LITERATURE REVIEW

Compiled by B. Baker

This section is compiled from journals which are often not available to non-professional ornithologists in Australia. The following criteria are used to select papers for review:

- They relate to species which occur in Australia and its Territories;
- They provide details of techniques and equipment that may be of use in Australia;
- They provide details of studies that may be of general interest to Australian ornithologists.

Journals perused: *Emu* **98, 99;** *Journal of Field Ornithology* **69;** *Journal of Wildlife Management* **62, 63;** *Proceedings of 22nd International Ornithological* Congress; *Trends in Ecology and Environment* **13;** *Wildlife Research* **25;** *Wildlife Society Bulletin* **26.**

TECHNIQUES AND ANALYSES

KERNELHR: A program for estimating animal home ranges. Erran Seaman, D., Griffith, B. and Powell, R. A. (1998). *Wildlife Society Bulletin* **26:** 95–100. (Kernel methods are state of the art for estimating animal home range area and utilization distribution (UD). The KERNELHR program was developed to provide researchers and managers a tool to implement this extremely flexible set of methods with many variants. The program runs interactively or from the command line on any personal computer (PC) running DOS. KERNELHR provides output of fixed and adaptive kernel home-range estimates, as well as density values in a format suitable for in-depth statistical and spatial analyses. An additional package of programs creates contour files for plotting in geographic information systems (GIS) and estimates core areas of ranges.)

Biases in bird strike statistics based on pilot reports. Linnell, M. A., Conover, M. R. and Ohashi, T. J. (1999). *Journal of Wildlife Management* **63:** 997–1003. (Collisions between birds and aircraft are a concern because they threaten human safety and result in costly repairs. Most data on bird strikes have been provided by pilots and may be incomplete or biased. To assess whether bird strike statistics derived from pilot reports are biased, we compared the number of pilot-reported bird strikes at a Hawaiian airport during 1990–94 to the number of bird strikes obtained for regular runway searches for dead birds. We documented 526 bird strikes, of which only 25% were reported by pilots. Pilot reporting rates (percentage of all strikes reported by pilots) varied by species involved, number of birds struck, season, time of day, location on the runway during the landing phase, and the bird's mass. Reporting rates were not, however, correlated to size of the bird. Pilot reporting rates were independent of wind speed, wind direction, and percent cloud cover, and reporting rates were similar during landings and takeoffs. We found that bird strike statistics derived from pilot reports were biased. A sole reliance on such data can lead to incorrect conclusions and may cause airports to select inappropriate measures and times to reduce bird strikes.)

The insignificance of statistical significance testing. Johnson, D. H. (1999). *Journal of Wildlife Management* **63:** 763–772. (Despite their wide use in scientific journals, statistical hypothesis tests add very little value to the products of research. Indeed, they frequently confuse the interpretation of data. This paper describes how statistical hypothesis test are often viewed, and then contrasts that interpretation with the correct one. I discuss the arbitrariness of P-values, conclusions that the null hypothesis is true, power analysis, and distinctions between statistical and biological significance. Statistical hypothesis testing, in which the null hypothesis about the properties of a population is almost always known a priori to be false, is contrasted with scientific hypothesis testing, which examines a credible null hypothesis about phenomena in nature. More meaningful alternatives are briefly outlined, including estimation and confidence intervals for determining the importance of factors, decision theory for guiding actions in the face of uncertainty, and Bayesian approaches to hypothesis testing and other statistical practices.)

Influence of point count length and repeated visits on habitat model performance. Dettmers, R., Buehler, D. A., Bartlett, J. G. and Klaus, N. A. (1999). *Journal of Wildlife Management* **63:** 815–823. (Point counts are commonly used to monitor bird populations, and a substantial amount of research has investigated how conducting counts for different lengths of time affects the accuracy of these counts and the subsequent ability to monitor changes in population trends. However, little work has been done to assess how changes in count duration affect bird-habitat models developed from point count data. In this paper, we present an empirical comparison of the performance of bird-habitat models, which were developed via logistic regression analyses based on point count data from 3-, 5-, 10-, and 20- min counts. We also investigated the effect of the number of visits to each survey point on model performance. We assessed model performance on the basis of R2- values and percent concordant pairs. A positive relation between model performance and count duration was most apparent for species with relatively low detection probabilities, whereas performance of models for species with relatively high detectability was fairly consistent or even decreased as count duration increased. Our results suggest that while some improvement in bird-habitat models for species with low detection rates can be achieved via longer point counts, the modest gains in model performance should be weighed against the increased time and effort required to conduct longer counts. Models based on data from a single visit to each point did not perform as well as models based on multiple visits. However, we found little or no improvement in model performance when the number of visits per point increased from 2 to 3. We suggest that current recommendations on point count durations (5 or 10 min) will provide adequate data for modelling bird-habitat relations.)

Tracking migrant songbirds with stable isotopes. Kelly, J. F. and Finch, D. M. (1998). TREE *Trends in Ecology and Environment* **13:** 48–49. (Abstract not available.)

EFFECTS OF MARKING AND RESEARCH TECHNIQUES

Evaluation of transmitter attachment techniques on growth of wild turkey poults. Hubbard, M. W., Tsao, L. C., Klaas, E. E., Kaiser, M. and Jackson, D. H. (1998). *Journal of Wildlife Management* **62:** 1574–1578. (We compared the effects on growth of backpack-mounted and surgically implanted radiotransmitters used as marking techniques in studies of wild turkey *Meleagris gallopavo* poult survival. We applied repeated-measures ANOVA and Bayesian analysis to evaluate the null hypothesis that marking technique did not affect growth. Growth in body mass was similar among treatment groups. We did, however, find differences in wing-growth rates among treatment groups. The control group had the highest wing-growth rate, the backpack group had the lowest growth rate, and the surgical implant group was intermediate. Latex backpack harnesses also caused physical developmental problems that would have negatively biased wild poult survival estimates in the field. Surgically implanted transmitters affected wing growth less than the backpack harnesses and are therefore recommended for attaching transmitters to wild turkey poults.)

Effects of radio transmitters on migrating wood thrushes. Powell, L. A., Krementz, D. G., Lang, J. D. and Conroy, M. J. (1998). *Journal of Field Ornithology* **69:** 306–315. (Wood thrushes *Hylocichla mustelina* can successfully carry a transmitter during migration with no detectable negative effects. The continued use of thigh-harnesses to attach transmitters is recommended, but the use of 5 kg test strength braided Dacron line is encouraged because it rots in less than 9 months.)

BIRDS AND LANDSCAPE ECOLOGY

Roads and nest predation: an experimental study in a modified forest system. Lindenmayer, D. B., Pope, M. L. and Cunningham, R. B. (1999). *Emu* **99:** 148–152. (To explore issues associated with the potential effects of roads on wildlife, levels of predation of eggs in artificial nests set at varying distances from roads into stands of forest were examined. The rate of egg predation from artificial nests did not vary in response to the distance from roads into the forest or the types of forest that surrounded roadways. In addition, the species of plant in which a nest was positioned was not significant.)

The effects of forest clearing and regeneration on the fauna of Wivenhoe Park, south-east Queensland. Green, R. J. and Catterall,

C. P. (1998). *Wildlife Research* **25:** 677–690. (The effects on fauna of clearing, fragmentation and regeneration of eucalypt forest and woodland were investigated in a former cattle-grazing area of south-east Qld. The abundance of species and higher taxa was compared among four major habitat types: interior of relatively mature forest, interior of earlier stages of regenerating forest, cleared pasture, and abrupt edges between the forest and cleared land. Cleared sites supported lower numbers of avian species and of total birds, than at any other habitat in winter, with a similar but non-significant trend in summer. Forest interior sites showed a significantly higher abundance of several avian species than that any other habitat, but noisy miners and Torresian crows were significantly more abundant in edge sites than in forest interior sites. Sites of low regeneration were chiefly utilized by birds characteristic of forest edge. Many decades of regeneration would appear to be necessary before many forest-dependent species are adequately supported in these areas.)

Predation of artificial nests in a fragmented landscape on the New England tablelands of New South Wales. Taylor, L. N. H. and Ford, H. A. (1998). *Wildlife Research* 25: 587–594. (Artificial cup-shaped nests containing 1 quail egg and 1 plasticine egg were placed in small (20 ha), medium-sized (90 ha) and large (350 ha) remnants of eucalypt woodland. Nests were placed near edges and centres of the two larger sites, the small site was considered all edge. Overall, 69% (659/960) of nests were preyed upon within 4 days, reflecting high predation pressure. More nests were preyed upon in the medium sized than in the larger or smaller sites. Loss was no higher at the edge than in the centre overall, though it was significantly higher at the edge than the centre of the largest site. Main predators were identified as being large and medium-sized birds. The results provide only weak support for the hypothesis that habitat fragmentation has increased predation on open nests. It is possible that nest predators and their impact have increased regionally, rather than locally. Habitat degradation may also lead to higher predation of nests, due to loss of understorey and an increase in nest predators.)

Fire and birds in a Western Australian heathland. Brooker, M. G. (1998) *Emu* **98:** 276–287. (The complexity of avifaunal response to fire is illustrated using long-term demographic data for passerines at Gooseberry Hill, Western Australia, that has experienced an average of one fire every two years in the 41 years since 1957. During a 26 year period from 1972 to 1997, when three major and eight minor fires occurred, the density of Splendid fairy-wrens *Malurus splendens* ranged from a high of 105 adults/100 ha in 1985 to 20 adults/100 ha in 1994. Both of these extremes followed periods of similar fire frequency (five fires in preceding 10 years). However, in the ten years before 1985, all fires were of limited extent, whereas the ten year period up to 1994 began with an extensive 100% hot summer burn, closely followed by two smaller re-burns. The aftermath of the major fire in 1985 and subsequent minor fires had a major detrimental impact on populations of splendid fairy-wrens, western thornbills *Acanthiza inornata,* scarlet robins *Petroica multicolor* and yellow-rumped thornbills *Acanthiza chrysorrhoa*, all of which declined during the following eight years, even though the vegetation had nearly recovered to 1985 conditions. This continued decline in bird densities was related to increased mortality of breeding birds and lowered productivity, due to temporary cessation of breeding by western thornbills and to increased nest predation and parasitism in fairy-wrens. In addition, the broad extent of the 1985 fire reduced opportunities for immigration from elsewhere. Understanding this avifaunal response to fire would not have been possible without an extended period of study. Any fire management plans based on just two or three years data might have yielded recommendations quite detrimental to the fauna they were designed to protect. For the species and habitats studied here, small patchy burns on a well-spaced rotational basis are to be preferred over regular fuel reduction burning of entire habitats, particularly in isolated areas where immigration is unlikely to occur. Once an entire area has been burnt, special care should be taken to prevent a re-burn within at least the next 8–10 years.)

AUSTRALIAN SPECIES

Ecology of the monsoon-rainforest endemic rainbow pitta Pitta iris. Zimmermann, U. M. (1996). Ph.D. Thesis, Northern Territory University, Darwin.

The effect of annual rainfall on the survival rates of some Australian passerines. McCleery, R., Yom-Tov, Y. and Purchase, D. (1998). *Journal of Field Ornithology* **69:** 169–179. (The survival rates of 18 species of wide-ranging Australian passerines were calculated by using recapture data provided by the Australian Bird Banding Scheme (ABBBS) for birds older than one year. On average, birds living in relatively lower rainfall areas (<760 mm annually) lived longer than birds living in higher rainfall areas (>760 mm). Out of 18 species examined, only three did not conform with this general trend.)

Bringing home the bacon: potential energy return from prey and central place foraging in a willie wagtail *Rhipidura leucophrys*. Maxwell, M. and Calver, M. C. (1998). *Emu* **98:** 62–65. (Observed breeding willie wagtails feeding on grasshoppers and recorded the handling times for the parent bird feeding on particular prey instars. From these observations the authors determined the most energetically rewarding prey size for the parent to eat itself rather than transport to the young.)

Roosting of non-breeding regent honeyeaters *Zanthomyza phrygia*. Oliver, D. L. (1998). *Emu* **98:** 65–69. (Records communal roosting at two sites during the non-breeding season.)

SEABIRDS

Seabird mortality on longlines in Australian waters: a case study of progress and policy. Gales, R., Brothers, N., Reid, T., Pemberton, D. and Baker, G. B. (1999). S12.1 in, Adams, N. J. and Slotow, R. H. (eds). *Proceedings of 22nd International Ornithological* Congress, Durban. Birdlife South Africa: Johannesburg. (Seabird bycatch arising from longline fishing is known to kill tens of thousands of seabirds each year, and is now acknowledged as representing the most pervasive threat to seabirds, particularly albatrosses, causing widespread declines in populations across the world. However the extent of seabird mortality is poorly known for most of the worlds longline fisheries. Information on bird bycatch in the Southern Oceans is best known for the Australian and New Zealand regions. The 10 year evolution of the seabird bycatch issue in the Australian Fishing Zone (AFZ), where the magnitude of the impact of longline fishing on seabirds was first documented, is presented as a case study. Most of the birds killed in the tuna longline fishery operating around Australia are albatrosses, including species recently listed as threatened and endangered. Analyses of the trends of seabird catch rates in the AFZ by Japanese longliners over 10 years show an apparent fall from the 1988 bycatch figure of 0.4 birds/1 000 hooks to levels of between 0.1 to 0.2 birds/1 000 hooks. Based on current fishing levels, these recent rates equate to between 1 000 to 3 500 birds being killed year. Although the initial fall in bycatch rate was achieved rapidly, the rate has plateaued, or risen slightly since then, indicating that there may have been changes to fishing practices or equipment which are detrimental to efforts to minimize seabird bycatch and/or adoption of mitigation methods has been slow. This is disturbing, given that awareness of the seabird bycatch issue has risen rapidly in ten years. In analysing seabird bycatch data it is important to understand the limitations of observer derived data sets. In particular, large amounts of data are necessary to gain clear insights into the suite of species impacted by a fishery, and the effect of different fishing gear, environmental variables, and the mitigation measures employed. In many cases, it is unlikely that such data will be available for a fishery. To overcome some of these problems, we recommend the retention of all seabird carcases for accurate identification and processing of samples, and also a pragmatic approach to the assessment and implementation of mitigation measures. The implementation and efficacy of the existing mitigation measures are discussed, together with the approach taken by Australia in preparing a Threat Abatement Plan to mitigate the threat posed to seabirds by oceanic longline fishing. In recognizing the need for international action to address the decline in albatross populations, the Australian Government is pursuing such action through international fora such as the Convention for Conservation of Migratory Species of Wild Animals, the Ecologically Related Species Working Group of the Commission for the Conservation of Southern Bluefin Tuna and the IMALF of the Convention for the Conservation of Antarctic Marine Living Resources.)

Post-breeding flight to Antarctic waters by a short-tailed shearwater *Puffinus tenuirostris*. Nicholls, D. G., Stampton, P., Klomp, N. I. and Schultz, M. (1998). *Emu* **98:** 79–81. (Reports the tracking of a short-tailed shearwater during the start of post-breeding migration from French Island in Victoria to the Antarctic divergence region (63 degrees south), ranging west from 146 to 120 degrees E.)