

Like Aldo Leopold, the authors of *People and Forests* believe that, under many circumstances, the local communities that use the land are the best equipped, given proper structures and support, to serve as their own guides and their own leaders in the enterprise of improving land use. *People and Forests* provides clear, incontrovertible evidence that what Leopold advocated does in fact work, and that, with a locally appropriate institutional framework, it can work almost anywhere.

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The California Condor: a Flagship Adrift

The California Condor: a Saga of Natural History and Conservation. Snyder, N., and H. Snyder. 2000. Academic Press, San Diego, CA. 410 pp. \$29.95 (hardcover). ISBN 0-12-654005-5.

The California Condor (*Gymnogyps californianus*) is arguably the most important endangered species to recover because of the extraordinary amounts of time, energy, and money that have been expended to rescue this magnificent bird from the brink of extinction in the most populous U.S. state. Once found along the Pacific coast from Canada to Mexico, only about 30 birds remained in southern California by the late 1970s. In 1980 an intensive field effort was launched jointly by the U.S. Fish and Wildlife Service (USFWS), the National Audubon Society, and several other agencies. In 1982 a captive flock was

started at the Los Angeles and San Diego zoos. A few years later the extreme step of removing the remaining few birds from the wild had to be taken when it became clear that the wild population was declining rapidly and was beyond rescue. The last wild Condor was captured in 1987. Breeding in captivity has been successful, and releases of captive-born young condors to the wild began in 1992.

Noel and Helen Snyder were the biologists largely responsible for designing and implementing the condor field-recovery program from 1980 to 1986. In *The California Condor: a Saga of Natural History and Conservation*, they meticulously document those efforts. The 18 chapters are divided into six sections: (1) "Historical and Background Matters" examines how condors are depicted in human cultures and traces early efforts to study the birds; (2) "Struggles to Launch a New Program" details the political battles that were waged in the early 1980s to conduct the hands-on field research required to restore condors and so many other endangered species; (3) "Research Results of the New Program" presents the major research findings on population size, movements, diet, nesting behavior and success, and mortality; (4) "Conservation in the 1980's" examines efforts to protect habitat, form a captive flock, and remove the remaining adults from the wild before they succumbed; (5) "Restoration" details the extraordinarily successful captive breeding program and far less successful attempts to release condors to the wild; and, (6) "General Evaluation" provides a provocative analysis of the lessons that the condor case study holds for implementing endangered species programs.

This book serves as a shining example of how to use both the declining- and small-population paradigms in endangered species management. Unfortunately, in his seminal paper that defined these paradigms, Caughley (1994) missed key published works and misrepresented "the sorry

story of the California condor" as a case study of how not to conduct field recovery efforts. This book sets the record straight. The declining-population paradigm was the initial basis of creative and dedicated field studies, often conducted under difficult conditions, to determine which factors had caused condors to decline. Time and time again, the view of condors from the armchair proved wrong when confronted with data from well-executed studies, which by necessity were often observational rather than experimental and which examined a broad array of hypothesized limiting factors. Perhaps the most surprising findings were the relatively high nesting success and low adult survival of condors, due in large part to lead poisoning from lead bullets and shot ingested from carcasses. The latter was an entirely unexpected cause of population decline. Data presented on the behavior and demography of wild condors from the 1980s are invaluable benchmarks for comparison with current and future reintroduction efforts. The small population paradigm initially played a smaller role but became more important after condors were brought into captivity. Population-viability models were neither employed nor necessary to evaluate the risks facing wild condors, but the application of a variety of state-of-the-art genetic techniques became central to managing the captive flock.

A detailed treatment is given to the severe problems with reintroduction attempts of captive-reared birds which have emerged over the past decade and currently threaten the success of the program. Releases into southern California and the Grand Canyon have been plagued by lead poisoning from ingested bullets and shot and by extreme tameness of the released birds, which has resulted in repeated vandalism of human property and has posed threats of injury to bystanders. The death rate of released birds from lead poisoning continues to be far too great to allow restoration of a wild population

(see also Meretsky et al. 2000). Moreover, mortality would be far worse if many birds had not been recaptured and given chelation therapy to rid them of lead. Alternative ammunition in the form of a tin, tungsten, and bismuth (TTB) composite have been developed and are currently being tested. They offer real hope for reversing what appears to be the major limiting factor faced by the species.

The other serious hurdle to success is posed by current captive-rearing practices, which have concentrated on maximizing production in captivity by removing eggs after laying and using puppets to rear the chicks instead of allowing their parents to do it. Puppet-reared birds released in California have landed repeatedly on roofs and other human structures in nearby towns, have frequently destroyed property, have sometimes chased people, and have accepted food handouts—behaviors that were not typical of historic condors. This situation is similar to the notorious “problem bears” of Yellowstone National Park. In contrast, parent-reared condors isolated from puppet-reared populations have shown few tendencies to approach humans in the wild. The Snyders recommend changing the captive-rearing approach to maximize production of parent-reared chicks in naturalistic field enclosures completely isolated from human influences, unlike the current cages on zoo grounds. Similar recommendations were made in 1978 by Verner and again in a 1994 workshop convened by the USFWS to solve behavioral problems in released condors. Unaccountably, they have never been implemented, but the need is now undeniable. As is often the case, it’s easier to load the ark than to unload it. The Snyders also make a strong case for removing all misbehaving condors from the wild, because there is no sign that behavioral problems have been disappearing spontaneously or that aversive conditioning has been successful in solving them. Moreover, because condors are highly social, it

is likely that new recruits released to the wild population will learn bad behavior from the birds already in the wild, regardless of what pre-release conditioning the former may be given. Removing all misbehaving condors from the wild and starting over with naïve birds is politically difficult for many recovery-program participants to accept, even though starting over with naïve parent-reared birds will offer a much better chance of achieving normally behaving wild populations than will continuing with current techniques.

The many political impediments to doing the hands-on work required to save endangered species is a recurrent theme throughout the book. The long shadow cast by Carl Koford, who conducted an early landmark study of condors from 1939 to 1946, created an image of the condor as a fragile bird and symbol of the wilderness that nearly prevented the use of modern recovery techniques such as visiting nests to determine their success, radiotelemetry, and captive breeding. During the first year of the Snyders’ work, state permits for intensive field activities were suspended indefinitely after condor chicks turned out to be unusually susceptible to stress from handling by researchers and one died. This one mortality nearly brought the entire recovery program to a premature death almost before it got started, a striking contrast to the recent release program in which condor lives appear to be an expendable resource. A few years later the condor recovery team was prohibited by the USFWS from meeting during crisis times when crucial decisions on recovery directions needed to be made, evidently for fear of what the team might recommend. Soon thereafter, a lawsuit was brought by the National Audubon Society against its former recovery-team partner, the USFWS, over the latter’s decision to remove the last free-flying birds from the wild to build the captive flock. Despite the continuing high risks of mortality from lead poisoning, the

National Audubon Society argued that the birds should be left in the wild because they could act as surrogates to protect habitat.

On an even larger stage, congressional lobbying resulted in the passage of a surprise rider attached to an appropriations bill that authorized payment of several hundred thousand dollars annually to the Peregrine Fund to establish a third facility to breed condors in captivity, bypassing the process of site selection in progress by the USFWS. You can’t make this stuff up! As in any good detective story, just follow the trail of money to see how vested interests can influence recovery recommendations and decisions. And the condor recovery program has involved many millions of dollars. Not since Schaller’s (1993) exposé on the panda have the motives and decisions of a recovery program been made so transparent and carefully evaluated as in this book. The final chapter is a must read for all involved in endangered species restoration.

Laced with strikingly beautiful photographs taken mostly by the Snyders, and written in a highly readable fashion that will appeal to both the lay and scientific reader, this book successfully walks the fine line between a volume that belongs on your coffee table and one that belongs in your research library. After examining the price of comparable or lesser books, I can’t understand how Academic Press could sell such a large and attractive hardback book for only \$29.95.

Unfortunately, the biological and political problems documented in this book continue to trouble recovery efforts for the California Condor, and there are few signs that needed programmatic changes are likely to occur. These problems cannot be expected to disappear unless fundamental changes are implemented in the program. Large amounts of money have been expended, and many individuals have worked hard to breed condors in captivity and to develop techniques for reintroducing them to the wild. Success is po-

tentially achievable, but the current condor release program appears likely to fail unless rearing techniques are changed and an all-out effort is made to eliminate lead contamination threats, for example by adopting TTB ammunition (Meretsky et al. 2000). Sources of lead are as widespread today as they were when the last wild condors were trapped to avert extinction. The success of any reintroduction effort is contingent on controlling the limiting factors that originally caused extirpation. This is as true for the condor as

for any other endangered species. If efforts to reduce lead threats and produce naturally behaving condors are not undertaken, the release program can be expected to consume conservation funds indefinitely and may never rise above a "put and take" operation. It will be only a matter of time before public support wanes.

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Errata

The erratum of the table of bighorn sheep population estimates for California (volume 14: 1565-1566) itself had errors. The 1994 estimate for the Orocopia Mts. should be 101-150 rather than >250; the 1940 estimate for the San Ysidro Mountains should be 18 rather than 19; the 1979-1985 estimate for the Tierra Blanco Mts. should be "transient" rather than 0; the zero values for the Laguna Mts. (1979-1985), McCoy Mts. (1957), and Old Dad Mts. (1994) should be changed to blank (no estimate); the "70-72" data column heading should be 70-74; and the following reference should have been included as a source of those data: R. A. Weaver. 1975. Status of the bighorn sheep in California. Pages 58-64 in J. B. Trefethen, editor. *The wild sheep in modern North America*. Winchester Press, New York. We thank V. C. Bleich for bringing these errors to our attention.

In the April 2001 issue (Volume 15) of *Conservation Biology* the corrections R. H. Podolsky made on his page proofs were not incorporated by the assistant production editor (pp. 412-423). Substantive changes that should have been made were 1) p. 413, first column, fifth line up from the bottom: *causing an* should be *can*; 2) p. 417, first column, seventh and ninth lines up from the bottom: *increased* should be *decreased* (seventh line) and *decreased* should be *increased* (ninth line); and 3) p. 417, second column, seventh line up from the bottom: WS is white spot.

There is an error in the table of contents in the June 2001 (Volume 15) issue of *Conservation Biology* attributable to a typesetting problem. Five papers are listed as Reviews. However, only the paper by Welsh and Droege is actually a review. The papers by Davradou and Namkoong, and Noss, are actually Essays, and papers by Thibault and Blaney, and Hancock et al. are Conservation in Practice. Andayani et al. and DiMauro and Dietz are Research Notes, and the papers by Pearman and Young are Comments.