

Joining hands to save birds in the bush

A community-based bird observer scheme in Western Australia has yielded information vital to managing the wheatbelt



Singing honeyeaters and yellow-throated miners – tiny inhabitants of Western Australia's south-west wheatbelt – have a special characteristic that gives them an edge over their nectar-loving competitors. They will fly some 1200 metres over open landscapes to move between isolated patches of native vegetation.

A result of their boldness is that they appear to be the only honeyeater species of the region to have increased in number this century. At the same time, numbers of the similar-sized white-eared honeyeater have declined, perhaps due to its reluctance to fly more than 200 m between vegetation remnants.

but also created opportunities for 34 species to increase their range and/or abundance.

An atlas of changes in the distribution and abundance of birds in the south-west has been written by Denis Saunders and John Ingram of CSIRO's Division of Wildlife and Ecology.

Birds of South-western Australia presents the results of a community-based observer scheme to map the distribution of birds in WA's south-western agricultural area, to gauge their numbers in 1987-1990, and to examine changes in their distribution and abundance this century. It also examines the major agents of change, and suggests ways of incorporating nature conservation

into landscape management, so that declining birds may be protected.

Saunders and Ingram, who are based at the division's Perth laboratory, describe the south-west wheatbelt as a 'classic example of our failure to follow the principles of ecologically sustainable development'.

Ninety per cent of the wheatbelt's original vegetation had been removed by the late 1970s. This widespread land clearing, coupled with the introduction of exotic species, has seen the disappearance from the area of many native plant and animal species. Changes in ecosystem processes, such as rising water tables and associated soil salinity, have followed the clearing.

In 1984, the division began a study of the wheatbelt's remaining native vegetation and associated fauna. The aim was to establish the conservation potential of remnant vegetation and develop ways of managing the remnants for their own preservation, and for the benefit of agricultural producers.

Left: Widespread land clearing is one of many human-induced changes to have affected the birds of Western Australia's south-west wheatbelt since European settlement.

Above: The decline of the bush stone curlew, a ground-dwelling species, coincided with an increase in rabbits and foxes.

In view of these goals, it's little surprise that the study has profited from positive relationships forged along the way between CSIRO researchers and the rural community.

A number of workshops have been organised jointly by the division and the rural community at which scientists and farmers shared ideas about managing the wheatbelt on a landscape or ecological scale, rather than at an individual farm level. Four books on nature conservation, co-edited by Saunders, (see 'Winning back the wheatbelt', *Ecos* 78) have resulted from these workshops.

Public participation has been no less important in the production of *Birds of South-western Australia*, another cooperative project associated with the wheatbelt conservation study. To gather data for the 'bird atlas', some 200 volunteers took part in a survey designed to establish the effects that changing land-use has had on birds of the wheatbelt.

Gathering the flock

Early in 1987, the division produced a 16-page booklet listing all bird species known to have occurred in WA's central wheatbelt. Beside each species were columns in which to record weekly bird sightings. A radio and newspaper campaign was conducted to enrol observers in the scheme. Once enrolled, each observer noted in the booklet all species of birds seen each week during the year in their nominated area.

Observers also described the location in which they were collecting data, including the extent of cleared land, the type of vegetation, and information to allow the locality to be plotted on a map. The data from each booklet were then entered into a computer database and verified. John Ingram maintained the database and produced the distribution maps.

Historic information about the distribution and abundance of wheatbelt birds was taken from 10 detailed bird lists based on records collected or published between 1900 and 1937. Data from these lists have been used to calculate the percentage of observers recording each species, thus giving an indication of how widespread the species was before 1937.

The results of this massive information-gathering exercise are presented, species by species, in the fourth chapter of *Birds of South-western Australia*. For more than 200 birds, from the emu to the little crow, two maps have been prepared showing distribution for the periods 1900-1937, and 1987-1990. Accompanying the maps are notes about the bird's eating, nesting and seasonal

habits, as well as any other characteristics that may have influenced its response to wheatbelt clearing.

Saunders and Ingram say it is necessary to understand what habitat requirements are needed to allow particular species to survive and move around fragmented agricultural landscapes. This information – combined with knowledge of ecosystem processes and the way they have been altered by clearing – will aid the development of sustainable land management practices and habitat reconstruction plans for threatened species.

What has happened?

A massive reduction in the range and/or abundance of a large proportion of wheatbelt birds has occurred this century. Excluding 14 species which are vagrants, 195 species of bird have been recorded in the region since settlement by Europeans. Ninety-five (49%) of these have declined in range and/or abundance, 34 (17%) have increased, and no change could be shown for the remaining 66 (34%).

Most of the changes are the direct result of human-induced alterations to the landscape through clearing of native vegetation, provision of water, new sources of food, introduction of species, or a combination of factors connected with development.

Each bird species in the wheatbelt study is identified as either a passerine (perching or songbird) or a non-passerine. Within each category are resident, nomad

and migrant species, grouped according to their particular lifestyle.

Overall, more passerine species have declined than non-passerine. Eighty-seven species of passerine have been recorded in the wheatbelt since European settlement. Fifty-eight of these have declined in range and/or abundance, 13 have increased, and there has been no apparent change in 16. Passerines are particularly vulnerable because many are habitat-specific, preferring to move about within the cover of vegetation. They are often small insectivores with relatively poor powers of dispersal in fragmented landscapes.

In contrast, non-passerines tend to be larger birds which are highly mobile such as magpies, galahs and corellas. Of the 108 non-passerine species recorded, 37 have declined, 21 have increased and 50 apparently have not changed.

The majority of species that declined in range and/or abundance are residents dependent on native vegetation. Extensive habitat loss is a factor in their decline.

Only 14% of aquatic species declined, but 53% of woodland species, 63% of mallee species, 69% of species dependent on shrubland and 65% dependent on heathland have declined. These declines are proportionally greater among passerine species. Among nomadic and migratory species, more of those dependent on native vegetation have declined compared with other habitat categories.

These declines are illustrated by three resident species that depend on woodland: the purple-crowned lorikeet, rufous tree-creeper and yellow-plumed honeyeater.



The singing honeyeater will fly some 1200 metres across open landscapes to move between patches of native vegetation. This gives it an advantage over some less-adventurous species.



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The wood duck has benefitted from the provision of farm dams, but in future may suffer from a shortage of suitable nesting sites in hollow trees.

The purple-crowned lorikeet was widespread in woodland and mallee before 1937. It feeds on pollen, nectar, fruit and insects in the canopy. It is now uncommon or rare, having been extirpated from large areas of the central and southern wheatbelt along with its habitat.

The rufous treecreeper often forages in the ground for insects among litter and fallen timber. It is this layer which is destroyed when stock are allowed to graze native vegetation.

The yellow-plumed honeyeater was once the most abundant honeyeater in the wheatbelt, feeding on nectar and insects in woodland and mallee. It has undergone a catastrophic decline in many districts in the past 50 years along with its habitat.

An analysis of diet in relation to change in status of wheatbelt birds revealed that among the resident non-passerine, the species that feed on invertebrates and vertebrates were most likely to have declined in range and/or abundance. Passerine species listed as feeding on fruit, nectar, seed and other plant material also declined significantly.

A similar analysis of nest sites in relation to change in status showed that of all resident species, declines were greatest among those that nested on the ground, in trees or in shrubs.

Habitat loss and fragmentation have not been the only causes of species decline and loss. Other factors such as species introductions and changes in ranges of other species, or a combination of factors, have also had adverse effects. For example, the bustard and bush stone

curlew, both ground dwellers, became increasingly rare from the 1950s. Their declines coincided with the period when rabbits and foxes were common.

Competition between species that have invaded the wheatbelt and those already present is another factor contributing to species decline. An example of this is the interaction between the galah – an 'invader' from the arid zone – and Carnaby's cockatoo, over nest sites. There is some overlap in the sizes of hollows used by these two species and the galah has been recorded entering hollows being used by black cockatoos and smashing their eggs.

Because of food shortages induced by habitat reduction and fragmentation, the black cockatoos often do not have a chance to re-nest successfully that season, if their first breeding attempt fails. The galah is capable of taking over the hollow and breeding successfully.

Opportunities for some

Twenty-one species of non-passerine and 13 species of passerine have increased in range and/or abundance in the past 90 years. Seven of these species are birds of the arid zone which have invaded the wheatbelt because of the creation of suitable habitat.

Widespread clearing of shrublands and woodlands to create open plains with associated patches of remnant vegetation, scattered trees, provision of water (stock troughs and dams), and food (cereal crops, pasture grasses, weed seed, insects in

agricultural land, and mice) have suited species such as the black-shouldered kite, crested pigeon, red-tailed black cockatoo, galah, little corella, mulga parrot, and pied butcherbird. Some of these species are still expanding their ranges.

The creation of this open 'riverine plain' has allowed 14 species which favour open habitats, and which formerly occurred in the wheatbelt, or parts of it, to increase in numbers and/or range.

The changes in status of the mountain duck and wood duck are of interest as they raise a point of conservation concern. A combination of farm dam creation and an ability to exist on water bodies that have become saline as a result of rising water tables, has allowed the mountain duck to benefit from changing land use.

The wood duck has also benefited from the provision of farm dams and is also widespread and common. Both species nest in hollow trees which are still available throughout the wheatbelt, although as many old trees die and blow over, fall down or are deliberately destroyed, there may be a shortage of nest hollows. It will be a long time before there are sufficient hollows in trees being planted to replace them, as it may take a salmon gum more than 130 years to grow large enough to accommodate a hollow of sufficient size for a duck or cockatoo.

Saunders and Ingram believe that unless this issue is addressed specifically in revegetation plans at a landscape scale, there will be a critical shortage of nest sites for species which are obligate hole nesters.

Less than 15% of the area of remnant vegetation in the wheatbelt is in conservation reserves. The other 85% is on private property and is still being degraded because of weed invasion, grazing by rabbits and domestic livestock, particularly sheep, and by changed ecological conditions in the surrounding agricultural land.

The authors say the role of managing remnant vegetation and its associated fauna must be taken up by community groups throughout the wheatbelt. They say that if this task is left to conservation and other government agencies, most of the work will not be done, simply because these agencies lack the resources to deal with the land directly under their control, let alone the remainder of the landscape.

Birds of South-western Australia, An atlas of changes in distribution and abundance of the wheatbelt fauna is available for \$39.95 plus postage from the publisher, Surrey Beatty & Sons, 43 Rickard Road, Chipping Norton, NSW 2170, (02) 602 3888, fax (02) 821 1253.

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