas, these populations are not, at this time, regarded even as California Species of Special Concern, let alone listed as threatened or endangered. With the “coastal” Cactus Wren’s recognition as target species of the NCCP/HCP and consequent monitoring, we undoubtedly know much more about this bird’s changing status and distribution in Orange County than

we would have otherwise. Furthermore, the NCCP/HCP established a conservation structure that can jump-start the process of population recovery.

Typically, cactus plantings take many years to become usable by Cactus Wrens. Whereas an intensive program of cactus scrub restoration undertaken early in the NROC’s existence might have put managers in a better position to start seeing the wren population recover several years from now, such a program probably would not have helped to stem the decline that has taken place over the past dozen years.

Finally, Cactus Wrens appear to be in decline all along the coastal slope of southern California, from Ventura County southward. These populations were the subject of a regional symposium held by the NROC in April 2008, and since that time a coastal Cactus Wren working group has been convening to start developing a coordinated approach to conserving these populations. Since this is a regional issue, and since Cactus Wrens appear to be doing poorly even in parts of the NROC not obviously impacted by wildfires or other disturbances, it is unclear that even 100% preservation of the habitat that existed in 1992 would have fundamentally improved the current situation.

In light of all that, you may well be asking yourself, “Okay then, what’s this guy’s beef?” My first concern is that the EIR/EIS for the NCCP/HCP for central and coastal Orange County generally seemed to assume that a worst-case scenario for any Identified Species was very unlikely to happen, and yet we all knew (a) that Cactus Wrens were likely to suffer serious adverse effects

from major wildfires, and (b) that such fires become more frequent as human populations increase. In hindsight, it might have been wise to specify some level of contingency funding for stepped-up fire management practices and intensive supplemental cactus restoration projects in case the problems associated with increased frequency and/or extent of wildfire turned out to be more serious than reserve planners hoped and assumed they would.

Another concern is that the bare-bones monitoring program outlined in the NCCP/HCP was inconsistent with the plan’s explicit reliance on “adaptive management” as an important guarantor of coastal sage scrub ecosystem health and functions. The architects of the NCCP/HCP did not realistically determine the breadth and depth of monitoring data that would be necessary to create and sustain a viable adaptive management program, and as a result the NROC’s monitoring budget is chronically underfunded. For example, the NROC stopped funding the reserve-wide, constant-effort mist netting venture after collecting five years of data. With each passing year of operation this long-term data set was becoming a more valuable adaptive management tool, and because the program was being run by part-time interns the costs were relatively low. The NROC may not be “flying blind” in the absence of its long-term banding program, but a potentially valuable piece of navigation equipment has been mothballed for lack of funds.

Finally, one must question whether the Cactus Wren is truly being treated as if it was a listed species in the central and coastal Orange County NCCP planning area. Has the time come for

the USFWS to seriously consider whether a finding of Unforeseen Circumstances might be warranted for the Cactus Wren in the coastal and/or central reserves? While it is true that such a finding would trigger the No Surprises rule, the Federal Register article suggests possible opportunities for the federal government to share the increased costs that would be associated with intensifying Cactus Wren recovery efforts: "Also, nothing in this final rule prevents the Services from asking a permittee to voluntarily undertake additional mitigation on behalf of affected species. While an HCP permittee who has been implementing the HCP and permit terms and conditions in good faith would not be obligated to provide additional mitigation, the Services believe that many landowners would be willing to consider additional conservation assistance on a voluntary basis if a compelling argument for assistance could be made."¹²

Tacitly acknowledged in the above-quoted passage is the notion that the federal government is seldom the only entity with a vital interest in the success of a given HCP. This is the first opportunity for the NROC and its Board of Directors to prove that the NCCP/HCP for central and coastal Orange County can achieve its central conservation goals even when populations of an Identified Species fail to thrive according to plan. Many people and institutions have worked long and hard to bring this plan to fruition; nobody wants to see it fail.

My final point is cautionary. As new conservation accords are contemplated, such as the one that Audubon California and other groups recently signed at Tejon Ranch, it will be important for the negotiating

parties to avoid the temptation to downplay the chances for worst-case scenarios and to realistically calculate the costs of operating a comprehensive monitoring program capable of (a) identifying potentially serious problems promptly and (b) collecting the depth and breadth of information required to avoid or remedy serious problems through true adaptive management.

¹ DeSante, D. F., Pyle, P., and Kaschube, D. 2003. The 2003 Annual Report of the Monitoring Avian Productivity and Survivorship (MAPS) Program at the Nature Reserve Of Orange County. Report dated 30 September 2003 prepared for Nature Reserve of Orange County.

² Hamilton, R. A. 2004. Target Bird Monitoring Study, Nature Reserve of Orange County, 2004. Report dated 3 November 2004 prepared for Nature Reserve of Orange County. Statistical analysis by Martha White, Ph. D., and Karen Messer, Ph. D.

³ Bontrager, D. R., Erickson, R. A., and Hamilton, R. A. 1995. Impacts of the October 1993 Laguna Fire on California Gnatcatchers and Cactus Wrens. Pp. 69–76 in *Brushfires in California Wildlands: Ecology and Resource Management*. J. E. Keeley and T. Scott (eds). International Association Wildland Fire, Fairfield, WA.

⁴ Harmsworth Associates. 2002. Final California Gnatcatcher and coastal Cactus Wren monitoring report for the San Joaquin Hills burn area 2001. Report dated January 2002 prepared for Nature Reserve of Orange County.

⁵ <http://www.naturereserveoc.org/>

⁶ <http://www.naturereserveoc.org/NCCP%20Parts%20I%20&%20II%20-%20Plan.pdf>

⁷ <http://www.doi.gov/initiatives/AdaptiveManagement/documents.html>

⁸ http://en.wikipedia.org/wiki/Adaptive_management

⁹ Federal Register 63:8859–8873.

¹⁰ Federal Register 63:8867.

¹¹ <http://repositories.cdlib.org/ccb/WRC-MSHCP/>

¹² Federal Register 63:8869.

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