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## Two Evaluations of Condor Recovery

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**Return of the Condor: The Race to Save Our Largest Bird from Extinction.**—John Moir. 2006. Lyons Press, Guilford, CT. 223 pp., 40 color photographs. ISBN-13: 978-1-59228-949-3; ISBN-10: 1-59228-949-5. \$24.99 (cloth).

**Condors in Canyon Country.**—Sophie A. H. Osborn. 2007. Grand Canyon Association, Grand Canyon, AZ. 149 pp., 56 color photographs, one black-and-white photograph, two color maps. ISBN-13: 978-0-938216-87-2; 978-0-938216-98-8 (paper). \$18.95 (paper).

Roughly 150 California Condors (*Gymnogyps californianus*) are now flying free in released populations in California, Arizona, and Baja California, and breeding has commenced in most populations. But are these various populations truly viable, and can the species now be considered recovered in the wild? The conclusion to be drawn from these two recent books is that despite considerable progress and a widespread public perception of success in release efforts, substantial hurdles still exist before the species attains self-sustaining wild populations behaving in a normal, species-typical way.

John Moir's *Return of the Condor* and Sophie Osborn's *Condors in Canyon Country* do an excellent job of introducing the reader to the basic biology of the species and to the major accomplishments and still-pending issues in condor conservation. Both are well-written and well-illustrated presentations for the general public, and both exhibit a high level of accuracy in discussing what has become a very complicated recovery effort. Both are also very enjoyable to read, presenting much new information that will be unfamiliar even to those who have followed the progress of condor conservation closely. It is clear from both volumes that views on recovery of the condor remain as diverse today as in the past and, while great strides have clearly been made, the best strategies for achieving what everyone would agree are properly behaving and viable wild populations are still under vigorous debate.

Osborn's book is mainly a very personal and colorful account of the release program in Arizona's Grand Canyon, a program in which she was one of the primary participants for four years, starting in 2000. Nevertheless, she also brings in much of the important data on the historical wild population in California and on other release programs in California and Baja California. John Moir is a science journalist with a long-standing interest in the condor, based in part on his early experiences growing up in the vicinity of the Sespe Condor Sanctuary. His book

is a more general account, emphasizing the historical development of knowledge about causes of the condor's decline, but also considering the tribulations of releases at some length. Both books treat various program participants and their sometimes opposing points of view in an admirably generous way and give the reader an informative look at the inside of what may be the most complex recovery effort ever undertaken for any endangered species.

Few would dispute that true recovery of the condor must involve the achievement of wild populations with demographic viability, such that net reproduction and survival allow the populations to expand without continued releases and without excessive management efforts. But perhaps just as important is achievement of populations that are behaving in a manner that is close to typical for the historic wild population. As detailed in these books, the recovery program for the condor has been making advances on both these fronts, but is still experiencing some difficulty in both sectors.

Demographically, the released populations are still suffering from major mortality threats, especially lead poisoning (evidently stemming mainly from ingestion of ammunition fragments in carrion). At the same time, both reproductive effort and success have not yet risen to historic norms, even in released populations that have had substantial numbers of adult individuals for a considerable number of years. Releases of California Condors have now been underway for some 15 years. By comparison, recent reestablishment efforts for the similar-sized Eurasian Griffon Vulture (*Gyps fulvus*) in France achieved a rapidly self-expanding wild population in about five years. Why these two species have differed so greatly in ease of reestablishment is not discussed specifically in either book, but might repay exploration in future accounts.

In part, the current demographic difficulties of released condor populations appear to be associated with behavioral aberrations. Unlike condors historically, released condors have generally exhibited a strong attraction to humans and human structures, and this attraction appears to underlie many of their difficulties, such as relatively high rates of collisions with overhead wires. As another example, releases in southern California have experienced a near total failure to fledge young because of parents feeding their chicks hard trash objects, such as pieces of glass and bottle caps, often leading to impaction of the digestive tracts of the nestlings and subsequent starvation. The causes of this problem have not been surely identified, but may involve condors mistaking human artifacts for the bone fragments necessary in their diet, coupled with excessive exposure to such artifacts as a result of the birds' attraction to civilized areas. No effective solution to this problem (which was not a difficulty experienced by the historical population) has yet been achieved, although efforts are currently underway to see if shifting food-provisioning sites to locations far from populated areas and far from nesting areas might lessen the problem. Other behavioral concerns involve occurrences of abnormal reproductive associations of birds in groups larger than pairs and a high rate of pair

break-up in pairs that do form—phenomena that were also unknown in the historic wild population.

What has been causing the behavioral abnormalities and how to correct them are matters of continuing debate. Sophie Osborn places emphasis on the importance of continued aversive training of released birds and reports that clear progress has been achieved in reducing adverse interactions of Grand Canyon birds with people by efforts to “haze” condors landing on buildings or closely approaching people. Nevertheless, the Grand Canyon birds still show some attraction to developed areas on the South Rim of the canyon and elsewhere, are still sometimes being offered food by passing tourists, and are still being observed in occasional incidents of vandalism of human property (e.g., condors recently entering and destroying furniture inside a home in southwestern Utah—see the *Salt Lake Tribune* of 31 May 2007). Such problems have now been chronic for many years, and it is not clear just how much can be achieved by aversive training.

John Moir calls attention to the possibility that early rearing experiences in captivity may be the crucial factor in producing abnormal behavior of released condors, despite the concerted efforts of zoos to minimize exposure of captive condors to people. In this context he cites the recommendation of the San Diego Zoo’s Bill Toone for initiation of releases in which birds are not reared in zoo environments but in naturalistic field enclosures, are always parent-reared, and fledge in a relatively species-typical way unassociated with condors other than their parents. Until such releases are tried in condor-free regions where released birds cannot subsequently learn bad behavior by contact with other birds already released under other rearing protocols, it will probably remain unclear just how many of the recent behavioral problems are simply due to rearing and release procedures. Although the condor is indeed a species capable of learning new behavioral patterns, trying to correct bad behavior once it is established may be a less successful way to proceed than avoiding abnormal early experiences in the first place. One rearing practice that is of particular concern is the standard practice that has been followed of socializing condor nestlings with other nonparental condors prior to release (fledging), something that is not known to happen in nature. Abnormal early socialization is known to cause subsequent reproductive problems in other species.

The various problems encountered to date in releases and potential solutions to these problems form a substantial fraction of both books, and, while it appears that some current difficulties have so far been resistant to correction and some potential approaches to solving problems have not yet been tried, other problems appear at last to be heading for solution. Indeed, there are now finally some hopeful signs that perhaps the most vexing problem of all—lead poisoning—may be on the verge of correction through prospective actions of the California State government and other agencies to require hunters to use nontoxic ammunition in condor range.

Should the lead poisoning threat be fully countered, this would not only remove what is generally

believed to be the most important mortality threat in the wild, but would also remove the need for repeated trapping and handling of released birds to check blood lead levels and chelate contaminated birds. Reductions in trapping and handling alone could be a very positive development in reducing the level of condor adaptation and attraction to humans. What is more, a full solution to the lead problem should ultimately remove the need for “clean” food subsidies in release efforts, leading to much more normal foraging behavior and greatly enhancing the potential for separating released populations from their association with civilized areas.

Neither Moir nor Osborn counsels despair regarding condor conservation, and both emphasize the positive progress that has been made and may be possible for the future. I recommend both of their books highly to those wishing to obtain a basic appreciation of condor biology, the history of condor conservation efforts, and a recent update on developments in release efforts.—NOEL F. R. SNYDER, P.O. Box 16426, Portal, AZ 85632. E-mail: nfrs16426@vtc.net