A preliminary summary of bird banding conducted within the Broome Peninsula 2000-2010 and

the relationship of this data to the vegetation community described as "Mangarr community on relict dune systems."

Prepared by

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INTRODUCTION

Jan Lewis has been involved in voluntary bird research since 1998 and has assisted in bird surveys conducted by Broome Bird Observatory, the Australasian Wader Study Group, Mornington Wildlife Sanctuary, DEC and Save the Gouldian Fund. Jan became a licensed bird bander in 2000 and currently operates two research projects:

- In Broome: Avian dynamics in the coastal habitat of Broome Peninsula
- In Wyndham: Comparative ecology of some little known East Kimberley passerines.

Jan has published several articles detailing the findings of her research, including articles in Amytornis, the Western Australian Journal of Ornithology:

"Ageing and sexing Red-headed Honeyeaters (*Myzomela erythrocephala*), with notes on aspects of the breeding biology" **Amytornis 2** (2010). p 15-24.

"Timing of breeding and wing moult in the Yellow White-eye (*Zosterops luteus*) near Broome, Western Australia". **Amytornis 3**, (2011). pp13-18.

"Synchronous breeding by the Star Finch (*Neochmia ruficauda)* in the east Kimberley, WA". **Amytornis 2** (2010), p 25-28.

"Post juvenile moult and associated changes in bare parts in Star Finches (*Neochmia ruficauda*) in the Wyndham region of WA". Accepted for publication in Amytornis volume 4.

BACKGROUND

Bird research has been conducted in Minyirr Park between the Broome Port and Barred Creek since late 2000 under license from Environment Australia and with the permission of the former Coastal Landcare Management Committee, the Port of Broome and the Yawuru/Goolarabaloo Traditional Owners.

Three of the capture sites used in the project are within close proximity to areas containing the plant community identified by Tudgeon (1990) as "inland dunes" which has later been described by Dureau et al. (2011) as "Mangarr on relict dunes."

Between 2000 and 2010, 117 bird banding sessions have been conducted in these three locations resulting in the capture of 8,054 birds of 53 different species.

Maps 1-3 show the location of the banding sites in relation to the areas mapped by Dureau et al. (2011) and also by Environs Kimberley (L. Beames pers com) as Mangarr on relict dunes community. Maps have been developed by SKIPA/ Environs Kimberley in preparation for the community to be nominated for listing as a Priority Ecological Community. The closest sites are:

Site 5 adjacent to the Broome Racecourse (17° 58' 68"S; 122° 11' 45"E) is within **100 metres** of the racecourse Mangarr site and approximately 540m to the 2nd most northern Mangarr site.

Site 4 where the coastal vine thicket narrows near Gantheaume Point (17° 58' 25"S; 122° 11' 63"E) is approximately **430m** from the racecourse Mangarr site.

Site 6 near to the Lighthouse at Broome Port (18° 00' 35"S; 122° 12' 43"E) is approximately **920m** from the southern-most Mangarr site.

Each bird banding site contains a number of species that also occur in Mangarr on relict dune habitat, including Mangarr (*Pouteria sericea*), Gumamu / Tropical Sandalwood (*Santalum lanceolatum*), Mirda/Stinkwood (*Gyrocarpus americanus*), Jigal (*Lysiphyllum cunninghamii)* and Sandpaper Fig (*Ficus opposita*). How dependant the species captured in this study are on the Mangarr on relict dune habitat for different aspects of their ecology (feeding/nesting/protective cover/roosting etc.) was not considered in this study. However, the frequency of capture in areas adjacent to that habitat suggests that, for some species at least, the vegetation community plays an important role.

Map 1: Capture sites 4, 5 and 6 in relation to Mangarr on relict dune habitat
Green lines surround confirmed Mangarr on relict dune habitat. Orange lines surround Mangarr on relict dune habitat that has been located from aerial maps.

METHODS

Birds were caught in mist nets erected in mid to late afternoon and left open until dusk. The same nets were re-opened at first light the next day and left open until temperatures became too high for birds to be safe. On average over the 2 days, banding sessions lasted for six to eight hours, depending on the time of the year and the strength and onset time of the westerly sea breeze.

Three 12 x 2.7 metre and four or five 9 x 2.7metre nets, each with 31mm mesh, were used. Nets were erected in the same general area at each site visit, although exact net line locations were based on maximising the capture of birds eg. if a particular species of tree was flowering, more nets might be located nearby.

Each individual captured was banded on the right tarsus with a numbered metal band supplied by the Australian Bird and Bat Banding Scheme (ABBBS) and examined to establish its species, age, sex and breeding condition. Processing of birds was undertaken by the author, or a collaborating licensed bander. Measurements were taken of each bird's wing length, head to bill length, and weight. The status of moult in primary wing feathers was recorded according to the conventions in Lowe (1989[1]). Birds were released when they had been processed. All data were submitted to the ABBBS on a monthly basis.

It should be noted that the variety of species captured is limited by the capture technique. Almost always, larger birds such as Great Bowerbirds *(Chlamydera nuchalis),* Pied Butcher Bird *(Cracticus nigrogularis),* Bar-shouldered Dove *(Geopelia humeralis)* or birds of prey are able to escape from a mist net. Capturing parrots and lorikeets is a highly stressful experience for bird and researcher, therefore nets were mostly closed or moved if parrot capture was imminent. The data attached therefore represents a minimum rather than maximum species list.

[1] Lowe, K. (1989). *The Australian Bird Bander's Manual*, (ANPWS, Canberra.)

RESULTS

117 banding sessions were held between 2000 and 2010. This resulted in the capture of 8,054 birds of 53 species at Site 4, 5 and 6 (Table 1). Honeyeater species (family Meliphagidae) predominated, particularly Brown Honeyeater (*Lichmera indistincta*), Singing Honeyeater (*Lichenostomus virescens*) and Rufous-throated Honeyeater (*Conopophila rufogularis*). These three species accounted for 87% of the birds caught.

Table 1: Catch results from 2000 to 2010 at Sites 4,5, and 6 Minyirr Park South

	Site 04	Site 05	Site 06	Total sites 4-6
Brown Quail		2		2
Peaceful Dove	12	38	20	70
Diamond Dove		7		7
Bar-shouldered Dove	5	1		6
Brown Goshawk	2	2	1	5
Collared Sparrowhawk		1		1
Little Eagle	2	1		3
Nankeen Kestrel		1		1
Red-winged Parrot		3		3
Blue-winged Kookaburra		1	1	2
Sacred Kingfisher	2	6	5	13
Rainbow Bee-eater	4	5	4	13
Brush Cuckoo	4	1		5
Black-eared Cuckoo	3	3		6
Horsefield's Bronze-cuckoo	7	12	1	20
Shining Bronze-cuckoo		1		1
Little Bronze-cuckoo	2	3		5
Tree Martin		2		2
Kimberley Flycatcher			1	1
Rufous Whistler	33	42	2	77
Grey Shrike-thrush	17	7	7	31
Magpie Lark		0	1	1
Black-faced Cuckoo Shrike	1	3	4	8
White-winged Triller	18	17	3	38
Grey-crowned Babbler	7	29	7	43
White-throated Gerygone	2	4		6
Variegated Fairy Wren	1	22	3	26
Red-backed Fairy Wren		23		23
Black-faced Wood Swallow	1	1		2
Mistletoebird	64	87	17	168
Yellow White-eye	3	106	72	181
White-throated Honeyeater		4		4
Black-chinned Honeyeater		1		1
Red-headed Honeyeater	2	21		23
Banded Honeyeater		2		2
Black Honeyeater		2		2
White-fronted Honeyeater		19		19
Brown Honeyeater	932	2591	621	4144

	Site 04	Site 05	Site 06	Total sites 4-6
Rufous-throated Honeyeater	253	189	417	859
Pied Honeyeater		2		2
Singing Honeyeater	370	1327	325	2022
Grey-headed Honeyeater		0	4	4
Yellow-tinted Honeyeater		1		1
White-gaped Honeyeater	8	1	11	20
Little Friarbird	25	15	59	99
Zebra Finch	3	0		3
Painted Finch		3		3
Double-barred Finch	14	33	5	52
Long-tailed Finch		7		7
Olive-backed Oriole	2	1	8	11
Great Bowerbird	2	0		2
Pied Butcherbird	2	0	1	3
Paperbark Flycatcher		1		1
Total birds /site	1803	4651	1599	8054
No. species	31	52	25	53
No. banding sessions	41	56	20	117

Analysis of recapture data for the total project (i.e. between the Broome Port and Barred Creek) reveals that:

- Brown honeyeaters are not only the dominant but also the most mobile species occurring in the Minyirr Park coastal habitat. 17.5% of retrapped birds moved from the site where they were originally captured, and most of these movements were further than the adjacent banding site. The longest movement recorded, of 37kms between the Port and Barred Creek, is the farthest that the project allows for.

- Singing honeyeaters are the second most common species in the coastal habitat. They are also quite mobile, 10% of re-trapped birds having moved sites since being banded. However, their movements are much shorter. Despite 783 birds being recaptured, the longest movement record is only 4kms, and the majority of movements are between banding sites only 1km apart. Several movements between the Port (site 6) and the Racecourse (site 5) have been recorded.

A number of insectivorous and/or fructivorous species which specialise in exploiting the habitat provided by larger trees are regularly present at sites 4-6 in the south of Minyirr Park near to Mangarr on relict dune habitat, including Grey Shrike-thrush (*Colluricincla harmonica*), Rufous Whistler (*Pachycephala rufiventris*), Grey-crowned Babbler (*Pomatostomus temporalis*), Olive-backed Oriole (*Oriolus sagittatus*), White-gaped Honeyeater (*Lichenostomus unicolor*) and Mistletoebird *(Dicaeum hirundinaceum*). The project has also recorded one capture of a Kimberley Flycatcher (*Microeca flavigaster tormenti*) at Site 6 near the Port. This bird, more usually found in mangrove habitat, is considered a sub-species of the Lemon-bellied Flycatcher (*Microeca flavigaster*).

Project data from all sites (Table 2) suggests these species are largely site faithful. Recaptures occur, but few inter-site movements have been recorded. In fact some birds are determinedly site faithful. A male Rufous Whistler, for example, was recaptured nine times at site 05 between his initial capture in August 2002 and August 2009.

Table 2: Movement records of insectivorous/fructivorous species in Minyirr Park

Species	Recaptures	No. movements	Longest distance
Grey Shrike-thrush	12	2	4km
Rufous Whistler	75	3	15 km Racecourse to Coconut Wells
Grey-crowned Babbler	36	1	2km
White-gaped Honeyeater	28	3	15 km Racecourse to Coconut Wells
Mistletoebird	31	1	22.5km Racecourse to Willie Creek

Several seasonal visitors occur in the south Minyirr Park habitat, supplementing the smaller number of residents of the same species. Large flocks of Rainbow Bee-eaters (*Merops ornatus*) migrating north/south between Indonesia are sometimes sighted (although less seldom caught). A number of cuckoo species, particularly Horsefield's Bronze-cuckoo (*Chrysococcyx basalis*) occur when honeyeaters are breeding. The dry season also sees an influx of White-winged Triller (*Lalage tricolor).*

DISCUSSION

Mangarr in relict dune habitat consists of a number of plants that provide important habitat for birds. At warmer times of the year most birds retreat to the shade of larger trees during the heat of the day. Many also roost in larger trees at night, and make their nests there during the breeding season. Several tree species also provide food for birds. At the end of the dry season when most other species have ceased flowering until the first rains bring the Guwal (*Fluegga virosa*) and Badar Badar (*Mallotus nesphillus*) into flower, the flowers of the various mistletoe species are especially important for nectivorous birds such as honeyeaters.

Brown and Rufous-throated Honeyeaters in particular, are reliant on the blossom of flowering trees for food. In several years huge influxes of Rufous-throated Honeyeaters have been observed when Jigal (*Lysiphyllum cunninghamii*) trees are flowering, that are not present when the species is not in flower. This tree is common throughout the area, including in those areas identified as Mangarr on relict dunes. Similarly, Brown Honeyeaters flock to flowering Mangarr on relict dunes species, Broome Bloodwood (*Eucalyptus zygophylla*). At the Site 5 Race-course *Grevillea refracta* is an important nectar-rich species for all honeyeaters, particularly as it flowers for long periods in the dry season.

In other seasons, important trees/shrubs for all honeyeaters include Jarridiny (Hakea macrocarpa), Minmin (*Crotalaria cunninghamii*), Guwal (*Fluegga virosa*), Goolyi (*Caesalpina major*) and varieties of mistletoe, all Mangarr habitat species. It is highly likely that many honeyeaters have a regular route that they traverse, as different species come into flower. For example, in several instances brown honeyeaters have been recaptured feeding on the same tree where they were originally caught a year or several years later, having not been seen at that location in the intervening months. Access to flowering trees is always dependent on the number of Little Friarbirds present. These birds behave very territorially when trees are in flower, chasing away smaller birds that try and feed there.

Catch numbers for Frugivores/Insectivores are lower than for honeyeaters because the territorial nature of several of these species, including Grey Shrike-thrush, Great Bowerbird and Rufous Whistlers, means that numbers are actually lower than those of migratory honeyeater species. Also they are more difficult to catch especially if they remain watching from a tree/groups of trees and do not move across more open country where nets can be erected. These insectivorous or fructivorous birds may well spend some of their time in the Mangarr on relict dunes habitat, flying out to adjacent habitats to exploit the fruit and insect life on flowering trees and shrubs there. Flowering Mirda (*Gyrocarpus americanus*) is particularly attractive to insectivores such as Rufous Whistlers; fruiting trees such as Sandpaper Fig (*Ficus opposita*) attract Great Bowerbirds and Olive-backed Orioles.

Another interesting phenomenon, apparent only at the southern tip of Minyirr Park is the presence of small numbers of birds generally regarded as desert species. These include Grey-headed Honeyeater (*Lichenostomus keartlandi*), White-fronted Honeyeater (*Phylidonyris albifrons*), Black Honeyeater (*Certhionyx niger*), Painted Finch (*Emblema pictum*) and Zebra Finch (*Taeniopygia guttata*). These birds are only rarely observed or caught, however they are relatively common in inland country to the east of Broome. One possibility is that when conditions in inland desert country are particularly poor, they head to the coast, cross Roebuck Bay to Minyirr Park south where they find conditions suitable enough to remain. Whilst some of the species listed above have been captured as far north as the De Marchi entrance to Minyirr Park (17° 56' 42"S; 122° 12' 35"E) , none have been observed or captured north of the Buckley Plain.

Conclusion

The research indicates that the coastal habitat of Minyirr Park at the southern end of the Broome Peninsula is an important habitat for supporting the biodiversity of birds in the Broome region, and their movement north and south through the coastal strip.

Reductions in the quality, quantity and diversity of the vegetative habitat present on the Broome Peninsula will result in a concomitant reduction in bird species diversity. It is important to retain a continuous strip of coastal habitat and associated unique habitats such as the Mangarr on relict dune system.

Map 2: proximity of Site 4 and 5 to the two northern-most Mangarr on relict dune sites

Green lines surround confirmed Mangarr on relict dune habitat. Orange lines surround Mangarr on relict dune habitat that has been located from aerial maps

Map 3: proximity of Site 6 to Mangarr on relict dune sites

Green lines surround confirmed Mangarr on relict dune habitat.