BIRDS OF PARA WIRRA RECREATION PARK: CHANGES IN STATUS OVER 10 YEARS

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INTRODUCTION

Para Wirra Recreation Park is situated about 30 km NNE of Adelaide and is a very popular recreation area, being visited by up to 2,000 people on a suitable Sunday. Because of its wide range of natural and artificial habitats, and its position near drier country, a remarkable diversity of birds can be seen in the Park.

Regular studies of the birds occurring in particular areas are important for two reasons. Firstly, when the results are published (an essential part of any ornithological study), they provide a guide for all visitors to the area; and secondly, if they are continued for a long period or repeated at a later date, they can give an indication of changes in status and abundance of any of the species.

A list of the species recorded in Para Wirra (produced with the assistance of the SAOA) is now available to visitors, or can be obtained from the National Parks and Wildlife Service in Adelaide. The basis for this list was the study of Clarke (1967) who documented the status and abundance of all the species of birds seen in the Park between October 1963 and March 1965. The present paper records all species seen between October 1973 and March 1975, a period exactly 10 years after the first survey, and documents their status and abundance in a way directly comparable with the findings in Clarke's paper.

PARA WIRRA RECREATION PARK

Clarke describes the history, geography, physiography, climate and botany of the Park, so that it is only necessary to give a brief account of these here.

An area of 1615 acres (650 hectares) was bought by the South Australian Government in 1962 and named Para Wirra National Park, a further 702 acres (280 hectares) were purchased in 1963, another 293 acres (120 hectares) added in 1966, and subsequently another 900 acres bringing the total to 3501.5 acres (1416.5 hectares). A map of the Park is shown in Figure 1 with the prominent topographic features.

The central and southern parts are flat or gently undulating, being sedimentary rocks overlying old Precambrian formations. The South Para River and Wild Dog and other creeks have cut deep gorges into these overlying rocks in the northern parts of the Park. The rocks have been subjected to prolonged leaching and the main habitat is rather stunted dry sclerophyll forest with savannah woodland on the flatter areas.

The dry sclerophyll forest is dominated by long-leaved Box, *Eucalyptus goniocalyx,* Pink Gum *E. fasciculosa,* and in some areas Peppermint Gum *E. odorata.* Most of these trees are mallee in form, and in the more exposed areas are rarely more than 10 metres in height. The Golden Wattle *Acacia pycnantha* is a common small tree and *Casuarina muelleriana* is locally common as a tall shrub. The understorey of sclerophyllous shrubs includes members of Epacridaceae (especially *Astroloma conostephioides*), Dilleniaceae (*Hibbertia* spp.), Proteaceae and Myrtaceae.

The savannah woodland, most of which was at one time cleared, is dominated by South Australian Blue Gum *E. leucoxylon,* with Sheaoak *Casuarina stricta* and native pine *Callitris preissii* occurring very locally. The River Red Gum *E. camaldulensis* also occurs in a savannah formation along the South Para River and along creeks. The Golden Wattle is common in this habitat also, and in some of the previously cleared areas it has regenerated very densely. Other cleared areas (e.g. near the South Oval, have also been taken over by the Yacca *Xanthorrhoea semiplana.* The present understorey of the savannah woodland now consists chiefly of introduced grasses and weeds, notably Salvation Jane *Echium plantagineum.* Originally it probably consisted of native grasses with perhaps scattered sclerophyllous shrubs.

Along the South Para River there are dense stands of *Melaleuca neglecta, Callistemon salignus* and more uncomfortably *Acacia armata. Correa schlechtendalii* and hop-bush *Dodonaea viscosa* are also present as small bushes.

There is a large dam of 2½ acres (1 hectare) on the Wild Dog Creek and seven small earth dams. Water flows in several creeks and the South Para River during the winter and spring, but is reduced to only a few pools along the South Para River during late summer.

CLIMATE

Typical of the Mount Lofty Ranges, Para Wirra experiences a warm to hot, dry summer and a cool to mild, wet winter. The average annual rainfall is 617 mm (24.5 inches), slightly more than Adelaide, and the mean January and July temperatures are slightly below those of Adelaide. The climate was appreciably wetter than usual during the study period, with particularly heavy rain in January 1974 (64 mm), and October 1974 (118 mm). The heavy rain in the summer of 1974 resulted in early and prolific flowering in many of the native plants. The rain in October 1974 caused the South Para Reservoir to overflow so that the South Para River cut the road to Williamstown. November 1974 to February 1975 were dry months, and most shrubs were very dessicated by the beginning of March 1975; but heavy rain fell in the second half of that month, ending the brief drought. There was also a serious fire on March 2, 1975 which destroyed about 600 acres (240 hectares) of the south-east corner of the Park. The eucalypts and Yaccas were regenerating well two months later however.

OBSERVATIONS

HAF visited Para Wirra on three to five occasions each month from November 1973 to October 1974 and less frequently from November 1974 to March 1975, mainly to carry out a study of the comparative ecology and behaviour of honeyeaters. DCP visited the area less frequently between January 1974 and March 1975 but greatly assisted HAF in attaining competence at identifying the more difficult species. All species of birds seen or heard were noted, and their status and abundance categorised, in the same way as by Clarke. We also included a few additional observations made by Ken Woodcock (K.W.) in or just outside the Park.

Visits were usually to one or more of eight particular sites (occasionally all eight) namely: 1) Youth Hostel, 2) Hamlins Gully, 3) and 4) Devil's Nose Trail, 5) Kiosk, 6) South Oval, 7) South Para River and 8) Goldmine (see Figure 1 for exact locations). Sites 1, 2, 3 and 8 were savannah woodland, 1 and 8 being partly cleared, sites 4 and 5 were sclerophyll forest with *E. goniocalyx* and *E. fasciculosa,* site 6 was cleared with regrowth of *Xanthorrhoea semiplana, Acacia pycnantha* and occasional *E. leucoxylon, E. fasciculosa* and *E. goniocalyx,* and site 7 was a creekside habitat with *E. camaldulensis.* Although this approach differed from that of Clarke, who covered one large area in a four to six hour walk, all the major habitats were visited. The only minor habitat visited infrequently was the large dam, which might account for the lack of data on some of the waterbirds.

A total of 98 species were seen in the eighteen month period, and these were classified as residents, summer, autumn or winter visitors, transients or vagrants. It is not unusual for a species to fall into more than one group, for instance several species appear to have a resident population which is added to in winter by visitors from elsewhere. It is also possible that the birds present in summer might themselves leave and be replaced by others in winter. The abundance of each species is classified in the same way as by Clarke:—

Abundant — species that can be met with without search.

Common — can be sought with fair certainty in the appropriate habitat.

Frequent — regularly met with in the appropriate habitat.

Occasional — met with irregularly.

Rare — met with on only one or two occasions.

Clarke also noted the relative abundance of each species in the different habitats. This is noted here only when a species appeared particularly associated with one of the habitats, if our opinions differed from those of Clarke or when species not seen by Clarke are mentioned. We should like to reiterate Clarke's opinion that detailed ecological studies, covering habitat, feeding site and breeding behaviour of closely related species such as thornbills, "flycatchers" (including robins and whistlers) and parrots would be very valuable. We report on the results of our ecological study on honeyeaters elsewhere. Breeding is noted by Br., probable breeding by Br.?; but no determined efforts were made to find nests, so that data here is rather inadequate.

Emu *Dromaius novaehollandiae.* Resident, common, Br. Re-introduced in 1967 from Belair, emus have been remarkably successful; too successful in the opinions of some Park visitors. They also wander several miles from the Park, e.g. Williamstown-Kersbrook Road, Kersbrook Forest (Brian Gepp pers. comm.) and Gawler.

Little Grebe *Podiceps novaehollandiae.* Two on the lake, May 10, 1975 (seen by K.W.).

Little Black Cormorant *Phalacrocorax sulcirostris.* Occasional, transient.

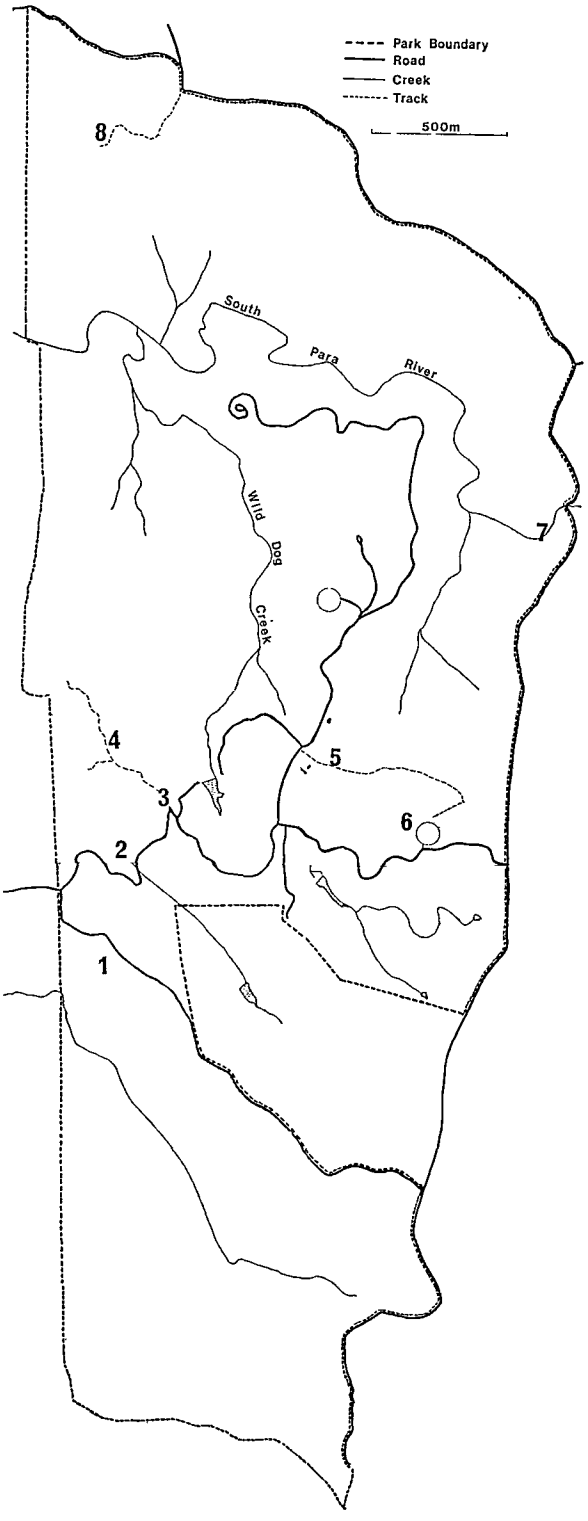

Figure 1. Map of Para Wirra Recreation Park with study sites numbered as in text.

Little Pied Cormorant *P. melanoleucos.* Occasional, transient, sometimes along creeks or on small dams with little water.

White-faced Heron *Ardea novaehollandiae.* Frequent, throughout the year, along South Para River, but also on South Oval, where it sits on the goalposts.

Black Duck *Anas superciliosa.* Frequent, resident, now relatively tame on the large dam.

Mallard *A. platyrhynchos.* Frequent, resident, a motley domestic group on the large dam, ought to be discouraged.

Chestnut Teal *A. castanea.* Rare, vagrant. One in South Para River, Sept. 5, 1974. (Clarke has a record of six ducks thought to be this species on the Wild Dog Creek Dam in January 1965).

Grey Teal *A. gibberifrons.* Occasional, transient, on the lake.

Whistling Kite *Haliastur sphenurus.* Occasional, transient. A few definite sightings, and a few others which were either this species or Little Eagle.

Brown Goshawk *Accipiter fasciatus.* Frequent, resident. Clarke did not observe this species between April and June, 1964; however it was seen in April and May, 1974.

Collared Sparrowhawk *A. cirrhocephalus.* Occasional, resident? This species is hard to tell from the previous one, but small hawks with slightly forked tails were seen on several occasions, especially between the South Oval and the kiosk.

Little Eagle *Hieraaetus morphoides.* Rare, vagrant. Only one definite one, South Oval, August 1, 1974.

Wedge-tailed Eagle *Aquila audax.* Frequent, resident, Br?

Brown Falcon *Falco berigora.* Occasional, transient, not only summer as Clarke suggests.

Little Falcon *F. longipennis.* Rare, vagrant, one, Devil's Nose Trail, October 1, 1974.

Peregrine Falcon *F. peregrinus.* Occasional, transient, two birds chasing and sparring at Goldmine, October 22, 1974; one at South Oval, March 7, 1975.

Nankeen Kestrel *F. cenchroides.* Occasional, transient.

Painted Quail *Turnix varia.* Occasional, resident? Quail were seen on several occasions between March and July, and were once or twice definitely identified as this species. Clarke

records quail between December and May but was unsure of the species.

Dusky Moorhen *Gallinula tenebrosa.* 3, South Para River, April 25, 1975 (seen by K.W.).

Peaceful Dove *Geopelia striata.* Common, resident?, not recorded July or August in this study nor by Clarke, could leave in the winter or maybe just stop calling. Several birds released from captivity on November 15, 1974, one of which was retrapped on February 28, 1975.

Common Bronzewing *Phaps chalcoptera.* Common, resident, Br.

Brush Bronzewing *Phaps elegans.* Frequent, resident?, seen regularly at the South Oval from July 1974 onwards and occasionally elsewhere.

Crested Pigeon *Ocyphaps lophotes.* Frequent, transient, mainly in more open areas, not recorded by Clarke.

Domestic Pigeon (Rock Dove) *Columba livia.* Frequent, transient, often seen flying over, rarely alights.

Indian Dove *Streptopelia chinensis.* Rare, vagrant, is now well established in Williamstown area.

White Cockatoo *Cacatua galerita.* Rare, vagrant, seen only once, February 12, 1974 near Youth Hostel.

Galah *C. roseicapilla.* Common, resident, Br.?

Musk Lorikeet *Glossopsitta concinna.* Frequent, maybe absent December and January, appears mainly dependent on the flowers of the blue gum *(E. leucoxylon).*

Purple-crowned Lorikeet *Glossopsitta porphyrocephala.* Common, absent or scarce December and January, Br., feeds on flowers of *E. leucoxylon* and other gums.

Cockatiel *Nymphicus hollandicus.* Occasional, spring and summer visitor, probably overshoots usual summer range to east of Mount Lofty Ranges. Not seen in wet spring of 1974.

Adelaide Rosella *Platycercus elegans adelaidae.* Abundant, resident, Br.

Red-rumped Parrot *Psephotus haematonotus.* Common, resident, scarce in summer.

Elegant Parrot *Neophema elegans.* Rare, vagrant, small flock flew over Youth Hostel site, February 12, 1974 (note same day as single record of White Cockatoo). Clarke noted 4 *Neophemas* in December 1964, but was unsure of the species.

Budgerygah *Melopsittacus undulatus.* Rare, vagrant, one, apparently a wild bird at South Oval, February 28, 1975.

Pallid Cuckoo *Cuculus pallidus.* Occasional, autumn and winter, transient.

Black-eared Cuckoo *Chrysococcyx osculans.* Rare, vagrant, one, February 12, 1974, South Para River.

Horsfield Bronze-Cuckoo *C. basalis.* Frequent, throughout the year, particularly numerous in May, 1974, Clarke records it as a summer visitor?

Boobook Owl *Ninox novaeseelandiae.* Occasional, resident, Br.?

Tawny Frogmouth *Podargus strigoides.* Occasional, resident, Br.?, not seen by present observers, but several sightings by Colin Waters including one of four birds, two adults and two fledged young? October, 1974. (Two adults and two fledglings seen by K.W. just outside the Park, December 4, 1973).

Owlet-Nightjar *Aegotheles cristatus.* Occasional resident, Br?

Spine-tailed Swift *Hirundapus caudacutus.* Rare, vagrant, ten on February 27, 1975, and two on March 21, 1975, over South Oval.

Kookaburra *Dacelo novaeguinae.* Common, resident, Br.

Sacred Kingfisher *Halcyon sancta.* Frequent, summer visitor (October 1-February 27), Br. pair with nest in a hole in a blue gum were taking small lizards to the young, at Devil's Nose Trail, January 14, 1975.

Rainbow Bird *Merops ornatus.* Frequent, late summer and autumn transient, seen between January 14 and March 25, does not appear to breed in the Park.

Welcome Swallow *Hirundo tahitica.* Common, mainly autumn and winter visitor, scarce between November and March, although Clarke says it is a resident and was not recorded between July 4 and September 2, 1964.

Tree Martin *Petrochelidon nigricans.* Common, resident, common during the winter although Clarke says that it was absent for a time during the winter of 1964.

Black-faced Cuckoo-Shrike *Coracina novaehollandiae.* Frequent, resident and transient (Br. K.W.).

Blackbird *Turdus merula.* Frequent, resident.

White-browed Babbler *Pomatostomus superciliosus.* Common, resident, Br.

Rufous Songlark *Cinclorhamphus mathewsi.* Rare, vagrant, a pair in South Para River site January and February 1975, Br? (A bird caught in mistnet on April 7, 1975 and retrapped May 7, 1975).

Whiteface *Aphelocephala leucopsis.* Frequent, resident, only seen near the South Oval, could not be described as common as it was in 1964-5. (Seen by K.W. near Gawler lookout February 23, 1975).

Weebill *Smicrornis brevirostris.* Frequent, resident?, mainly in savannah woodland particularly in areas with cleared understorey.

Little Thornbill *Acanthiza nana.* Rare, vagrant, a single record at Goldmine site, March 7, 1974. This species is fairly common among *Callitris* to the north and east of the Park.

Striated Thornbill *A. lineata.* Common, resident, Br?

Yellow-tailed Thornbill *A. chrysorrhoa.* Common, resident, Br., a large flock usually feeding on the South Oval.

Buff-tailed Thornbill *A. reguloides.* Common, resident, Br?

Brown Thornbill *A. pusilla.* Rare, vagrant, one, Devil's Nose Trail, May 3, 1974, and one caught in a mist net South Oval, February 28, 1975.

Superb Blue Wren *Malurus cyaneus.* Abundant, resident.

Grey Fantail *Rhipidura fuliginosa.* Common, winter visitor, scarce or absent October to March, although described as resident by Clarke.

Willy Wagtail *Rhipidura leucophrys.* Abundant, resident.

Restless Flycatcher *Seisura inquieta.* Frequent, resident.

Jacky Winter *Microeca leucophaea.* Frequent, resident.

Scarlet Robin *Petroica multicolor.* Common, resident.

Hooded Robin *P. cucullata.* Frequent, resident. (Br. just outside Park, K.W.).

Golden Whistler *Pachycephala pectoralis.* Common, resident. Clarke describes this as a frequent winter visitor; however in this survey it was seen in every month, and was notably common in late summer 1975 when five birds were caught in mist nets.

Rufous Whistler *Pachycephala rufiventris.* Frequent, chiefly summer visitor, occasionally seen in winter.

Grey Shrike-Thrush *Colluricincla harmonica.* Common, resident.

Eastern Shrike-Tit *Falcunculus frontatus.* Frequent, resident.

Black-capped Sittella *Neositta chrysoptera.* Frequent, resident?, perhaps a transient as not seen in every month?

Brown Treecreeper *Climacteris picumnus.* Common, resident. (Br. K.W.).

White-throated Treecreeper *C. leucophaea.* Frequent, resident, only amongst *E. goniocalyx.*

Mistletoe Bird *Dicaeum hirundinaceum.* Common, maybe scarce or absent in the summer, the mistletoes *Amyema* and *Lysiana* flower between January and April and produce berries from May onwards.

Yellow-tailed Pardalote *Pardalotus xanthopygus.* Frequent, summer visitor?, not recorded summer of 1973-4, one record from July 1974, and relatively common in woodland and forest in summer of 1974-5. Not recorded previously to this study.

Striated Pardalote *P. substriatus.* Abundant, resident.

Grey-backed Silvereye *Zosterops lateralis.* Common, chiefly winter visitor, described as a resident by Clarke but was scarce in the two summers 1973-4, '74-5.

Singing Honeyeater *Meliphaga virescens.* Rare, vagrant, one, June 20, 1974, on extreme NW boundary of Park near Goldmine site.

Yellow-faced Honeyeater *M. chrysops.* Common, winter visitor. Described as resident and winter visitor by Clarke, but was not seen between December 12, 1973 and April 5, 1974, or between November 1, 1974 and March 25, 1975. (The authors believe that most Yellow-faced Honeyeaters leave the Mount Lofty Ranges in the summer months).

White-plumed Honeyeater *Meliphaga penicillata.* Abundant, resident, almost always in red gum *(E. camaldulensis)* or blue gum *(E. leucoxylon).* Breeds autumn and spring.

Brown-headed Honeyeater *Melithreptus brevirostris.* Common, resident. (Br. Just outside Park).

White-naped Honeyeater *M. lunatus.* Frequent, winter visitor, not seen until February 6, 1974, or after September 17, 1974 in the present survey. Clarke noted movements of this species and the Yellow-faced Honeyeater in July 1964.

Black-chinned Honeyeater *M. gularis,* Frequent, resident, Br. chiefly in savannah woodland, nests by South Para River May and September 1974, and on Devil's Nose Trail, September 1974.

Crescent Honeyeater *Phylidonyris pyrrhoptera.* Common, resident, Br.

Yellow-winged Honeyeater *P. novaehollandiae.* Abundant, resident, Br. but less common summer. Breeds in autumn, winter and spring.

Tawny-crowned Honeyeater *P. melanops.* Frequent, resident, Br. present around South Oval in all months except December 1973 and January 1974. Nest and two young there October 1, 1974. Occasionally seen elsewhere.

Eastern Spinebill *Acanthorhynchus tenuirostris.* Frequent, resident, Br.

Red Wattlebird *Anthochaera carunculata.* Common, resident, Br. although scarce in driest months, not seen between 12 December and February 6, 1974, after which they were common (rain at end of January); they were also noticeably more conspicuous on and after March 21, 1975 after rain the previous week. Clarke comments on this post-breeding departure.

Goldfinch *Carduelis carduelis.* Frequent, resident and transient.

Red-browed Finch *Aegintha temporalis.* Common, resident.

Diamond Firetail *Emblema guttata.* Frequent, resident? or summer visitor, Br. — March 1975 before the first rain. Associated with savannah woodland.

House Sparrow *Passer domesticus.* Common, resident.

Starling *Sturnus vulgaris.* Common, resident and transient, Br.

Magpie Lark *Grallina cyanoleuca.* Common, resident.

White-winged Chough *Corcorax melanorhamphus.* Common, resident, Br. (Sept.-Oct.).

Dusky Woodswallow *Artamus cyanopterus.* Common, resident, not only in summer as suggested by Clarke.

Black-winged Currawong *Strepera versicolor.* Common, resident, Br. (Sept.).

White-backed Magpie *Gymnorhina tibicen* Abundant, resident, Br.

Little Raven *Corvus mellori.* Common, resident (recorded as *C. coronoides* by Clarke).

DISCUSSION

The main purpose of this paper was to reveal changes in the abundance and status of species of birds in the ten years since the last comparable survey of Para Wirra National Park.

The majority of apparent changes were probably due to differences in coverage and familiarity of the observers with different groups of birds. For instance the present survey was carried out during a study of the comparative ecology of honeyeaters and other nectar-feeding birds, so that birds occurring in the aquatic habitats were probably overlooked. Other changes may have resulted from fluctuations in populations of species, or chance occurrences of vagrants. There may however have been two real changes in the environment over the ten years: firstly the eighteen months of the present study were wetter and cooler than in the earlier study, with rain in midsummer (January 1974) one year and late spring (October 1974) and early autumn rains (March 1975) the following year. The second change is a presumed one as no detailed notes were made ten years ago. It is likely that cleared land is more heavily vegetated now than previously, with *Acacia pycnantha* being especially dense in places. These two likely changes would both mean that the Park was more predominantly forested in character, than in the earlier survey. This might have resulted in a few changes in the abundance of species which have strong preferences for one or other habitat.

A total of 98 species was seen in this survey compared with Clarke's total of 106 (including three species not certainly identified and four species seen by other observers). Of these, 85 species were seen in both surveys. The 13 species seen only in this survey and the 21 species seen only in the previous survey are shown in Table 1. Of the 13 species seen only in this study, two were introduced and eight were recorded as vagrants only. The Collared Sparrowhawk was an occasional visitor and may even be a resident: It could have been overlooked in the earlier survey because of its close similarity with the Brown Goshawk; or maybe only a single pair now visit or are established in the Park. Bellchambers (referred to by Clarke) recorded it as a visitor in the 1920s. The Crested Pigeon was seen frequently in the present survey. Two or three birds were released near the Kiosk, and several of the sightings were in this area; however the species has become common in the surrounding farmland recently. The Yellow-tailed Pardalote was regarded as frequent and was common in the last three to four months of this survey,

as it was in other parts of the Mount Lofty Ranges.

Of the 21 species seen only by Clarke, nine were vagrants, eight were occasional visitors and four frequent. The Pipit, Little Wattlebird and Noisy Miner were seen just outside the Park on several occasions and the Little Grebe and Grey Butcherbird were seen just after the end of the survey. Many of the "missing" species are associated with drier or more open habitats (12 out of 21); and their absence could be explained by the high rainfall throughout South Australia, and the increased regrowth of the cleared areas of the Park. The absence of five species of water birds could have been due to the increased availability of wet habitats outside the Park; or as pointed out earlier they could have been overlooked in the present study.

We should however be cautious about reaching such conclusions, as Para Wirra is situated close to more arid and open country, so that a large proportion of the species recorded as occasional visitors or vagrants could be expected to come from these habitats. Six (out of 13) of the species seen for the first time in this survey are also associated with drier or more open habitats.

Eighty-five species were recorded in both surveys, and 55 of these were placed in the same category of abundance; 14 were placed in one category higher; 13 in one category lower; two in two categories higher, and one in two categories lower. These categories are inevitably subjective, so that an apparent change could result from differences in coverage and familiarity with different groups of species. The differences between abundant and common, and between occasional and rare, are probably less clear-cut than between the middle categories, common — frequent — occasional, and the species which have moved within these three categories are shown in Table 2.

Five of the eight species which were common, but are now only frequent, are typically species of savannah woodland or more open or drier habitats. Whitefaces were only seen in one place, although regularly, and Hooded Robins and Rufous Whistlers were seen most often along the northern edge of the Park, areas not covered by the earlier survey. Four of the species which have increased in abundance are honeyeaters, perhaps a result of increased attention paid to this group.

It is usually necessary, especially with less common species, to study an area for several successive years to determine which species are residents and which are seasonal visitors. The majority of species that are common or frequent at Para Wirra can be described as resident, as they have been seen in every month of the year. This does not mean that individual birds are necessarily present throughout the year; and some species which are chiefly transients may be called residents. There are a few species which are seasonal visitors to southern Australia generally, Cockatiel, Spine-tailed Swift, Sacred Kingfisher and Rainbow Bird in summer. Several other species apparently undergo local migrations and are noticeably more common in one season than others at Para Wirra. It is not known how extensive and regular these movements are, and the opinions stated here are largely speculative, and are intended to encourage detailed studies of particular species. Such studies could note numbers of individuals at a range of sites in the Mount Lofty Ranges throughout the year and also colour band individuals, using one colour for each site.

Table 3 lists species which are probably summer and winter visitors to Para Wirra — that is their numbers increase in these seasons, although some individuals may be present throughout the year. It also shows species which may leave for a shorter period in summer or winter.

IMPLICATIONS OF THE STUDY TO CONSERVATION

Some conservationists are concerned that National Parks are becoming "islands" of natural vegetation in a sea of unsuitable habitat (Diamond, 1975). Islands have fewer species than continental areas of equivalent area, partly perhaps because of a reduced rate of immigration and a high rate of extinction. (See Abbott, 1974 and Ford and Paton, 1975 for a discussion of the birds of Kangaroo Island and the neighbouring peninsulas of South Australia). If National Parks do act as islands, it is probable that species which are apparently "safely conserved" will become extinct, and will not be able to recolonise if source areas are few and distant.

The present study shows that there have been remarkably few changes in the abundance and status of birds in Para Wirra National Park over ten years. The majority of species seen in only one of the studies were occasional or rare visitors, and most of them were not species typical of sclerophyll forest or savannah woodland. The species which have changed in abundance have mostly moved between neighbouring categories of abundance. This apparent

stability is not really surprising for two main reasons.

(1) The period of ten years is very short. The time taken to reach the new reduced equilibrium of species would probably be of the order of hundreds or maybe thousands of years.

(2) The effective area of Para Wirra is rather more than its 3,500 acres because of the large area of native vegetation around the South Para and Barossa Reservoirs, and Hale and Warren Conservation Parks less than five km away. Para Wirra would be a more valuable conservation area if this whole area is retained in its present condition.

There are also reasonable explanations for some of the changes in abundance. A large number of visitors from the more arid parts of the State were not seen in 1973-5 — a period of high rainfall throughout Australia. Many species associated with open habitats were less common, perhaps because of continued regrowth of cleared areas within the Park. Nevertheless special attention should be paid to the species which have decreased in case they are undergoing a local or widespread decline. A more widespread survey of these species would be appropriate at this time.

We should like to end with a plea that Para Wirra Recreation Park will be extended in total area — as no other National Parks in the State cover a similar range of habitats — or at least that the area of similar and relatively unspoilt habitat to the north and east of the Park will be effectively conserved.

ACKNOWLEDGEMENTS

We are grateful to the National Parks and Wildlife Service of South Australia for letting us work in the Park, for providing the map (Fig. 1) for us to copy and other information on various aspects of the Park. We are also grateful to the Rangers at Para Wirra, especially G. Harrington and C. Waters, for their assistance and enthusiasm while we were carrying out the survey. We should also like to thank K. Woodcock for reading and commenting on the manuscript and adding some of his observations.

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TABLE 1. Species seen in one survey only. I—introduced. D—associated with drier or more open habitats. W.—waterbirds.

1963-5 only		1973-5 only	
Rare		**Rare**	
Hoary-headed Grebe	W	Pelican	W
Spotted Nightjar	D	Little Falcon	
Red-backed Kingfisher	D	Indian Dove	
Fairy Martin	D	Pallid Cuckoo	D
Purple-backed Wren	D	Black-eared Cuckoo	D
Red-capped Robin	D	Spinetailed Swift	
Black Honeyeater	D	Little Thornbill	D
Noisy Miner		Singing Honeyeater	D
Little Wattlebird			
Occasional		**Occasional**	
Wood Duck	W	Collared Sparrowhawk	
White-winged Triller	D		
White-fronted Chat	D		
Spotted Pardalote			
Greenfinch			
Masked Woodswallow	D		
White-browed Woodswallow	D		
Grey Butcherbird	D		
Frequent		**Frequent**	
Spur-winged Plover	W	Mallard	1
Black-fronted Dotterel	W	Crested Pigeon	D
Pipit	D	Yellow-tailed Pardalote	D
Little Grebe	W		
		Common	
		Emu	I

TABLE 2. Changes in abundance between the categories common—frequent—occasional. D—particularly associated with savannah woodland or drier habitats.

Common — Frequent		**Frequent - Common**	
Horsfield Bronze-cuckoo		Golden Whistler	
Whiteface	D	Mistletoebird	
Restless Flycatcher		Silvereye	
Jacky Winter	D	Yellow-faced Honeyeater	
Hooded Robin	D	Brown-headed Honeyeater	
Rufous Whistler	D	House Sparrow	
White-throated Treecreeper		Dusky Woodswallow	
Diamond Firetail	D		
Frequent — Occasional		**Occasional — Frequent**	
Brown Falcon		Black-chinned Honeyeater	D
		Eastern Spinebill	
Frequent — Rare		**Rare — Frequent**	
Little Eagle		Brush Bronzewing	
Cockatiel		Domestic Pigeon	

TABLE 3.—Species which increase in numbers in summer and winter, or which are absent in mid-summer or mid-winter.

Summer visitor	**Winter visitor**
Cockatiel	Fan-tailed Cuckoo
Sacred Kingfisher	Horsfield Bronze-cuckoo
Rainbowbird	Welcome Swallow
Rufous Whistler	Grey Fantail
	Silvereye
	Yellow-faced Honeyeater
	White-naped Honeyeater
Absent mid-winter	**Absent mid-summer**
Peaceful Dove	Musk Lorikeet
	Purple-crowned Lorikeet
	Mistletoebird
	Red Wattlebird