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Population Ecology of the Cooperatively Breeding Acorn Woodpecker. Walter D. Koenig and Ronald L. Mumme. 1987. Princeton University Press Monographs in Population Biology Number 24, Princeton, New Jersey. 435 pp.; \$55.00 cloth, \$16.95 paper.

This book is one of a series of works published by Princeton University Press describing the results of long-term research projects on some of North America's most unusual birds. These projects depend heavily on color-banded populations, so the volumes should be of wide interest to banders. In the present book, Koenig and Mumme summarize their efforts to measure the causes and consequences of group living in the Acorn Woodpecker.

Acorn Woodpeckers are found in oak woodlands from California, Arizona and New Mexico south through Central America to Columbia. In most of these areas, the annual cycle of the woodpecker is closely tied to the production of acorns. Probably the most celebrated feature of this bird is its habit of storing acorns in thousands of specially-drilled holes in sections of dead tree limbs (or telephone poles) called granaries. The birds store acorns in the granaries during the fall for later use. Acorn Woodpeckers remain in flocks year round. Flock activities are centered around the granaries, which must be defended from acorn predators (including other Acorn Woodpeckers). In the spring one to four males and one to five (rarely three) females breed in each flock. Pairing behavior has not been observed, and breeders may mate with all opposite-sex members of the flock. Thus, it is usually impossible to determine the exact parentage of many of the young. All breeding females lay eggs in the same nest, and all flock members help raise the brood. In addition to the breeders, up to 10 nonbreeders can act as helpers-at-the-nest. The birds do not always cooperate, however; for example, breeding females may throw eggs out of the nest in order to increase the relative proportion of their own eggs in the final clutch.

To measure the consequences of these behaviors, and to try to understand how such a system might evolve, Koenig and Mumme studied a color-banded population of Acorn Woodpeckers at Hastings Reservation, Monterey Co., California. The banding at Hastings was started in 1972 by Michael and Barbara MacRoberts, and has been continued first by Koenig and then by Mumme, an example of research cooperation that parallels the woodpeckers themselves, since high quality granaries are often passed down between generations within a single woodpecker lineage. Since 1972, over 800 birds have been banded, including 447 nestlings.

The book seeks to describe the basic characteristics of the population, and how these are affected by variation in both the environment and the composition of the flocks. Koenig and Mumme calculate and discuss reproductive success (both annual and lifetime), survivorship, dispersal of young, and construct a basic life table for the Hastings population. Due to the variation present in the data, the writing tends to be somewhat complicated. For example, the breeding groups at Hastings can be composed of monogamous pairs, polygynous groups of one breeding male and several females, polyandrous groups of one female and several males, and extended groups of multiple males and females (called polygynandry, try that one out on your SCRABBLE board), all in the same year. Describing how survivorship and other characteristics vary for birds in all these categories requires a certain amount of complexity. This is balanced by useful summaries at the end of each chapter which re-emphasize the main points. A basic knowledge of simple statistics, and a willingness to attempt to understand (or skip over) mathematical equations are helpful, especially in the latter chapters. Mathematical equations are used in the final chapters to show how various components of reproductive success and survivorship were calculated.

Since the results are too complex to summarize in this review, I will describe one of several paradoxes presented by Koenig and Mumme as an example of the extent to which they have analyzed patterns shown by the woodpeckers. The major result of the study was the importance of the stored acorns to almost all facets of the woodpeckers' life. The acorn stores were strongly correlated with the number of fledglings produced, survivorship of the adults, group size and other variables. Flocks that deplete their supply of acorns prior to the end of winter often deserted their territories. Flocks without acorn stores at the start of the spring usually did not attempt to breed. Thus, it was a surprise to see that stored acorns constituted only a minor portion of the diet. Koenig and Mumme combined a chemical and energetic analysis of the acorns with estimates of the energy needs of the birds at different seasons. They found the stored acorns in an average granary represented only 14 days worth of energy per bird. Obviously, the woodpeckers cannot be using the granary stores as their primary food source throughout the entire winter. The stores apparently represent an emergency supply to be used to survive winter crunches, to get the breeders to an energetic threshold necessary for breeding, or when the adults need a boost while supplying nestlings with insects. Koenig and Mumme state the paradox this way (pp. 100-101): "We know of no comparable example in which reproductive success is so strongly dependent on a food supply that is

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not only separated temporally from the breeding season by at least 6 months, but also apparently supplies only a small fraction of the overall diet."

My criticisms of the book are few. The variation in the population substantially reduces sample sizes for many of the analyses, with the result that many of the statistical tests are of borderline statistical significance. One must take care in describing "trends" apparent in non-significant data. Koenig and Mumme acknowledge that their analysis is weakened by both the immigration of un-banded breeders from outside the study area (which reduces the sample of birds of known history) and the uncertain paternity of young in each nest (which forces them to assume that both paternity and maternity are shared equally among all breeders). Perhaps new genetic techniques now being developed will help with the latter problem. In general, the Hastings study is a solid, and sometimes spectacular, research effort.

Banders involved in long-term research on single species will be interested in this book for comparative purposes. Koenig and Mumme draw from the literature on cooperative-breeding Florida Scrub Jays, Green Wood-Hoopoes and Red-cockaded Woodpeckers to compare with their study. They do less to compare their data with more "normal" (for lack of a more unbiased term) species. This complaint is hardly their fault, however. Little comparative data exist outside of Van Nolan's monumental work on Prairie Warblers (1978, Ornithological Monographs 26), where are the established banded populations of such common species as Downy, Hairy, Red-bellied or Ladder-backed Woodpeckers or Northern Flickers to provide comparative data? Acorn and Red-cockaded Woodpeckers have been subjects of extensive, long-term studies. We need more work done with the more "normal" species also. If normality is too boring to captivate one's interest, species such as Red-headed and Lewis' Woodpeckers have special behavioral or ecological attributes which would also yield fascinating comparative data.

Finally, Princeton University Press should be commended for publishing a fine series of volumes in which some of the best ornithologists in North America summarize their long-term research. Koenig and Mumme's book joins Golen Woolfenden and John Fitzpatrick's volume on the Florida Scrub Jay, Peter Grant's book on Darwin's finches, and Jerram Brown's text on helping behavior which drew heavily from his studies on Gray-breasted Jays; All describe classic studies of long-term ornithological research, and all are very affordable. One waits eagerly for the next installment.

John B. Dunning, Jr.

The Atlas of Breeding Birds in New York State. Robert F. Andrie and Janet R. Carroll, Editors. 1988. Cornell University Press, 740 Cascadilla Street, P.O. Box 250, Ithaca, New York, 14850. 551 pp., illustrated. \$29.95; map overlays \$9.95.

This is the latest book in a new generation of wildlife volumes documenting the up-to-date status and distribution of all breeding species of birds within a geographical area. It is without a doubt another milestone! It is an easy to use, generously illustrated reference work that gives instant information on 238 birds native to New York State. The supplementary acetate map overlays show; 1) counties/federal and state wildlife areas; 2) ecozones; 3) elevations; 4) river systems; 5) forest types; 6) forest cover; 7) mean temperature (F°) in July; 8) mean annual precipitation (inches).

The enthusiasm and energy put forth by all concerned is very evident as a thread of quiet pride runs through the entire book. Four thousand volunteers contributed 200,000 hours as they collected data. The species accounts are very well written by 19 dedicated people on 238 native birds. They are composed of individual text with a map for each species confirmed as breeders. Habitat, a short life history, an analysis of distribution, a summary of nesting information, the historical status where appropriate and banding data when available are included.

The Editors have meticulously and exhaustively researched and referenced this mass of data. They have produced what may well be the most up-to-date and complete summary of New York's breeding bird life for decades to come! Hopefully this carefully written and constructed analysis will serve as *THE* baseline and benchmark against which future data will be compared.

A little background is in order here:- the very first book of this kind - the "Atlas of Breeding Birds in Britain and Ireland" was published in 1976 and served as an inspiration and a model, followed since by several European countries, Natal in Africa and Australia.

The first North American atlas project to be modeled after the British was Maryland in 1971. In 1974, Massachusetts started their project and 1976 witnessed the start of the Vermont project with the field work completed in 1981 and their atlas published in 1985. Ontario's atlas appeared in 1987.

When I was in school, my parents had a summer home in the finger lakes region of New York and the Eastern Bluebird was a nesting bird on our many acres. The property was sold in 1960, and I lost contact with my favorite bird - the bluebird. It was good to read in the species account that in 1986 7,068 bluebirds fledged from 2,138 nest boxes. The Eastern Bluebird is here to stay!

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Now we come to the ever present question - is THIS book worth the price? The answer is a resounding YES! It cannot be equalled in its thorough treatment of the geographic distribution of the state's avian population.

The pen and ink drawings are superb and are rich with feeling.

Bob Arbib gave inspiration, love and direction to all concerned with this volume. It is indeed sad he did not live to see his ideas come to fruition, and I can only say - Bob you can look down with a great deal of pride on a project well done! You gave of your best to this book and will be remembered and missed by all of us who knew you.

Mrs. Roger W. Foy

Birds of the Okanagan Valley, British Columbia.

Robert A. Cannings, Richard J. Cannings and Sydney G. Cannings. 1987. Royal British Columbia Museum, Victoria. xx + 420 pp. \$27.50 Cdn. paper; \$37.50 Cdn. cloth.

British Columbia's Okanagan Valley has long been popular with Canadian naturalists for its special blend of alpine, southern, northern, eastern and western species. Its rich avifauna has been matched by a rich record of published and unpublished notes by such notable naturalists as Major Allan Brooks, James Grant, C. De B. Green, James A. Munro, Percy A. Taverner, and many others, including the remarkable Cannings family. This book started in 1973 as a summary of observations over 25 years by the authors and their parents, but mushroomed to include published works and 126,000 observations of 460 observers as recorded in the Royal British Columbia Museum's vertebrate record file, the B.C. Nest Records Scheme, B.C. routes of the Breeding Bird Survey, and many previously unpublished notes from the diaries of Brooks, Grant, Green and Munro. After a preface and foreword, the first 64 pages of main text introduce the reader to the geography, vegetation, history and avifauna of the region, including geographical origins of the birds, ornithological history, a check-list and a summary of the chronology of the birds by two-week periods. The checklist consists of 303 species confirmed by September 1986. These 303 species are then treated in detailed species accounts (pp. 65-381), followed by an appendix of 21 species considered hypothetical (believed accurate, but lacking substantiating detail), an appendix of a further ten species considered incorrect, a list of museum locations of known specimens,

a summary of Breeding Bird Survey data, a list of scientific names of plants and non-bird animals mentioned in the text, a detailed gazateer, and an 11-page list of literature cited. Further information on eight species fills an addendum page which brings the valley list to 307 confirmed and 18 hypothetical species. An index to bird species concludes the book.

In a book that is so thoroughly documented, banding is surprisingly seldom mentioned. However, this appears to result from lack of banding (or at least published banding results), rather than from lack of use of banding data by the authors. The appearance of several Trumpeter Swans marked in Tweedsmuir Provincial Park in February "sometime in the mid-1950s" at Vaseaux Lake the same year is specifically mentioned as the only information available on the movements of swans using the valley, while patterns of California Gull movements are inferred from coastal recoveries of Saskatchewan-banded birds. Mist-netting activities were responsible for producing the only spring record of Boreal Owl and for documenting the Chestnut-sided Warbler as an "accidental" in the area. J.T. Fowle's 1940 note in *News from the Bird Banders* is mentioned in reference to a nestling Western Wood-Pewee banded in 1934 that returned to nest on top of its old nest in 1935, but the return of a Song Sparrow for four winters in a row documented in the same note is not mentioned.

"Birds of the Okanagan" is thoroughly referenced and profusely illustrated with graphs, tables, photographs and drawings (many by Allan Brooks). Biological notes are scattered throughout, many involving poorly studied species at their northern limits. The text flows easily, often humorously, and is a pleasure to read. The proof-readers seem to have worked overtime, as I could find only a very few typographical errors, and only one reference (Munro 1937, p. 359) is missing from the literature list, while the dates of only two references differ between the text and the literature cited (Bent cited incorrectly as 1941 once on p. 252, but correctly as 1942 several times on the same page, and Austin and Low cited as 1931 on page 261, but 1932 in the literature list). The reference to Bent (1958) on page 349 also appears to refer to his 1968 work. These trivial errors aside, this book is difficult to criticize. It will take its place among "must" reading on the ornithological book shelves of serious observers anywhere in north-western North America, and elevates local bird books to the level of provincial or state treatises.

Martin K. McNicholl

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Distributional Checklist of North American Birds. David DeSante and Peter Pyle. 1986. Illustrations by F.P. Bennett, Jr., and Keith Hansen. Artemesia Press, P.O. Box 119, LeeVining, CA 93541. 456 pp., 51 black-and-white drawings. Hardbound \$30.00.

The purpose of this book is three fold: 1) it provides a compendium of state and province bird lists developed according to identical criteria, set down by the authors and applied uniformly to each state of the U.S. and each province of Canada; 2) to provide a convenient means for birders to keep all of their North American state and Canadian life lists in a single volume no matter how large and bulky, and which allows for up-dating indefinitely into the future; 3) to provide up-to-date status and abundance classifications. The cut-off date for inclusion of data was 28 Feb. 1985, which already makes the data out of date. There is an Addenda starting on page 433. An "ERRATA" list of 23 errors is included where it is suggested one should make the corrections directly into your copy.

If you can wade through 16 pages (8 1/2x11") of introduction, you then come to the real purpose of said book - listing your birds. Part I has Native Populations and Part II Introduced Populations. This separation is between populations not species. For example, Northern Cardinals are included in both Parts I and II because of introduced populations in southern California and Hawaii. This can be confusing to novice birders. For some whose eyesight is not as good as it should be, the codes in the matrix set-up are very hard to read. Larger type would have helped.

A matrix system consists of over 60,000 cells, half filled with codes, such as summer resident & confirmed breeder (S), non-breeding summer resident (S*) winter resident or visitant (W), to name but a few. There are 23 codes followed by what is called the "qualifier." This is designated as -q. This means the "species is included on this checklist on the basis of a documented (in writing) and generally accepted sight record, but is not included on the Official List for the state or province because of different acceptance codes." In reality, what the authors have done here is set up their own code system. Rather than printing these on the front and back end papers, it would have been prudent to print them on stiff paper (that could be used as a book mark) and enclosed this with the book; This would save constant returning to the introduction or end papers for an explanation of the codes. There are 10 status codes; with 4 suffixes; 5 abundance codes with 3 prefixes, and of course the -q.

I can understand why some records committee people in some states and provinces would be extremely upset because the authors have seen fit to include species that are considered "hypothetical or provisional" on their state lists. What the authors tried to do here was set up criteria for inclusion of species that can be applied uniformly to all states and provinces. This is notably next to impossible even with the authors' qualifier -q. There is plenty of supposition in this book! Whenever they include a species that was under review they used the -q again to indicate a documented record exists and I quote . . . " and we believe, will be accepted;" the authors' own words from page 5 of the introduction. What happens if a particular bird is not accepted by a given state or province?

The authors have brought all species under one group of 23 codes. Until representatives of all state and provincial records committees in the U.S. and Canada can sit down and establish definable criteria for accepting documented records, the authors are presumptuous in applying all species to their own set of standards.

975 birds arranged in A.O.U. Check-list order are treated. The information from 156 individuals, each of whom is expert in his/her region is to be commended.

If a bander is interested in keeping track of the first time he/she bands a given species, this could fill the bill. There is enough room under each state to fill in the date.

\$30.00 is a high price to pay for what ultimately will be nothing more than a checklist. Abundance figures are from 1985 and before, and, some could very well be out of date at this writing. There are several books on the market for listing one's birds, and they are a lot cheaper than \$30.00.

Mrs. Roger W. Foy