CSIRO DIVISION OF WILDLIFE RESEARCH 1970-72

The C.S.I.R.O. Division of Wildlife Research has published summaries of its work from 1970/72. Much of this research work has been carried out in Western Australia and, with no apologies for adopting a parochial approach, these summaries are reproduced below:

EMU

Field work on the emu (*Dromaius novaehollandiae*) at Mileura Station, Western Australia has continued. The picture that emerges is of the emu as a successful breeding animal in the arid zone. Wherever additional water points have been provided as a result of pastoral settlement, emus have increased in number many times compared with their population in unsettled areas. The importance of water to the species is indicated by the fact that emus drink freely even in periods of low temperature with night minima below 0°C.

In good years the increase in numbers of emus on sheep and cattle stations can be so great that they run short of food in ensuing years. It appears that this food shortage is relative rather than absolute and depends upon dominant birds maintaining large territories that contain all the food, whereas subordinate birds can hold only territories without food. This situation is being examined in detail in a small part of the original study area, where an intensive study of the bird's breeding biology has begun.

Food shortages are most acute in winter when the birds are dependent upon green herbs and grasses. The germination and growth of these depend, in turn, on recent rain, whereas the spring and summer food supply of seeds and fruits of shrubs is generated from rains many months before. Not only is food most likely to run short in autumn and winter but days are shorter and colder then, so that although more food is needed to maintain body temperature, there is less time to collect it and in a dry season, the small quantity of food is more widely scattered. Under these conditions many emus move over long distances.

The birds normally move south-west in the winter, reaching the farming areas in September and October. This south-westerly movement brings the birds into the region of regular winter rainfall but they do not stop moving as soon as they reach abundant green feed. It appears that although shortage of food may be a factor in initiating these movements, abundance of food is not the only factor which stops them. This situation is also to be investigated in the intensive study at Mileura.

A movement out of the farming areas towards the north-east has been observed in most summers, particularly those in which a cyclone has passed through the pastoral areas. Such a movement brings the birds into areas in which grass is germinating after cyclonic rain.

Much attention has been given to the temporal and spatial distribution of rainfall and its effects on emu biology, but recently it has become clear that there are large differences in ambient temperature between different parts of the study area, and that these may have far-reaching effects on the ecology of emus. It appears that the ambient temperatures by the creeks, where most of the rainfall is concentrated and where most of the food grows, particularly in dry years, are more extreme both in winter and summer than in the upland areas. The difference is of the order of 7 to 8 °C and could be significant in relation both to heat stress in summer and cold stress in winter. Since the birds breed in winter, cold stress might be especially critical for newly hatched chicks. This situation will be investigated in the intensive study now in progress.

Field experiments to capture live emus have been conducted with the drug alphachloralose. The drug was presented to the birds in drinking water and proved effective, especially in narcotizing half-grown chicks which could accommodate a dose rate three to four times larger than adult birds. Experiments are continuing, and the drug seems a promising alternative to pursuing the birds with a Landrover. Captive birds are being maintained at the Division's laboratory at Helena Valley, where three pairs are now breeding.

In addition to the immediate practical results that stem from the study of a pest species it is becoming increasingly clear that the study of emus is the study of a highly successful animal living in an environment where sheep and cattle are far from successful animals. Some of the insights into how the emu is successful in the arid zone could give useful leads for better stock management and land usage in the area.

WEDGE-TAILED EAGLE

The field work which started in 1967 in Western Australia in the western (Rawlinna) and eastern (Carnarvon) parts of the pastoral zone has continued.

Reproduction

The density of breeding birds on the study areas is as follows:

Site	Land Use	Area (Square miles)	Breeding Density (Square miles per occupied nest)				
			1967	1968	1969	1970	1971
Carnarvon	Sheep	250	27	36	50	36	36
Rawlinna	Sheep	160	....	41	41	*	82
,,	Cattle	150	....	....	21	*	*
,,	Unoccupied	210	....	16	*	*	*

* No occupied nests in area.

While eagles breed more consistently at Carnarvon than on the unoccupied Rawlinna study area, productivity as measured by the number of chicks banded per square mile per year is the same for both areas during the four-year period 1968–71. Whereas two fledglings per nest has been a common occurrence at Rawlinna, it is rare at Carnarvon where there has been only one record where both eggs of a clutch hatched.

Eagles of breeding age at Carnarvon appear to hold territories throughout the year but do not attempt to breed every year. Rawlinna eagles vacate the census area completely during dry periods.

Data collected so far from the agricultural areas show that eagles breed successfully in this zone.

Food

Analysis of food remains collected from nests at Carnarvon indicated that eagles utilise a large range of prey species in the breeding season. Analysis of pellets collected at other times of the year showed a similar number of food sources.

Rabbit density as measured by spotlights and warren counts remained low on all Rawlinna study areas until spring, 1971 when a significant increase occurred on the cattle area. Numbers of rabbits in this area were subsequently reduced by an outbreak of myxomatosis.

Birds (especially *Corvus spp.* and several species of Psittaciformes) constitute an important food source for eagles during the nesting period in the agricultural zone of Western Australia. The remains of a great-winged petrel (*Pterodroma macroptera*) were found at a nest near Corrigin, 125 miles from the nearest coastline.

Movements

A further 96 nestlings and adults were banded during the last two years and the majority of these have also been fitted with coloured wing-tags. During this period, the first movement east from the Rawlinna study areas was demonstrated. An interesting recovery was that of a bird banded as a chick in August, 1968 and recovered twenty miles from the nest site in February, 1972. This bird still showed immature plumage.

Radar Tracking

In co-operation with the staff of the Carnarvon Tracking Station of the Commonwealth Department of Supply, narrow-beam radar is being used to observe eagles and other birds of prey. Radar parameters of various species are being measured and accurate flight paths for wedge-tailed eagles recorded.

Behaviour

Diurnal observations of colour-tagged eagles are continuing at Carnarvon. This study incorporates the effect of a local eagle population on lamb mortality.

WHITE-TAILED BLACK COCKATOO

Taxonomy

Since the work on the white-tailed black cockatoo, *Calyptorhynchus baudini*, began in Western Australia, specimens have been collected from throughout the range of the bird. During 1970-72 this sampling was increased and analysis of the specimens has confirmed that there are two distinct types of white-tailed black cockatoo. One type has a longer bill and slightly longer wing than the other.

There is no difference between the two types in measurements of bill width, tail length, tarsus length or weight. There are no size differences between the sexes within the two different types, and no appreciable differences in colour between the two types. Both display the normal sexual dimorphism described for the white-tailed black cockatoo.

Long-billed birds are found in the heavily forested south-west corner of Western Australia, to the south-west of a line from Perth to Albany. The short-billed birds are found to the south-west of a line from Geraldton to Esperance. At present not enough is known about the breeding distribution of the birds to be able to say what range the different types occupy during the breeding season, but it is suspected that the short-billed birds breed in lower rainfall areas than the long-billed birds. Collections will be made over the next breeding season in an attempt to clarify the breeding distribution of the two types.

Red blood cell agglutination and blood serum tests are being conducted using blood from both types in an attempt to see if there are any differences in the blood of the two types. It is hoped to obtain blood from other *Calyptorhynchus* species to compare the blood of the two subject types with the rest of the *Calyptorhynchus* group.

Biology

Since 1970 specimens of both long and short billed birds have been collected from Mundaring State Forest. This forest has large areas of pine plantations as well as large tracts of natural bush and both types of white-tailed black cockatoo occur in the forest during the non-breeding season. Crop analysis from these specimens has shown some interesting differences in the food preferences of the two types. Long-billed birds eat mainly *Eucalyptus calophylla* (marri) seeds and insect larvae found under the bark of some trees, while short-billed birds eat mainly pine seeds and seeds from Proteaceous shrubs, which have small hard seed pods.

Analysis of birds shot in apple and pear orchards being damaged by white-tailed black cockatoos reveals that the damage is due exclusively to the long-billed type. The long-billed birds depend heavily on *Eucalyptus calophylla* seeds as a food source and orchadists maintain that the damage they cause is worst when the marri fruit crop is poor.

In 1969 a study of the breeding biology of the short-billed white-tailed black cockatoo was begun. The study initially involved four areas which are located at fairly widely separated points over the range of the short-billed birds. An account was kept of the use of specific nest sites by individual birds in these areas. The study of the four areas was conducted for two breeding seasons and enabled some comparisons to be made between the areas. Study in the two southern areas was discontinued in 1971 to enable a more detailed behavioural study to be made in the other two areas at Coomallo Creek and at Manmanning.

The birds return to the breeding areas around June/July and eggs are laid between mid-July and mid-October. The birds return to the same area to breed and in some cases to the same hollow, but studies of nest-site selection and preparation are incomplete. Individually tagged birds are being used to study nest-site selection in the two study areas. Stainless steel wing tags have been developed and in 1971 these were placed on all breeding adults caught on their nests and on all fledging nestlings in the two study areas.

Breeding birds show no preference for any particular species of tree, the only requirement being a suitable sized hole in the tree. As the majority of these holes are

a result of termite damage to the trees, the birds favour those trees that are more susceptible to termite attack.

The usual clutch is two and usually both eggs hatch. The female does all the incubation and broods the nestling for about three weeks. Both parents feed the nestling in the morning and in the evening. The nestling fledges after ten to eleven weeks but it is not known what happens after fledging as the flocks leave the area after the nestlings have fledged.

An intensive study is being made at Manmanning of breeding behaviour, nest site selection and preparation, flock interactions and individual recognition. Breeding studies will continue at Coomallo Creek but not at the same intensity as at Manmanning.

It is planned to find a suitable study area to begin studies of the breeding of the long-billed white-tailed black cockatoo.

Movements

The study of movements in Mundaring State Forest was completed in late 1970. This gave no conclusive results on movement patterns but provided some information on food and flock size. This work together with other observations shows that generally long-billed birds occur in smaller flocks than short-bills.

Studies of short-billed birds have indicated that at the end of the breeding season the short-bill flocks move out of the breeding areas in December or January and amalgamate into bigger flocks near the coast and return to the breeding areas in June or July. The flocks in the non-breeding season can get very large and in some pine plantations the numbers of short-bills can get as high as several thousand birds which will stay around until most of the available pine seed has been eaten.

At this stage very little is known about the movements of the long-billed birds but they appear to be resident and indulge in local wanderings. It is planned to carry out more work on the long-billed birds in the coming season.

GALAH

In 1970, following a request from the Western Australian Government, the Division started a programme of research into the behaviour and ecology of galahs, *Cacatua roseicapilla*, which were regarded as a pest of cereal crops, especially wheat.

Most of the species of birds that are blamed for causing agricultural losses do so when they form flocks. It is therefore of importance to understand the formation, composition, mobility, and general behaviour of such flocks. Besides the immediate pest problem, the galah is a very suitable species for studying social organisation, feeding aggregations, and flock behaviour. The cornerstone of the present project, therefore, is the individual marking of a representative population in a typical wheat-farming area; the subsequent resighting of these easily recognisable birds will provide information about their social ties and movements.

The main study area is located at Manmanning, 120 miles north-east of Perth, where 226 galahs have been individually wing-tagged, and the breeding cycle and productivity are being studied at more than 100 nests each year. More than 1,000 galahs, many of known age, have been banded with metal leg bands under the aegis of the Australian Bird-Banding Scheme, to give details of their later movements. Monthly food samples are being collected and analysed. Limited complementary studies are being made in an arid environment (Mileura Station, 8 in. rainfall) and in a wetter coastal habitat (Badgingarra, 25 in. rainfall) and these should emphasise the versatility of the species.

Near Perth a number of birds have been marked to study the behaviour and movements of a colonizing population spreading into new localities—a process that has been proceeding for years in Western Australia but which has only recently reached Perth.

When the field ecology of the galah is better understood it is anticipated that there will be several unanswered questions largely of a behavioural nature. These will be best answered under controlled aviary conditions and to achieve this a captive colony of galahs is being established; these birds are already invaluable for testing, marking and monitoring techniques.

NOISY SCRUB BIRD

The noisy scrub bird, *Atrichornis clamosus*, is considered threatened because only one small population is known to exist. Its range was formerly more extensive.

In 1970 a study of the bird's ecology and behaviour was begun at Two People's Bay, Western Australia.

The main aim is to gain an insight into the habitat requirements and factors regulating breeding. This work is being done to assist the Western Australian Department of Fisheries and Fauna to develop a management plan for the preservation of the noisy scrub bird and of five other small passerines.

The main areas of research are an examination of the effects of climatic factors and food resources on breeding and the analysis of habitat in relation to distribution and breeding. Comparative studies on the western whip-bird and bristle-bird are being initiated. Work on the vocalizations of the noisy scrub bird is being continued with an emphasis on the functions of the song. Comparative studies on the vocalizations of the western whip-bird and bristle-bird are being started.

PENALTIES INCREASED FOR RARE SPECIES

In S.W.A.N.S. Vol. 3, No. 2, we gave notice that nine species of bird had been declared "rare and likely to become extinct" and that the penalty for infringing this protection was $1,000.

By notice in the *Government Gazette* on February 9 1973 a further six birds have been placed in this category. These are:

Partridge Pigeon (*Geophaps smithii*)
Burdekin Duck (*Tadorna radjah*)
Red-tailed Tropic Bird (*Phaethon rubricauda*)
Peregrine Falcon (*Falco peregrinus*)
Grass Owl (*Tyto longimembris*)
Princess Parrot (*Polytelis alexandrae*).

There are now 16 birds placed in this category. The Western Australian Wildlife Authority is still examining those species of reptiles and mammals which should be afforded this additional protection.