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: Animal Behaviour 54, 56; Auk 114; Biological Conservation 88; Bird Study 43, 45; Emu 98, 99; Journal of Wildlife Management 62, 63; Pacific Conservation Biology 4; Pavo 36; Polar Biology 26; Wildlife Research 25; Wildlife Society Bulletin 26.

SOCIAL BEHAVIOUR

Laying order affects incubation duration in the Black Kite Milvus migrans: experimentally delaying hatching age strongly Vilaudd, J. (1987) Auk 114(2): 192–199. (Variation in the duration of the incubation period of Black Kites Milvus migrans was studied with respect to laying order, egg size, clutch size, and timing of the start of incubation. The author estimated the duration of the incubation period and the effect of the order of incubation by experimentally delaying the start of the incubation. Egg mass and clutch size had no clear effect on incubation duration. First-laid eggs in clutches where the start of incubation was delayed had the longest incubation periods. Hatching in these experimental clutches occurred in the reverse order to that of laying. High environmental temperatures during the period that eggs were maintained unincubated prolonged the duration of the incubation. Third-laid eggs in clutches where the start of the incubation had been advanced had the shortest incubation periods.)

WATERBIRDS

Does available foraging area, location or colony character control the size of multispecies Egret colonies. Baster, G. S. and Fairweather, P. G. (1998) Wildlife Research 25: 23–32. (The available area of saltmarshes proved to be a significant predictor of colony size for great, Intermediate and Little Egrets Ardea alba, A. intermedia and Egretta garzetta. Saltmarshes may be stable, long-term feeding habitats for these three native aquatic feeders, but not for the territorially feeding Cattle Egret Ardea ibis. Nest numbers of this latter species were related positively to the area of saltmarshes, and negatively to latitude, suggesting that nest numbers of this exotic species may be influenced by climate, with proximate factors such as colonial nesting with the three native species also being important. Because of the numerical dominance of cattle egrets, the numbers of nests of all species followed the same pattern as that for Cattle Egrets.)

GENERAL INTEREST

Seasonal changes in diet of pied currawongs Strepera graculina at Wollongong, New South Wales. Wood, K. A. (1998). Emu 98: 157–170. (Data on the diet of pied currawongs Strepera graculina were acquired from incidental records from 1984 to 1996 and 165 hours of observation at four nests. In the non-breeding season, fruit from native and introduced trees was the major component of diet. In the breeding season, breeding currawongs switched to a diet consisting mostly of insects (91% by weight) before eggs were hatched and mostly of nesting and juvenile birds (55% by weight) when feeding their own nestlings. Estimated food consumption rates were 0.56 g per currawong-hour (parents only) for insect prey in the incubation period and 0.67 g per currawong (parents and nestlings) for passerine prey in the nestling period. During a breeding episode, a breeding pair of currawongs can capture up to 2,000 g of young passerines. The method of dismembering prey is described.)

Impact of environmental lead pollution on the physiology of birds. George, J. C. (1998). Pavo 36: 1–14. (Studies on the effects caused by environmental lead pollution in the wild and on the effects of experimentally induced lead toxicity in captive wild birds, are reviewed with a view to obtaining a better understanding of the effects of lead toxicity on birds, the sites of action and the mechanisms involved in the physiology of the avian body.)


TECHNIQUES AND ANALYSES

Development of playback census methods for storm petrels Hydrobates pelagicus. Ratcliffe, N., Vaughan, D., Whyte, C. and Shepherd, M. (1998). Bird Study 45: 302–312. (The factors affecting the probability of nest site attendance and response to playback were examined on Moussa, Shetland, to develop a standard technique for censusing storm petrels using diurnal playback. Nest site attendance by breeding birds peaked at 90 per cent during July. Site attendance by non-breeding birds was much lower at 15 per cent and this increased as the season progressed. The average laying dates at colonies throughout Britain and Ireland were in late June, but those at Moussa were on average two weeks earlier, and at Inish Glora one week later. Site attendance was highest in mid July and so this represents the best time of year to conduct playback censuses at colonies in Britain and Ireland. Rates of response to playback of the male purr call were highly variable, with evidence for effects of the environment, colony location, playback equipment and year. This suggests that the application of a single correction factor to playback survey data collected at different colonies is likely to result in serious errors in estimation of population status. It is recommended that the probability of detecting a nest is examined during each survey so that a colony-specific correction factor can be applied to the census data.)

Autocorrelation of location estimates and the analysis of radiotracking data. Otis, D. L. and White, G. C. (1999). Journal of Wildlife Management 63: 1039–1044. (The wildlife literature has been contradictory about the importance of autocorrelation in radiotracking data used for home range estimation and hypothesis tests of habitat selection. By definition, the concept of a home range involves autocorrelated movements, but estimates or hypothesis tests based on sampling designs that predefine a time frame of interest, and that generate representative samples of an animal’s movement during this time frame, should not be affected by length of the sampling interval and autocorrelation. Intensive sampling of the individual’s home range and habitat use during the time frame of the study leads to improved estimates for the individual, but use of location estimates as the sample unit to compare across animals is pseudoreplication. We therefore recommend against use of habitat selection analysis techniques that use locations instead of individuals as the sample unit. We offer a general outline for sampling designs for radiotracking studies.)

Wood duck eggshell membranes predict duckling numbers. Davis, J. B., Kaminiski, R. M. and Stephens, S. E. (1998). Wildlife Society Bulletin 26: 295–301. (The inner layer of avian eggshells is composed of 2 membranes; 1 of these becomes exposed after hatch and enables estimation of number of young. The authors counted the number of wood duck Aix sponsa eggshell membranes to estimate number of hatched ducklings. Number of membranes counted within 24 hours after hatch was a reliable predictor of ducklings produced.)

On the use of demographic models of population viability in endangered species management. Beissinger, S. R. and Westphal, M. I. (1998). Journal of Wildlife Management 62: 821–841. (Examines why demographic models should be used cautiously in Population Viability Analysis (PVA) with endangered species. Reviews the structure, data requirements, and outputs of analytical, deterministic single-population, stochastic single-population, metapopulation, and spatially explicit models. Predictions from quantitative models for endangered species are unreliable due to poor quality of demographic data used in most applications, difficulties in estimating variance in demographic rates and lack of information on dispersal (distances, age, orientation of movement patterns). Unreliable estimates also arise because stochastic models are difficult to validate, environmental trends and periodic fluctuations are rarely considered, the form of density dependence is frequently unknown but greatly affects model outcomes, and alternative model structures can result in very different predicted effects of management regimes. It is suggested that PVA 1. evaluate relative rather than absolute rates of extinction, 2. emphasize short-time periods for making projections, 3. start with simple models and choose an approach
that data can support. 4. use models cautiously to diagnose causes of 
decline and examine potential routes to recovery, 5. evaluate cumulative 
enduring functions and alternatives reference points rather than extinction 
rates, e. g. examine risk of subpopulation persistence and demographic currencies sparingly. Links between recovery options and 
PVA models should be established by conducting field tests of model 
assumptions and field validations of secondary model predictions.)

EFFECTS OF MARKING & RESEARCH TECHNIQUES

Effects of radiotransmitters on survival and reproductive success of 
Wildlife Management 63: 1044–1051. (Because of the recent decline in 
gray partridge Perdix perdix populations in northern France, we 
conducted a field study in 1993–97 by using radiotelemetry to examine 
mortality causes. We investigated the effects of radiotransmitters on 
survival, reproductive success, and body mass of gray partridge. We 
captured 260 hens in spring 1995, 99 in autumn 1995, and 358 in spring 
1996 and tagged them with a 10 g necklace radiotransmitter. We found 
no effects of radiotag on survival (P = 0.191), reproductive success 
(P = 0.375), and body mass (P = 0.990) in spring 1995. In contrast, 
reverse effects were observed in spring 1996 on survival (P < 0.001), 
reproductive success (P = 0.006), and body mass (P = 0.013). The 
postrelease effect on survival observed in spring 1996 varied among 
populations (P < 0.001), between radio types (P = 0.036), and with 
regard to body mass at time of capture (P = 0.046). The differences 
observed between years and across study areas were correlated to 
weather and predator abundance but not to habitat features we measured. 
Our findings suggest that radiotelemetry data should be carefully 
interpreted with regard to potential radiotag effects, all the more 
that these effects are influenced by environmental conditions.)

Coloured leg bands affect male mate-guarding behaviour in the 
Behaviour 54: 121–130. (Free-living male Luscinia s. svecica with 
ornamental bands guarded mates less and sang more than controls with 
non-ornamental bands.)

Is penguin banding harmless? Froget, G., Gautier-Clerc, M., Le Maho, 
penguins are banded annually worldwide, even though little is known 
about the potential impact of these flipper bands. In this paper, the 
possible effect of banding on the survivorship, breeding frequency and 
other ecological factors on king penguins was investigated. The 
extended laying period (4–6 months) of the king penguin allows 
observation of non-lethal effects that could influence the time of 
laying and thus the reproductive success. Three hundred and eighty-three 
breeding king penguins on a colony on Possession Island, Crozet 
Archipelago were either single or double flipper banded. The results 
show that the returning birds were laying late the following breeding 
season, and that double banded birds lay significantly later than single 
banded birds. Furthermore, our data suggest a lower return rate for 
double banded birds than for single banded birds (45% as opposed to 
70%). The low numbers of single banded birds, when combined with 
the return rate, to an interannual survivorship estimated to be 96.5 per cent, 
also raises questions concerning the potential impact of single banding.)

Effects of implanted radiotransmitters on captive mourning doves. 
Schultz, J. H., Bermudez, A. J., Tomlinson, J. L., Firman, J. D. and 
1451–1460. (Previous mourning dove telemetry studies using transmitter 
attachment has found the technique to be relatively short term (<10 weeks), and that transmitter harnesess possibly have deleterious 
effects on doves. To improve attachment methods, we developed and 
refined surgical techniques for implanting subcutaneous and intra-
abdominal radiotransmitters with external whip antennas in mourning 
doves, and determined physiological and pathological responses to the 
Transmitter implants. We used a captive colony of 200 wild caught doves 
to develop and test procedures for subcutaneous implants (SC1), 
subcutaneous surgeries without implants (SC2), intra-abdominal implants 
(IA1), intra-abdominal surgeries without implants (IA2), and a control 
group without surgeries or implants (CNT). 20 males and 20 females 
were assigned to each experimental group. Surgeries for IA1 took less 
time than SC1 surgeries. Heterophasy lymphocyte ratios showed that IA1 
and IA2 doves had higher (P = 0.024) post treatment changes compared 
with SC1, SC2, or CNT groups. At 4-6 days post-surgery, 153 of 160 
doves with surgical treatments showed closed or healed surgical sites 
with no complications. At 14 days post treatment, 34 (87%) SC1 
implants were located in the thoracic aorta. Gross necropsy findings at 
10 weeks post surgery found that 36 of 39 (92%) SC1 and 36 of 39 
(92%) IA1 implants showed little or no tissue response to the implants. 
Functioning transmitters began failing 2 weeks post treatment, and 85% 
were not working at 10 weeks post treatment. Our data suggest 
subcutaneous implants with external antennas were a better alternative 
compared to intra-abdominal implants with external antennas, but further 
testing is needed to compare subcutaneous implants to conventional 
attachment techniques.)

POPULATION MONITORING

The use of constant effort mist-netting to measure between-year 
changes in the abundance and productivity of common pterodactyls. 
142–156. (The Constant Effort Sites (CES) Ringing Scheme of the BTO 
aims to provide annual measures of change in the abundance and 
productivity of common breeding passerines in scrub and wetland 
habitats in Britain and Ireland. Changes in the sizes of the annual 
catches, from a set of standard mist nets operated during 12 summer 
visits, are combined across sites to produce estimates of the percentage 
change in adult and juvenile numbers. The proportion of juveniles in 
the catch is used as a relative measure of breeding productivity. Methods 
are presented for calculating standard errors of between-year changes 
in both adult and juvenile catches, and changes in the proportion of 
juveniles. Present levels of precision are summarized and predictions 
are made concerning likely improvements in precision from a larger 
CES Scheme. For most of the species considered there was little 
evidence that between-year changes in catches of adults at CE sites have 
different or correspond with those experienced by the proportion of 
juveniles. Present levels of precision are summarized and predictions 
are made concerning likely improvements in precision from a larger 
CES Scheme. For most of the species considered there was little 
evidence that between-year changes in catches of adults at CE sites have 
different or correspond with those experienced by the proportion of 
juveniles. Present levels of precision are summarized and predictions 
are made concerning likely improvements in precision from a larger 
CES Scheme.)

Long-term changes in the abundance of small passerines in Britain 
and Ireland as measured by Constant-Effort mist-netting. Peach, W. 
(For most species examined, long-term changes in adult catches were 
similar to changes in territory counts on Common Bird Census plots, 
suggesting that standardised mist-netting is a reliable method for 
assessing extensive changes in songbird populations.)

BIRDS AND LANDSCAPE ECOLOGY

Radio-tracking revealed home ranges of black-breasted button-quail 
Turnix melanogenister in remnant vine scrub between hoop pine 
Emu 98: 171–177. Home range estimates ranged from 2.2 to 
6.1 ha. (Home ranges overlapped considerably (both within and between 
especies). Birds were found solely within microphyll vine forest 
and sooty bellied within the vegetation within the range of surrounding 
cultural land or young hoop pine plantation, although elsewhere in the region birds have been observed in older hoop pine plantations and a closed eucalypt forest with a well developed understory.)

Influence of the noisy miner Manorina melanogaster on avian 
diversity and abundance in remnant grey box woodland. Grey, M. 
4: 55–69. (The abundance of an aggressive honeyeater, the noisy miner 
Manorina melanogaster, was reduced at four small grey box 
Eucalyptus microcarpa woodland remnants by experimental removal. 
The diversity and abundance of small insectivorous and nectarivorous 
birds increased at three of the four sites (relative to matching control 
sites) over the 12 months following the removal of noisy miners. These 
results, taken together with those from three earlier experiments where 
the abundance of noisy miners was reduced in mugga ironbark E. 
sideroxylon woodland remnants, demonstrate that noisy miners affect 
avian diversity and abundance by aggressive exclusion of other species. 
In five out of seven experiments, noisy miners did not reduce the small 
woodland remnants during the ensuing twelve months. When noisy miner 
abundance was reduced, increased populations of small insectivorous 
and nectarivorous birds used small degraded woodland remnants. Colonizing 
populations of small birds have the potential to reduce insect infestations 
and may assist in the recovery of dieback-affected woodland remnants. 
Reducing the abundance of noisy miners in remnant eucalypt woodlands 
may also be a useful, short-term measure which could assist in the 
recovery of threatened or endangered bird species.)

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CONSERVATION

The Rufous Bristlebird, *Dasyornis broadbenti*, at the eastern edge of its range: selected aspects of distribution, habitat and ecology. Peter, J. M. (1999). *Emu* 99: 9–14. (The Victorian subspecies of the rufous bristlebird is classified as rare. It is mostly found in coastal areas from west of Port Phillip Bay to the mouth of the Glenelg River near the South Australian border. In the eastern part of its range, it mostly inhabits coastal scrub, the structure and floristic diversity of which are discussed. Populations in this area are threatened by fragmentation of habitat as a result of residential development, leaving them vulnerable to the effects of wildfire or longer-term change of climate.)

The importance of behavioral studies in conservation biology. Sutherland, W. J. (1998). *Animal Behaviour* 56: 801–809. (The exciting research developments in animal behaviour over the last two decades have had a negligible impact on conservation. I list 20 subjects in which the study of animal behaviour can make a significant contribution to conservation. Behaviour may in itself be worth conserving. I also suggest how behavioural ecologists could become more involved in conservation.)

The importance of insects and lerp in the diet of juvenile regent honeyeaters, *Zanthomyza phrygia*: implications for the conservation of an endangered woodland bird. Oliver, D. L. (1998). *Wildlife Research* 25: 409–418. (Insects were the most common dietary items fed to juveniles (53% of items identified), followed by lerp (26.5%) and nectar (20.5%). Nestlings were fed mostly insects (58% of feeding), and carbohydrates (nectar and lerp) made up the rest of the diet. Fledglings were fed mainly carbohydrates while protein from insects was the other major component. The study highlights the importance of lerp and insects in the diet of juvenile regent honeyeaters, and the diversity of plant species on which their parents foraged. The importance of insects and carbohydrates other than nectar needs to be recognised in development of conservation strategies for the species.)

AUSTRALIAN SPECIES

Faithfulness to breeding site and birthplace in Noisy Friarbirds, *Conopophila albogularis*, Ford, H. A. (1998). *Emu* 98: 269–275. (Noisy friarbirds are migratory near Armidale, arriving in August and departing by the end of April. Annual survival of adults is 89 per cent, with adults returning to the same breeding sites in subsequent years. In some cases individual birds use similar, even identical, nest sites over several years. Some, probably most, individuals do not breed every year, but nevertheless return to their breeding sites. In contrast, only one bird fledged at the site has returned in later years to breed.)

Nesting biology of the Golden Bowerbird, *Prionodura newtionia*, endemic to Australian upland tropical rainforest. Frith, C. B. and Frith, D. W. (1998). *Emu* 98: 245–268. (Nearly 20 pairs of birds were colour banded on the Casuarina campus of the NT University, where they occupied territories of 0.17–0.47 ha all year round. Six of 48 birds survived five or more years, one being nine years old at the time of writing. Males were larger. Breeding was recorded in every month of the year. Both sexes participated in nest building, and incubation and nestling periods each lasted 14 days. Clutch size was usually two (mean 2.1). Four broods were common, and two pairs successfully raised five broods in one season.)

SEABIRDS

Movements of seabirds banded at MacLeann and Moutier Cays and Sandbanks No. 7 and 8, Northern Great Barrier Reef, Australia 1979–1998. Dobbs, K. (1999). (Report to the Raine Island Corporation and the Queensland Parks and Wildlife Service (unpublished). From 1979 through 1985 849 birds of three species were banded at Moutier Cay (also known as Pandora Cay), MacLeann Cay, Sandbank No. 7 and Sandbank No. 8; 720 brown boobies, 54 masked boobies and 75 sooty terns. Twenty birds have been recaptured away from these locations. Distances travelled ranged from 265 km (32 km from Daru, PNG) to 3 800 km (Tuvalu). Countries where banded birds have been found include Indonesia (1), PNG (18) and Tuvalu (1). Six (0.7%) banded at Moutier Cay have been recaptured in subsequent surveys of the island: 5 brown boobies and 1 masked booby. Four masked boobies originally banded at Raine Island have been recaptured at Moutier Cay.)

Movements of seabirds banded at Raine Island, Northern Great Barrier Reef, Australia 1978–1997. Dobbs, K. (1998). Report to the Raine Island Corporation and the Queensland Dept of Environment (unpublished). (From 1979 through 1987 7 080 birds of 17 species were banded at Raine Island: these included 1 947 brown boobies, 2 007 masked boobies, 420 common noddies, 196 black noddies, 1 greater frigatebird, 321 least frigatebirds, 13 herald petrels, 522 red-footed boobies, 860 red-tailed tropicbirds, 524 wedge-tailed shearwaters and 75 sooty terns. Eighty-seven birds have been recaptured away from this location. Distances travelled ranged from 100 km (Wallace Island) to 4 000 km (Tuvalu). Countries where banded birds have been found include Australia (12), Caroline Islands (1), Indonesia (1), Kiribati (1), PNG (69), Solomon Islands (2) and Tuvalu (1). 1 079 (15%) birds banded at Raine Island have been recaptured in subsequent surveys of the island: 91 brown boobies, 3 herald petrels, and 627 masked boobies, 65 red-footed boobies, 232 red-tailed tropicbirds. Of the 1 079 birds recaptured, 791 have been recaptured once, 195 twice, 67 three times, 20 four times, 4 five times, 1 six times and 1 bird seven times. Four masked boobies originally banded at Raine Island have been recaptured at Moutier Cay.)

New Zealand black-browed Albatross, *Diomedea melanophris imparipeda*, and grey-headed albatross, *D. chrysostoma*, banded at Campbell Island: recoveries from the South Pacific region. Waugh, S. N., Sagar, P. O. and Ford, H. A. (1998). (Albatrosses banded at Campbell Island, New Zealand have been recovered at a very low rate over 30 years. From 24 000 NZ banded black-browed albatrosses *Thalassarche melanophrys*, 77 birds have been recovered from beaches and vessels around the south-west Pacific Ocean. The seasonal distribution of juvenile, sub-adult, and adult NZ black-browed albatrosses is described, and the incidence of recoveries from vessels and beaches is examined. Sub-adults were more susceptible to capture on vessels than other age-classes, whereas juveniles were found more frequently on beaches than by other means. The proportion of adult birds recovered from vessels indicated that they associate with fisheries more commonly in winter than during the breeding season. Recoveries were restricted to Australasian and western South Pacific waters. One grey-headed albatross *Thalassarche chrysostoma* was recovered from 9 000 birds banded.)

Sexing little penguins, *Eudyptula minor*, from Cook Strait, New Zealand, using discriminant function analysis. Renner, M. and Davis, L. S. (1999). *Emu* 99: 74–79. (The influence of environmental variables and mitigation measures on seabird catch rates in the Japanese tunalongline fishery within the Australian Fishing Zone, 1991–1995. Brothers, N., Gales, R. and Reid, T. (1999). *Biological Conservation* 88: 85–101. (Long-term fisheries observer data were used to analyse the influence of a range of environmental variables and mitigation measures upon catch rates of seabirds in the Japanese pelagic longline fishery. In the AFDI seabirds were most likely to be caught on longlines that were set in summer, in southern areas of the zone, and during daylight hours. However, interpretation of changes in catch rates resulting from the use of mitigation measures or from weather effects was problematic due to the interrelationships between the many measured factors. Interpretation and accurate assessment was further complicated by ongoing changes to fishing practices and equipment, and due to changes to the priority that fisheries observers placed on the collection of seabird data. The data relating to factors affecting seabird bycatch which is currently collected incidentally by fisheries observers is not sufficiently robust to allow confidence in statistical assessments alone to examine the efficacy of mitigation measures. Dedicated observations may allow for more confident determination of the reasons why seabirds were or were not caught, and to what degree mitigation measures are effective. The use of these observations in combination with the analyses suggested seabird bycatch rates may be lowered by the use of bird lines, bait throwing machines and thawed baits. However, appropriate use and deployment of these measures are critical if they are to be effective. Further work is required to better understand the effect of these measures, and their effect upon the catch rate of target and non-target species.)