

## BOOK REVIEW

**The California Condor: A Saga of Natural History and Conservation**, by Noel Snyder and Helen Snyder. 2000. Academic Press, San Diego. 410 pp., 118 color and 21 black-and-white photos, 22 tables, 8 graphs, 4 maps. Hardback, \$29.95. ISBN 0-12-654005-5.

This nearly folio-sized book of 4¼ pounds is aptly subtitled, given the history of the major study and conservation programs directed toward this species since the 1940s. A prologue tells of the authors' first experience with California Condors and expresses the book's goal, "to give the reader an appreciation of both the basic biology of the condor and the dynamics of condor conservation from a viewpoint mainly inside the conservation and research program." The book is then organized into six "parts," the first of which is "historical and background matters." chapter 1, on "perspectives," summarizes the species' natural history and compares it with that of the Andean Condor and several Old World vultures. Chapter 2 provides an excellent account of the ceremonial and other uses made of California and Andean Condors by native peoples within their ranges.

Part I concludes with the 39-page chapter 3, "Condor Research and Conservation in the Early–Mid 20th Century." Much of this is derived directly from the same authors' 1989 account "Biology and Conservation of the California Condor (*Current Biology* 6:175–267). Some of the text is identical, but other parts are rewritten and updated where appropriate. As in their earlier account, the Snyders divided studies preceding theirs into segments that they now call "eras," each named for one or two of the chief investigators or proponents: Finley (early 1900s), Robinson–Easton (1930s), Koford (the first detailed field study, 1939–46), Miller–McMillan (late 1950s into 1970s), [Fred] Sibley (1966–1969), and Wilbur (1970s). Throughout this chapter, the Snyders trace the developing knowledge of the condor's behavior and ecology, along with changes in ideas as to its apparent decline. Each era is also credited with a special advance in knowledge or a particular emphasis that had a subsequent effect on the effort to conserve the species. Interaction of the sometimes conflicting ideas is discussed freely whenever it seems appropriate, and the authors give their own evaluation of the major advances and diversions. Thus the stage is set for Part II.

This is titled "Struggles to Launch a New Program," and its three chapters are "Battles in the Political Arena," "Africa and Peru," and "Development and Testing of Research Techniques." Noel Snyder, of the U.S. Fish and Wildlife Service, and John Ogden, of the National Audubon Society, were named as joint managers of an expanded condor-conservation program beginning in early 1980. Noel's wife Helen was also involved as an Audubon employee in much of the work of the research center, established in Ventura. Although they left those positions in 1986, and the recovery [advisory] team was subsequently discontinued by the Fish and Wildlife Service, it seems to me the Snyders are the best choice to tell the story of the often controversial efforts to conserve this endangered species, and this book is it!

Chapter 4 details the campaign to establish and expand refuges and wilderness areas for the condor's nesting. The Snyders believed from the outset that the very mobile condors should be studied first by radio-telemetry to discern the foraging range of individuals, and to aid in learning just what factors were involved in their population decline. They describe the controversies they encountered, including a tense meeting at the home of one of the chief proponents of the "hands-off" approach, and a "gag order" from their superiors in the Fish and Wildlife Service that prohibited them from contacting high-level California Department of Fish and Game officials directly. When freer communications were allowed in 1982, a more reasoned plan emerged. A permit issued in 1980 by the California Department of Fish and Game allowed the center to capture and radio-tag 10 birds, with the stipulation that one female be

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retained as a mate for the then lone California Condor in captivity—the first admission by “hands-off” proponents that any efforts should be made toward building a captive population. But after the second chick handled died from stress, the California Department of Fish and Game permit was revoked, and only after two years was a new one issued.

Without a permit to handle any California Condors, Snyder and Ogden went to Peru to observe, and sometimes participate in, research on the Andean Condor, thus learning much about capturing, radio-tagging, and behavior of condors. They also visited European research teams in South Africa, Zimbabwe, and Namibia working with the Cape Griffon and the Lappet-faced Vulture, the latter species showing breeding characteristics similar to the two condors'. Chapter 5, describing these trips, includes some interesting accounts of encounters with local peoples and even a narrow escape from being targets of a victorious but not yet disbanded army unit!

Chapter 6 details the development of techniques for capturing condors (they selected cannon-netting), handling, blood-sampling, and sexing the birds, and radios for tracking of the birds so marked. The excitement attendant on establishing methods that would provide the data needed on the movement and lives of the marked birds comes through very nicely in this chapter.

Part III is titled “Research Results of the New Program.” Its six chapters take up more than 100 pages, organized under censusing, movements and food, nest sites, breeding behavior, breeding effort and success, and mortality. Only a few highlights can be mentioned from this meaty basis for the rescue program that was finally adopted. The use of frequent photos of flying condors proved by far the most reliable tool for counting the number of birds still alive. California Condors obtained little food near their nest areas but traveled great distances to ranch lands around the southern San Joaquin Valley. When nesting, the adults used parts of that foraging range closer to their nest sites, but some young birds roved over the entire range. Characteristics of nest sites of different pairs varied, but most were difficult of access by humans or ground-based predators. Ravens, however, were watchful of many sites and quick to enter for a meal if the egg was left unguarded. Most pairs that lost an egg or young chick readily initiated another breeding effort the same year, but almost always at a different site and often miles away. This was not possible to detect without telemetry. Courtship postures are described, and one photo from the wild and one of a captive pair are included.

Tables provide data pertinent to courtship, copulation, incubation shifts, percentage of daylight hours adults were at or near nest sites, number of feedings of young by male and female parents, pairs breeding in the 1980s and the success of each, and dates when individual photo-documented birds were last seen. These are reported pair by pair or by individual, by means of identification codes of which only two are explained in the book (pp. 213–214). The other codes also probably have a geographic indication and were no doubt left unpublished to minimize potential disturbance when birds were still free-flying and nesting in those areas. Those familiar with California geography can guess at several others, so the continued secrecy may be of questionable value. More disconcerting, however, is the lack of any list of tables in the front of the book. Diligent readers should prepare such a list for themselves as not all of the text references to them are within two or three pages of the table.

Chapter 12 discusses the known and potential causes of death of condors—from shooting, collisions with wires and wind turbines, possible effects of eating poisoned ground squirrels or coyotes, to cyanide guns set for coyote control. Strong evidence is presented that the predominant factor killing wild condors, at least in recent years, has been lead poisoning from bullet fragments ingested with food. The case histories of three radio-marked birds and one other found dead by a ranch foreman build the case like an intriguing detective story. This culminates in a step-by-step description of a January 1984 lab demonstration to skeptical state and federal officials that the last

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bird had, indeed, died from the cyanide–tracerite powder from a coyote-poisoning device. Only then was any restriction placed on the widespread use of such devices in the condors' foraging range.

In part IV, Conservation in the 1980s, chapter 13 surveys several efforts made to improve suboptimal nest sites by altering the slope of the cavity, building an external "porch" where the nearly fledged young could exercise their wings without falling off, by reducing the number of ravens in the area, etc. Of three ways to reduce the likelihood of condor deaths from lead poisoning, neither the conversion of the foraging range into a no-hunting zone nor prohibiting use of lead ammunition by hunters was ever tried, because of bureaucratic hurdles and lack of time. The third method, providing clean lead- and poison-free carcasses for the wild condors to eat, was tried on the Hudson Ranch in southwestern Kern County. But the condors shifted locations when deer-hunting season began in other parts of their range and so continued to eat meat with lead embedded. There is also a list of 30 steps taken from 1937 to 1992, mostly by the federal government, that set aside or improved protection of areas to benefit the California Condor.

Chapter 14, "Formation of a Captive Flock," documents the controversies and slow stages in 1982–84 of this effort, the success in replacement clutching when removal of first-laid eggs of wild pairs was finally allowed and then hatched in incubators, and the questions as to the fraction of the population to which such efforts could be applied. Only after the winter of 1984–85 saw the disappearance of one or both members of all but one of the breeding pairs was the emphasis shifted to rapid development of a captive breeding flock, by taking the nine remaining birds into captivity. Another interplay of opposing views is described without rancor for those who didn't agree with that goal and insisted that at least a few birds be left in the wild. Foremost among these proponents was the National Audubon Society, which sued to prevent the last captures. Most of chapter 15 is devoted to this topic, after precursor events described in chapter 14. This part ends with a summary of the "alternative plan" dependent on captive breeding to preserve the species "near term" but with eventual releases into the wild after safe numbers and genetic variety were in the population and after release techniques had been tested on Andean Condors temporarily released in the area.

In part V, "Restoration," chapter 16 describes the facilities built to house captives and the methods developed to promote pairing and at the same time preserve or even heighten the genetic diversity of this small population. Table 16 (p. 320) shows for each facility the number of mated pairs, eggs laid, and young fledged each year from 1988 through 1998. The overall total, obtained only by adding yearly totals, was 141 fledglings—very impressive from a start of only 9 adults and 18 immatures in 1987! Elsewhere in the chapter results are tabulated by each parent bird, and various comparisons are made of reproductive output with the few pairs followed in the wild (mostly in the early 1980s). Incubation periods averaged 57.2 days, slightly shorter than that of Andean Condors. This chapter also contains a host of other natural history information that would have been extremely difficult to obtain from wild birds even though critical to the planning for their survival.

Techniques and results (through 1998) of "Releases to the Wild" (chapter 17) are described, with several appropriate photos. Results for each of 61 birds released in California and 28 in northern Arizona are summarized in table 22. The gist of the findings is that young raised by captive parents are much better at surviving when free to fly than those that are fed early in life only by "puppets" (gloves of very realistic condor head shapes) operated by hidden keepers. Those that undergo "aversive conditioning" to rectangular human-built structures fare somewhat better than those that don't. Various release locations already tried, and several others with potential, are described. So also is the question of food subsidy and the conditions that might make it work by reducing the likelihood of the birds foraging widely and eating

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carcasses containing lead fragments. The authors give their own recommendations for releases and general captive propagation in this chapter, and those interested in the ultimate survival of the species should read them carefully.

Part VI, "A General Evaluation," includes in chapter 18 the authors' philosophy of how efforts to conserve endangered species in general should be organized, with interplay of private and government units, intensive research and captive breeding if needed, but overall allowing for diversity of input and implementation guided by well-constructed recovery teams. These are distinguished from those that rely just on "recovery plans," many of which have been written with inadequate supporting knowledge and are too detailed to allow for the constant alteration necessary as new facts emerge. The Snyders warn of the danger of goal substitution—of the preservation of recovery programs being substituted for the recovery of the species itself. The chapter ends with nine recommendations specific to the recovery of the California Condor. The authors say, "[we] remain optimistic that unmanaged and viable wild condor populations can be reestablished, but we are deeply concerned about the recent rate of progress toward that goal."

Maybe those who want to know just about the California Condor's natural history, without wading through this history of the research and conservation efforts directed toward its survival, will tire of all the accounts of controversies. However, for those interested in complex species-conservation problems and the associated negotiations and politics, this is a really valuable story. Many additions to the natural history saga are to be found only embedded in the conservation saga that forms the bulk of the book. Most technical aspects of the book's production are also of high quality: heavy glossy paper, attractive layout, superb photos (drawings in two cases where more pertinent), a generous set of acknowledgments (and a special list of credits in front for all the photos), a bibliography of 382 cited references, and a thorough index. I noted only about three typographical errors. In short, anyone interested in the California Condor or in the conservation of endangered species in general should study this book.

*Howard L. Cogswell*