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Front cover: Bourke's Parrot, Welford National Park. Photograph by Mary Hume.

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Avifauna of Deliverance Island (Warul Kawa) and Kerr Islet (Awaiyal Kawa), North-Western Torres Strait

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Abstract

Warul Kawa (Deliverance Island), a small, densely forested sand cay, is the most north-westerly island in Torres Strait, far north Queensland. Awaiyal Kawa (Kerr Islet), a smaller cay, is located 9.5 km to the south of Warul Kawa and supports low dune wood/shrubland and patchy grassland. Two bird surveys in December 2011 and November 2012 recorded 55 and 49 species, respectively. To date, a total of 70 species are collectively known from these islands. All 34 species recorded on Awaiyal Kawa are also reported for Warul Kawa. This paper presents a comprehensive species list and discusses unusual bird records. Potential threats to island fauna and management issues are identified.

Introduction

Warul Kawa (meaning 'island of turtles') or Deliverance Island (9º 31' S, 141º 34' E) is approximately 140 km north-west of Cape York Peninsula, 35 km south of the Papua New Guinea (PNG) coast and 67 km west of Boigu Island, the nearest inhabited island in Torres Strait. Its Indigenous name reflects the fact the island is a significant nesting site for several species of marine turtles in the region.

Awaiyal Kawa (meaning 'island of pelicans'), also known as Kerr Islet or Kiss Islet (9º 37' S, 141º 34' E) is a low-lying sand cay, approximately 1.8 ha in area, sparsely covered with grasses, shrubs, vines and coconut palms. The island supports a rookery of Australian Pelicans *Pelecanus conspicillatus,* and like Warul Kawa, it is an important sea turtle nesting site (Anonymous 1877; Limpus *et al.* 1989; Hitchcock 2007).

Warul Kawa is approximately 1.4 km long and 0.5 km at its widest, with a total area of about 43 ha. It is surrounded by a shallow reef platform comprising sandy patches and algal growth on rocky substrate with intermittent seagrass beds. Along the western shoreline mudflats (previously supporting mangrove: Nelson Gibuma, personal communication) and rocky outcrops are exposed at low tide along with an extensive sandbank approximately 3 km off the south-west corner of the island.

Fell (2012) identifies five vegetation communities on the island:

- Closed forest (semi-deciduous vine forest) (25–30 m) dominated by *Pisonia grandis* with associated *Terminalia catappa, Manilkara kauki* and *Milletia pinnata* occurring on organic coralline sand (coral cay).

- Closed forest (12–16 m) dominated by *Manilkara kauki* and *Aglaia eleagnoidea* with *Diospyros maritima* and *Guettarda speciose* occurring on coralline sand.
- Deciduous vine thicket/dune shrubland (3–6 m) dominated by *Premna serratifolia, Mimusops elengii, Diospyros maritima, Guettardia speciosa, Aglaia eleagnoidea* and scattered *Acacia auriculiformis* occurring on coralline sand.
- Dune herbland/shrubland (1–5 m) of *Euphorbia pallens, Sesuvium portulacastrum* and *Ipomoea pres capre* subsp. *brasiliensis,* with occasional shrubs of *Clerodendrum inerme, Caesalpinea bonduc, Scaevola taccada, Hibiscus tiliaceus* and *Premna serratifolia* occurring on exposed coralline sand above the highest tide mark

Warul Kawa was declared an Indigenous Protected Area (IPA) on 15 February 2001 under the Commonwealth Government's National Reserve System; the total area of 3,500 ha covers the island and the surrounding reef flats and is managed by the traditional owners – the people of Boigu, Saibai, Dauan, Mabuyag and Badu Islands – with support provided by the Torres Strait Regional Authority (TSRA) (Waia *et al.* 2001; MacFarlane & Hitchcock 2009).

MacFarlane and Hitchcock (2009) summarised the recent history of Warul Kawa, including the presence of the Danish-born hermit, Harold Enevoldsen (known locally as 'German Harry') between the 1890s and 1928, who introduced a range of exotic birds and animals, including fowls, ducks, pigs, dogs and cats. It is assumed that these introduced species had a significant impact on the island's native fauna and flora. None of these species are extant on the island today.

Warul Kawa has remained uninhabited (Awaiyal Kawa is also not inhabited) since Harry's death in 1928, although there is occasional visitation by Torres Strait Islanders, Papua New Guineans and Indonesian fisherman (Limpus *et al.* 1989).

Draffan *et al.* (1983) claimed 14 species of birds were known from Warul Kawa, but named only 13 in their paper. MacFarlane and Hitchcock (2009) completed a two-day bird survey in September 1999 (mid dry season) and reported a total of 33 species for the island, including eight listed by Draffan *et al.*, and a total of eight species for Awaiyal Kawa (all also recorded on Warul Kawa). Table 1 lists the bird species recorded to date on these islands.

Aim

This study was undertaken as part of a set of broader surveys that aimed to further document the cultural and natural values of Warul Kawa and Awaiyal Kawa, inform the development of a management plan for Warul

Kawa IPA (Maluilgal RNTBC & Arafura Consulting 2013) and train TSRA Rangers in ecological survey techniques. The biophysical investigations aimed to systematically record terrestrial vertebrate fauna (birds, mammals and reptiles) on the islands, describe their habitats and identify key ecological values and threats. This paper describes the results of the avifauna surveys undertaken in 2011 and 2012; full results of the broader assessment are summarized in a report by Watson (2013).

Methods

We visited Warul Kawa for five days between 30 November and 4 December 2011, at the start of the wet season. Average rainfall for December, based on records for Boigu, is 115 mm. Annual average rainfall is 1,570 mm, with 75% falling during a wet season between December and May (Bureau of Meteorology 2015). Rain fell each day or night during this study, with mornings and evenings cooler than the middle of the day.

We also visited Warul Kawa for five days between 26 and 30 November 2012, and Awaiyal Kawa for a period of five hours on 29 November 2012. During the 2012 survey, light south-easterly winds were frequent, it did not rain and slightly cooler temperatures prevailed than in the earlier (2011) survey.

All habitats on Warul Kawa were examined by walking through or scanning the area with Swarovski 10 x 42 binoculars or a Kowa TSN821 (20–60 mm) spotting scope. Habitats surveyed included the dry reef, covered reef, rocky/mud and sandy shoreline, sand banks, dune herbland/ shrubland, vine thicket/dune shrubland and closed forest. Awaiyal Kawa is a small island and the entire area was traversed.

On Warul Kawa, target surveys were completed daily and included transects through the thicket vegetation and around the perimeter of the island. A minimum of four systematic surveys were completed for morning and afternoon periods during both the 2001 and 2012 expeditions. Nocturnal surveys (four in total, each of two hour's duration for 2011 and 2012) were also completed. Waders and seabirds were surveyed at low, flood, high and ebb tide throughout the survey period. In 2012, surveys were also completed along the tidal sandspit/sandbank that extends to the south-west of Warul Kawa. In addition to active surveys, incidental observations were noted continuously for the duration of our time on the islands, including any evidence of breeding. The avian systematics and taxonomy adopted here follows Christidis and Boles (2008).

Results and discussion

These surveys, more than a decade after the 1999 survey, identified a total of 70 and 34 bird species on Warul Kawa and Awaiyal Kawa, respectively (Table 1).

In contrast, MacFarlane and Hitchcock (2009) reported 33 species for Warul Kawa and eight species for Awaiyal Kawa. Four of the species recorded by MacFarlane and Hitchcock (Wandering Tattler *Tringa incana,* Sharp-tailed Sandpiper *Calidris acuminata,* Beach Stone-curlew *Esacus magnirostris* and Yellow White-eye *Zosterops luteus*) were not recorded during this study. The total species list for Warul Kawa, including Awaiyal Kawa, now comprises 70 species. Although not confirmed, it is possible that 18 species (excluding possible Laridae species) may breed on the island/s (Table 1).

Despite no Australian pelicans being recorded breeding on Awaiyal Kawa when viewed from helicopter on 30 November 2011, or when the island was visited during 2012, abandoned nests and dead juvenile birds were noted. This broadly aligns with the August–September breeding season described by the TSRA Rangers (personal communication) and noted by Hitchcock (2007).

An anonymous (1877) account, prior to European occupation, noted the presence of Orange-footed Scrubfowl *Megapodius reinwardt* on Warul Kawa. Later visitors remarked on the presence of a large number of cats, which possibly led to their extirpation during German Harry's residence (Hitchcock 2007). MacFarlane and Hitchcock (2009) suggest that the species subsequently recolonized the island (most likely from coastal areas of southern New Guinea and/or other islands in Torres Strait) and estimated that Warul Kawa supported a population of approximately 30 birds. While a systematic count of megapodes was not completed during this study, our results also indicate that at least 30 individuals currently inhabit the island, suggesting that the population may have remained relatively stable in recent times.

Birds of interest recorded from these islands include a number of species of conservation significance (i.e. listed as migratory, marine and/or threatened under State and Commonwealth legislation). These include the federally listed (*Environment Protection and Biodiversity Conservation Act* 1999) Beach Stone-curlew (vulnerable), Curlew Sandpiper *Calidris ferruginea* (critically endangered) and Eastern Curlew *Numenius madagascariensis* (critically endangered). An additional 26 species are listed as marine/ migratory species under the Commonwealth (special least concern under the State) legislation (refer Table 1).

Of general ornithological interest was the observation of a number (at least four) of Eastern Yellow Wagtails *Motacilla (flava) tschutschensis,* recorded on the eastern side of the island, flying south over a period of two days, 2–3 December 2012 (late afternoon, and midday and afternoon respectively). Birds were followed on a number of occasions, displaying characteristic extended flight, dipping and calling to perch sites in the low dune vegetation on the south-east side of the island. It is considered that these birds were on a southward passage, towards northern Australia where they are reported to

be a regular summer (wet season) migrant (Higgins *et al.* 2006; Pizzey & Knight 2012). Although there are no records for this species in Torres Strait (Draffan *et al.* 1983; Clarke & Ewen 2008), it would generally be expected that this species travels as a summer migrant, en route through the Strait to the mainland. An observation of this species on Boigu Island in February 2012 (personal observation) adds weight to this theory.

A single Pacific Baza *Aviceda subcristata* was recorded hovering and flying over the northern part of the island on 4 December 2012 for approximately ten minutes. This record is of interest as this species is not considered common in Torres Strait. For example, Draffan *et al.* (1983) report only a single record from Prince of Wales Island in 1981 and it has not been recorded during recent surveys in northern Torres Strait (e.g. Clarke 2004; Clarke & Ewen 2008). It is, however, identified by Pizzey & Knight (2012) as occurring in PNG and islands off Cape York (Weipa to Torres Strait) (Marchant & Higgins 1993).

The Collared Imperial-Pigeon *Ducula mullerii,* traditionally considered a PNG species, is now fairly regularly recorded in northern Torres Strait (pers. obs.; Clarke 2004; Pizzey & Knight 2012) and one bird was seen flying from thicket on the western of the island on the morning of 4 December 2012.

Given its close proximity to PNG, it may be expected that additional species from PNG, and other migratory species, will be recorded on Warul Kawa in the future. Two 'PNG' species (Papuan Spine-tailed Swift *Mearnsia novaeguinea* and Orange-bellied Fruit-Dove *Ptilinopsis iozonus*) have recently been added to the Australian species list, having been observed on Boigu Island (Clarke 2006, 2007) and may potentially visit Warul Kawa.

As mentioned above, MacFarlane and Hitchcock (2009) previously recorded four species that were not observed during the 2011–2012 study (refer also Table 1). Of these, Yellow White-eye is not known from Torres Strait (Draffan *et al.* 1983; Clarke 2004; Clarke & Ewen 2008; Pizzey & Knight 2012). It is reported to occur on Cape York, northern Australia and some islands in the north-west (Higgins *et al.* 2006; Pizzey & Knight 2012). MacFarlane's field notes indicate possibly 14 birds, with very yellow breast and underparts active in the north-eastern part of the island.

We did not record Wandering Tattler or Sharp-tailed Sandpiper during our surveys. However, they were observed on Boigu Island, immediately following the Warul Kawa surveys and are known from elsewhere in Torres Strait (personal observation). Consequently, despite some discrepancies in MacFarlane's notes over the identity of these species, it seems reasonable to include them as likely users of these islands. Seasonal variation in survey timing could well explain their absence during recent surveys.

Beach Stone-curlew was also not recorded during the 2011–2012 surveys but is known from many other islands in Torres Strait (personal observation), thus most likely also occurs on Warul Kawa and Awaiyal Kawa at times.

Table 1. Bird species recorded for Warul Kawa (Deliverance Island) and Awaiyal Kawa (Kerr Islet), north-western Torres Strait.

Species (Family in Bold) [Local name in parentheses]	Scientific Name	Comments/ Observations[1]	Conser-vation Status[2]	Warul Kawa	Awaiyal Kawa
Megapodiidae					
Orange-footed Scrub-fowl [*surka*]	*Megapodius reinwardt*	Numerous mounds, nesting, Br		X	
Anatidae					
Pacific Black Duck [*beuger*]	*Anas superciliosa*	Birds seen flying in 2011		X	
Columbidae					
Emerald Dove	*Chalcophaps indica*	Few birds recorded in forest/woodland in 2012, Br		X	
Bar-shouldered Dove [*kuduluk*]	*Geopelia humeralis*	Abundant*, Br		X	
Rose-crowned Fruit-Dove [*waba*]	*Ptilinopus regina*	Occasional, but expected to be common, Br		X	*
Collared Imperial-Pigeon [*wau goenaw*]	*Ducula mullerii*	PNG species recorded in northern Torres Strait, sin-gle bird seen flying from tall thicket in 2011 (refer text)		X	
Pied Imperial-Pigeon [*goenaw*]	*Ducula bicolor*	Many birds roosting & fly-ing to/from island		X	X
Caprimulgidae					
Large-tailed Nightjar [*gugu*]	*Caprimulgus macrurus*	Encountered in dune thicket vegetation, Br		X	
Fregatidae					
Lesser Frigatebird [*waumer*]	*Fregata ariel*	Common	SL	X	X
Great Frigatebird [*waumer*]	*Fregata minor*	Single bird seen with *F.ariel*	SL	X	X
Sulidae					
Brown Booby [*dabay*]	*Sula leucogaster*	Few birds recorded offshore	SL	X	X
Anhingidae					
Australasian Darter	*Anhinga novaehollandiae*	Single birds seen feeding in shallows in 2012		X	X
Phalacrocoracidae					
Little Pied Cormorant	*Microcarbo melanoleucos*	Single bird seen on west of island in 2012		X	
Great Cormorant	*Phalacrocorax carbo*	Pair of birds on sandbank & flying		X	X
Pied Cormorant [*tulugamay*]	*Phalacrocorax varius*	Birds recorded on reef/ sandflats		X	X

Table 1 cont.

Species (Family in Bold) [Local name in parentheses]	Scientific Name	Comments/ Observations[1]	Conservation Status[2]	Warul Kawa	Awaiyal Kawa
Pelecanidae					
Australian Pelican [*away*]	*Pelecanus conspicillatus*	Nesting on Awaiyal Kawa Islet (Hitchcock 2007); roosting on Warul Kawa; flock of >250 birds seen 2012, Br		X	X
Ardeidae					
Intermediate Egret [*karbai*]	*Ardea intermedia*	Reef/sandflats in 2011		X	
Striated Heron [*gawi*]	*Butorides striata*	Recorded in mud & sandflats (west of island)		X	
Little Egret	*Egretta garzetta*	Single bird foraging in shallows in 2012		X	
Eastern Reef Egret [*karbai*]	*Egretta sacra*	Abundant on sandflats/reef	SL	X	X
Nankeen Night-Heron [*Warul Kawa gawi*]	*Nycticorax caledonicus*	Abundant in thicket/dune vegetation, >50 recorded Awaiyal Kawa 2012 & suspected nesting, Br		X	X
Threskiornithidae					
Australian White Ibis [*bukiri*]	*Threskiornis molucca*	Few birds recorded on reef/ sandflats and flying		X	
Royal Spoonbill [*tarpu*]	*Platalea regia*	Birds recorded flying over on two occasions in 2011		X	
Accipitridae					
Pacific Baza	*Aviceda subcristata*	Single bird recorded flying/ hovering in 2011		X	
White-bellied Sea-Eagle [*ngagalaig*]	*Haliaeetus leucogaster*	Suspected breeding, pair (2011 and 2012) with subadult (2012), Br	SL	X	X
Rallidae					
Buff-banded Rail [*beugi*]	*Gallirallus philippensis*	Recorded on beach/edge of thicket vegetation		X	X
Burhinidae					
Beach Stone-curlew [*karawagi*]	*Esacus magnirostris*	* refer comments in text, Br	QV	*	
Haematopodidae					
Australian Pied Oystercatcher	*Haematopus longirostris*	Pair recorded on sandflats, Br		X	
Charadriidae					
Pacific Golden Plover	*Pluvialis fulva*	Fairly common on reef/ sandflats	SL	X	X
Grey Plover	*Pluvialis squatarola*	Recorded on reef/sandflats	SL	X	X

Table 1 cont.

Species (Family in Bold) [Local name in parentheses]	Scientific Name	Comments/ Observations[1]	Conser-vation Status[2]	Warul Kawa	Awaiyal Kawa
Lesser Sand Plover	*Charadrius mongolus*	Recorded on reef/sandflats, common along shoreline, large high tide roost SW sandbank	SL	X	X
Greater Sand Plover	*Charadrius leschenaultii*	Recorded on reef/sandflats	SL	X	X
Scolopacidae					
Masked Lapwing [*puiteretere*]	*Vanellus miles*	Few birds recorded on reef/ sandflats		X	
Bar-tailed Godwit	*Limosa lapponica*	Common on reef/sandflats	SL	X	X
Whimbrel	*Numenius phaeopus*	Recorded on reef/sandflats	SL	X	X
Eastern Curlew	*Numenius madagascariensis*	Few birds on reef/sandflat	QV, CCE	X	
Terek Sandpiper	*Xenus cinereus*	Recorded on reef/sandflats	SL	X	
Common Sandpiper	*Actitis hypoleucos*	Recorded on mud/reef area	SL	X	
Grey-tailed Tattler	*Tringa brevipes*	Very abundant wader species	SL	X	X
Wandering Tattler	*Tringa incana*	* refer comments in text	SL	*	
Common Greenshank	*Tringa nebularia*	Recorded on reef/sandflats	SL	X	X
Ruddy Turnstone	*Arenaria interpres*	Recorded on reef/sandflats	SL	X	X
Great Knot	*Calidris tenuirostris*	Recorded on reef/sandflats	SL	X	X
Red-necked Stint [*sui*]	*Calidris ruficollis*	Recorded on reef/sandflats, common along shoreline	SL	X	X
Sharp-tailed Sandpiper	*Calidris acuminata*	* refer comments in text	SL	*	
Curlew Sandpiper	*Calidris ferruginea*	Few birds recorded on reef/ sandflats	SL, CCE	X	X
Laridae Br (possible for some Laridae species)					
Black Noddy [*dua*]	*Anous minutus*	Single bird recorded in 2011 resting on beach in west & on Awaiyal Kawa in 2012		X	X
Common Noddy	*Anous stolidus*	Birds seen offshore & dead on Awaiyal Kawa in 2012	SL	X	X
Sooty Tern [*dua*]	*Onychoprion fuscata*	Few birds flying & on reef/ sandflats		X	X
Gull-billed Tern [*sara*]	*Gelochelidon nilotica*	Recorded flying & on reef/ sandflats in 2011		X	
Little Tern	*Sternula albifrons*		SL	X	X
Common Tern [*sara*]	*Sterna hirundo*	Sandbanks & flying in 2012	SL	X	X
Black-naped Tern [*sara*]	*Sterna sumatrana*	Recorded flying & on reef/ sandflats	SL	X	X
Crested Tern [*malu kiai*]	*Thalasseus bergii*	Large (>1000) roost on sand spit to SW, reported nesting on sandspit by TSRA Rangers		X	X

Table 1 cont.

Species (Family in Bold) [Local name in parentheses]	Scientific Name	Comments/ Observations[1]	Conservation Status[2]	Warul Kawa	Awaiyal Kawa
Silver Gull [*kipuru*]	*Chroicocephalus novaehollandiae*	Recorded flying & on reef/ sandflats		X	X
Cuculidae					
Pheasant Coucal [*palpul*]	*Centropus phasianinus*	Recorded in thicket vegetation in 2011, Br		X	
Eastern Koel [*gora*]	*Eudynamys orientalis*	Recorded in thicket vegetation in 2011		X	
Channel-billed Cuckoo	*Scythrops novaehollandiae*	Recorded in thicket vegetation & seen flying over island in 2011		X	
Meropidae					
Rainbow Bee-eater [*birubiru*]	*Merops ornatus*	Heard calling over island in 2011	SL	X	
Halcyonidae					
Sacred Kingfisher [*biuni*]	*Todiramphus sanctus*	Single bird in west in 2012, Br		X	
Pachycephalidae					
Mangrove Golden Whistler	*Pachycephala melanura*	Common in thicket vegetation, Br		X	
Dicruridae					
Spangled Drongo [*sansusu*]	*Dicrurus bracteatus*	Recorded in thicket & dune vegetation in 2011, Br		X	
Meliphagidae					
Red-headed Honeyeater [*kulka gamul muth*]	*Myzomela erythrocephala*	Common on Warul Kawa, Br		X	X
Monarchidae					
Broad-billed Flycatcher	*Myiagra ruficollis*	Common on Warul Kawa, Br		X	
Leaden Flycatcher [*yetamu*]	*Myiagra rubecula*	Uncommon in thicket & dune vegetation		X	
Paperbark (Restless) Flycatcher	*Myiagra nana*	Single bird seen in 2011 and 2012		X	
Timaliidae					
Pale White-eye [*pisum*]	*Zosterops citrinella*	Common on island, Br		X	
Yellow White-eye [*pisum*]	*Zosterops luteus*	* refer comments in text		*	
Nectariniidae					
Olive-backed Sunbird	*Nectarinia jugularis*	Few birds recorded in 2012, Br		X	
Motacillidae					
Eastern Yellow Wagtail	*Motacilla (flava) tschutschensis*	At least four individuals recorded on eastern side of island, flying south over two day period in 2011	SL	X	

Table 1 cont.

[1] Comments refer to Warul Kawa unless qualified.

[2] Conservation Status (as at October 2015): **Q** Queensland *Nature Conservation Act 1992;*

C Commonwealth *Environment Protection & Biodiversity Act 1999*.

SL special least concern; **V** vulnerable; **CE** critically endangered.

X recorded during the 2011 & 2012 study.

* reported by MacFarlane & Hitchcock (during 1999 study) and not during the current (2011 & 2012) study.

Br possible or suspected breeding.

No evidence was located of any breeding seabird colony on Warul Kawa, and this was confirmed by Boigu Islanders. With regard to this, it is of interest to note that large (> 30 m) Cabbage Trees, *Pisonia grandis,* occur on Warul Kawa. This species is a large, pale-trunked flowering tree, and its occurrence, particularly on islands largely composed of coral debris, is closely correlated to seabird distribution and nesting (Walker 1991). Within the Great Barrier Reef a range of bird species have been recorded with *Pisonia* fruits attached, including Pied Imperial Pigeon *Ducula bicolor,* Black Noddy *Anous minutus,* reef egrets and migratory waders (Walker 1991; Ogden 1993), and seabird colonies (e.g. noddies) are often associated with *Pisonia* forests in the Central Torres Strait Islands (Fell & Watson 2014). Given the maturity of the *Pisonia* trees on Warul Kawa, their extent and the correlation noted elsewhere, it appears likely that the island historically supported colonies of seabirds. Anthropogenic impacts on the island may be responsible for the current absence of seabird colonies but further investigations would be required to confirm this.

A large wader (including stints, sand plovers, godwits and tattlers) and seabird (terns) roost was observed at the sandspit (unvegetated sandbank) extending from the south-western part of Warul Kawa. The furthest portion of the sandbank is isolated from the main island during high tide and is only accessible for a short period during low tide. This area is also reported to support a large tern (likely Crested Tern *Thalasseus bergii*) nesting area (TSRA Rangers personal communication).

This study resulted in the first record of the introduced Black Rat *Rattus rattus* on Warul Kawa. Large numbers were observed on the island during both visits and it is considered a significant threat to most native fauna (Watson 2013). Although not quantified, the rat density appears to be high. Rats are known to predate both seabirds and turtle hatchlings on islands and can have significant impacts on populations of these species (Caut *et al.* 2008). While the State listed (i.e. vulnerable under the *Nature Conservation Act* 1992) Beach Stone-curlew has been reported nesting on many islands in Torres Strait (personal observation), rats are a known threat to this species hence breeding success on Warul Kawa is likely to be limited. The south-western

sandpit may afford some protection for ground nesting seabirds (e.g. Laridae), but considering its proximity, may also be subject to visitation by rats.

Given the historical anthropogenic impacts on the island and its biological resources, future management strategies will include the implementation of actions aimed at reversing or minimizing further degradation of these values. Rats have been successfully eradicated from numerous small islands worldwide, including many in the tropics (e.g. Phillips 2010; Keitt *et al.* 2015), and development of an eradication program on Warul Kawa is recommended. Human visitation, either legal (i.e. with the consent from the traditional owners) or illegally (without consent, as occurs when foreign fishermen visit the island) has the potential to further impact fauna and flora through the introduction of exotic species. The Warul Kawa IPA Plan of Management (Maluilgal RNTBC & Arafura Consulting), developed by the Traditional Owners and informed by the findings of the current study, sets out future management activities for the TSRA Rangers to address these issues.

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View (north eastwards) towards Warul Kawa from sand spit. Photo: J. Watson.

Vine thicket with Scrubfowl mound. *Pisonia* trees in background. Photo: J. Watson.

Mulga Parrot and Bourke's Parrot in Central-western Queensland

Andrew Ley[a] & Brian Tynan[b]

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The known ranges of Mulga Parrots and Bourke's Parrots have expanded in central-western Queensland in recent decades. This may be a result of our growing knowledge of bird distributions in the northern Channel Country of the Lake Eyre basin or because these species have been expanding their ranges, or both.

The Mulga Parrot *Psephotus varius* and Bourke's Parrot *Neopsephotus bourkii* have similarly shaped distributions covering the southern half of the Australian continent from south-western Queensland and western New South Wales to the west coast, with a significant north-south constriction in both where the species are largely absent from the Lake Eyre drainage in north-eastern South Australia and the Channel Country of central-western Queensland (Higgins 1999; Barrett *et al.* 2003).

In the 1980s the Queensland distributions were described as north to Quilpie and Charleville (south and east of Idalia National Park) for the Mulga Parrot, and north to Windorah (south of Welford National Park) for Bourke's Parrot (Storr 1984); Queensland records in the first Atlas went as far north as the 25° S grid block for the Mulga Parrot and as far north as the 26° S grid block for the Bourke's Parrot (Blakers *et al.* 1984). In the 1990s these distributions were extended, for both species, to Idalia National Park by Sharp & Sewell (1995) and to Diamantina National Park by Ley (1996). The northern limits for both species were extended again by Barrett *et al.* (2003) to the 24° S grid block for the Mulga Parrot and to the 23° S grid block for Bourke's. It is now apparent that both species are even more widely spread than this in the central-west of Queensland and are present in Diamantina, Bladensburg, Lochern, Welford and Idalia National Parks (Table 1), which are all in the headwaters of the Lake Eyre drainage, on the Diamantina, Thompson and Barcoo Rivers (Figure 1). Both species are most common in the south and south-east of this area, at Welford and Idalia, and least common in the north, at Bladensburg (Table 1).

To give some idea of the relative abundances of the two parrot species at each of the abovementioned parks we have collated for each park the number of records made of each species during our visits and the number of records for each species from the Queensland Government's Wildlife Online database. Our recording method, presence of a species in a one-minute grid block per visit, is explained in detail by Ley *et al.* (2011) (Table 1).

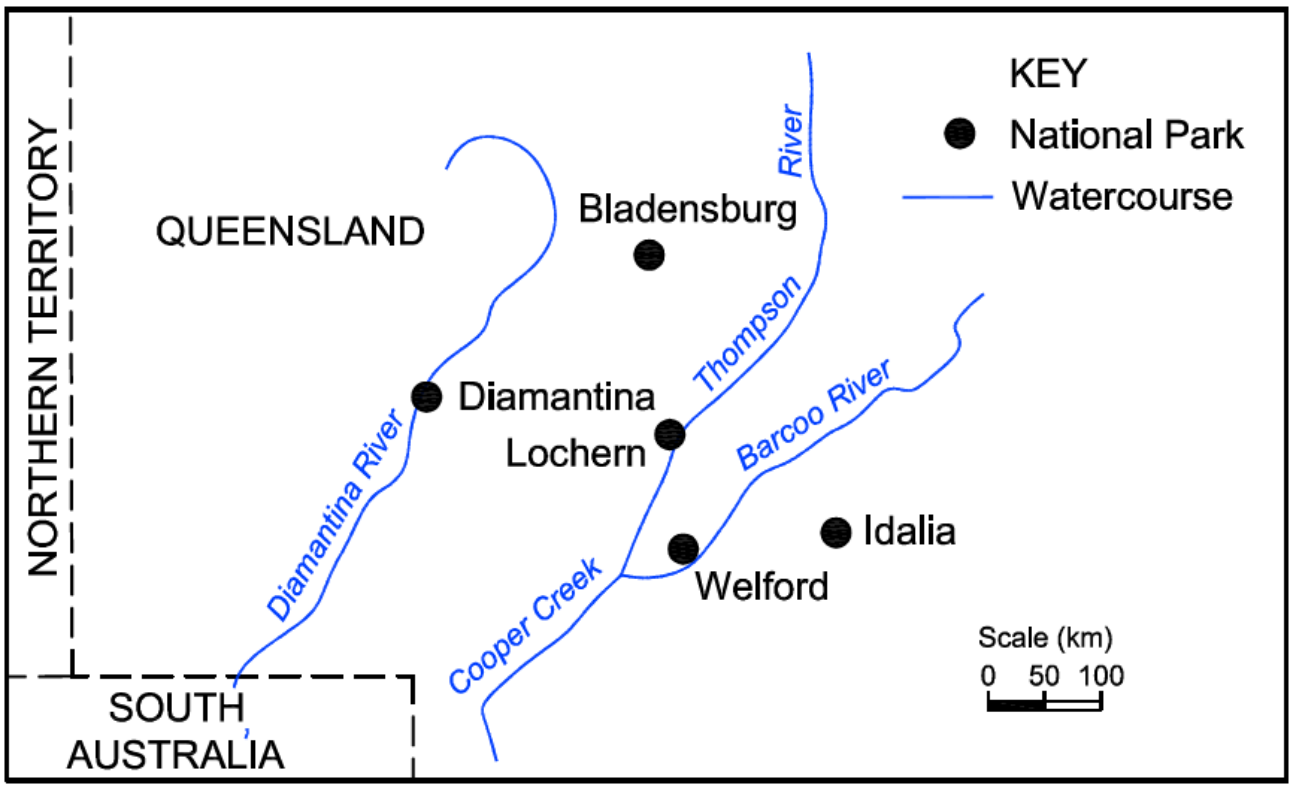

Figure 1. Map of the area under consideration.

The avifaunas of the parks considered here are not well known as all the parks are relatively new, the oldest being Bladensburg, declared in 1984 (Table 1), and all are remote and little visited. In addition most parts of the parks are at least nominally not accessible to tourists. Complicating this is that all the parks were formerly grazing properties and destocking may have an ongoing influence on bird abundances and distributions, including those of the two parrots. There remains much to be elucidated about bird distributions in these parks and in that part of the Channel Country generally. It may be that the two parrot species have been present all along, or are expanding their ranges, or both. That the Mulga Parrot may be expanding is supported by Angus Emmott, a life-time resident (and proprietor) at Noonbah station which adjoins Lochern National Park, who does not recall seeing the species at his place until 15–20 years ago but confirms that it is now apparently resident there in small numbers. Regarding Bourke's Parrot, Angus Emmott considers that at Noonbah it is probably more common now than it was in the past.

We thank Stephen Debus and Angus Emmott.

Table 1. Occurrence of Mulga Parrots and Bourke's Parrots in central-western Queensland national parks.
'Our records' is the number of sightings of each species in each park held in our databases.
'Wildlife Online records' is the number of sightings of each species in each park in the Queensland Department of Science, Information Technology and Innovation Wildlife Online database (accessed 30 September 2015).

		Mulga Parrot		Bourke's Parrot	
National park (year declared) Location	Number of visits by us	Our records	Wildlife Online records	Our records	Wildlife Online records
Diamantina (1993) 23° 45' S, 141° 8' E	16	6	2	25	7
Bladensburg (1984) 22° 30' S, 143° 2' E	10	3[1]	1	1	1
Lochern (1994)/Noonbah[2] 24° 6' S, 143° 17' E	2	-	3[3]	4	3[3]
Welford (1994) 25° 10' S, 143° 20' E	15	18	13	97	9
Idalia (1990) 24° 53' S, 144° 46' E	2	1	29	1	8

[1] Includes one record from Dave Torr personal communication to AL by e-mail 6 August 2013.
[2] Lochern National Park is enclosed on two sides by Noonbah station and we have surveyed the combined area as one.
[3] Excludes Noonbah station.

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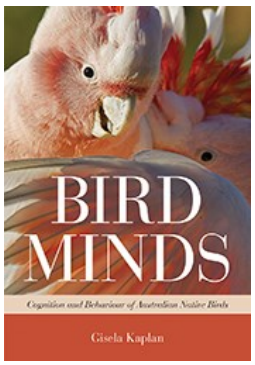
Mulga Parrots, Welford National Park. Photo: Shane Hume.

Bourke's Parrot, Welford National Park. Photo: Mary Hume.

Book Review

Bird Minds
Cognition and Behaviour of Australian Native Birds

By Gisela Kaplan



Published by CSIRO Publishing, 2015
Paperback, 280 pages
AU$45.00.
http://www.publish.csiro.au

Review by Jill Brown

There is very little systematic documentation on the behaviour of Australian birds, let alone on cognition. *HANZAB* (the *Handbook of Australian, New Zealand and Antarctic Birds*) contains some information, and snippets also appear in various field guides and books on Australian birds. Gisela Kaplan's book provides a systematic review of various types of behaviour, and links this in at least some cases to aspects of brain size and function .

It is an unusual approach, reflecting Kaplan's background and expertise in ornithology and neuroscience, and also her expertise in the rehabilitation of injured birds which has provided very personal insights into avian behaviour and cognition.

The book begins with an examination of the origins of Australian birds and the factors which may influence their behaviour and cognitive abilities. Kaplan also highlights brain size and capacity for innovation as factors which contribute to species surviving and thriving. The importance of brain plasticity and the capacity for life-long learning and adaptation, now considered so important for humans, is examined in the context of birds.

The book is divided into twelve chapters, most of which relate to specific behaviours, the cognitive processes which may underpin them, and the purpose they may serve in the survival of the species. Among these behaviours are foraging, tool use, nest and bower building, play, mimicry, social and vocal learning, emotions, communication and the ability to understand abstract concepts. Ornithologists and bird watchers will undoubtedly recognize many behaviours they have observed and may be surprised at the purposes these behaviours serve.

The author presents a great variety of her own observations of bird behaviour, as well as those from other sources, and relates these to the unique circum-

stances encountered by Australian birds. There are several recurring themes. One is the relatively high incidence of cooperative breeding among Australian birds, and the purposes this may serve. Others are the longevity of our birds, and the high proportion which pair bond for life. These themes recur in the discussion of various behaviours.

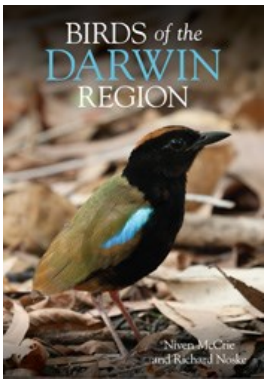
The book has an enormous bibliography which would be of great assistance to those who may wish to explore particular issues in more depth.

It also has a fascinating appendix which provides a table of data on lifespan, parenting and a range of behavioural adaptations as well as body mass, brain mass and other information on over 350 species of Australian land birds. This is a work in progress, and of course has many gaps, but is nevertheless a very useful summary of our current state of knowledge.

Book Review

Birds of the Darwin Region

By Niven McCrie & Richard Noske



Published by CSIRO Publishing, 2015
Paperback, 464 pages
AU$79.95.
http://www.publish.csiro.au

Review by Andrew Humphries

After years of interest in the birds of the Top End and several birding trips to this part of the world, I was excited to finally get my hands on a copy of the new *Birds of the Darwin Region* by Niven McCrie and Richard Noske. I take it as a sign of ever-increasing maturity within Australian birdwatching and ornithological circles when a regional bird guide of this quality appears on the market. While several natural history books covering birds of the Top End have appeared relatively recently (Leseberg & Campbell 2015; Van Oosterzee *et.al.* 2014; Pizzey & Pizzey 2013) this book has carved a new niche in being a scholarly reference that would not be out of place on the home coffee table. The book has uniquely combined elements of a photographic field guide and an avifauna atlas; in this sense it will be of interest to both ornithologists and birdwatchers.

Both authors have authoritative credentials: Niven McCrie has authored the popular *Finding Birds in Darwin, Kakadu and the Top End* (2009) and has lived in the region and worked as a bird guide. Richard Noske was Senior Lecturer in Biology at Charles Darwin University and has a substantial publication list including the book *Birds of Groote Eylandt* (2002).

Covering all 258 regularly occurring species, *Birds of the Darwin Region* is the first comprehensive treatment of the avifauna of Darwin. On the whole, this is a delightful, glossy, soft cover book that is exceptionally well presented with a layout that has an intuitive feel, making it easy to use.

Introductory descriptions of the climate, vegetation and sites of the region provide the necessary background to the avifauna of the region. Following a general appraisal of the avifauna, species accounts describe the habitats, relative abundance, behavior, ecology and breeding season of each species; these accounts are amply supported by individual grid distribution maps and charts showing seasonal patterns of observed abundance. Most species accounts are enhanced by splendid high quality photographs that are a definite highlight of the book.

The species accounts are well written and full of interesting facts that are not often found elsewhere and usually relate to the region. For instance, the dramatic changes in the distribution and abundance of some species, such as the increase in the Silver Gull population in the Darwin region detailed in this species' account, will interest many readers and remind them of the importance of these observational datasets. Similarly, the detailed descriptions of the habitat and feeding preferences of sympatric Azure Kingfishers and Little Kingfishers in local tidal waterways is not only fascinating but is also practical information for birdwatchers.

The numerous individual grid maps detailing species presence/absence and relative abundance give the book the look and feel of an avifauna atlas. In this regard, the book has made excellent use of 'citizen science' with the maps allowing compilation and display of these observations from across the region.

Some minor criticism of these individual species grid maps is that they appear somewhat oversimplified, making observations difficult to locate (the position of Darwin and Palmerston is not marked) without referring to the regional map on page 3. Where species are particularly abundant, the maps are so full of circles that they appear 'busy' and obscure any map details.

Birdwatchers may also feel that the book lacks information on the best sites to see the different species in the Darwin region. Perhaps this could have been included in the species accounts along with the Range, Habitat, Status and Breeding summaries at the top of the species entry information. Habitat descriptions could also have perhaps included more examples of the best sites around Darwin. Nevertheless, *Birds of Darwin Region* will be a very welcome addition for the birdwatcher and will complement McCrie & Watson (2009).

In conclusion, this long-overdue regional bird guide is the only book of its type and fills a substantial gap in the market combining a regional atlas and detailed species information. Consequently, *Birds of the Darwin Region* is likely to be the most important avifauna reference on this part of the Northern Territory for years to come.

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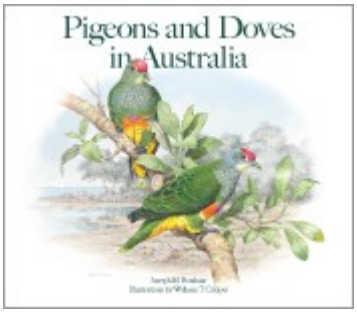
Book Review

Pigeons and Doves in Australia

By Joseph Forshaw and William T. Cooper



Published by CSIRO Publishing, 2015
Hardback, 360 pages
AU$185.00
http://www.publish.csiro.au

Review by Deborah Metters

This book builds on the substantial work of Harry Frith, who studied, researched and developed innovative methods to observe Australian pigeons and doves, including building a tropical aviary next to his CSIRO office in Canberra. Mr Frith was a pioneering researcher of Australian Columbiformes and his book, *Pigeons and Doves of Australia* (1982) has been, until now, the most comprehensive book on this group of Australian birds. This book by Forshaw and Cooper significantly expands on the 1982 work, incorporating research from journals, personal observations and field notes from Australian birders and ornithologists. The writing style is factual, descriptive and meticulous.

This book is both an impressive collection of data and stories about Australian pigeons and doves as well as a gallery of outstanding avian artwork. William T. Cooper remains one of the world's most acclaimed scientific painters, especially of birds, and this book is a fitting tribute to his work given it was released shortly after his passing in March 2015. The detailed brushstrokes of his artwork are staggeringly beautiful creating a sense that you are actually looking at the bird, and it is looking back at you. Although the birds sit prominent in the paintings, the backgrounds are equally meticulous, accurately portraying the animal's habitat, so you get an immediate sense of its locale.

Thirty-two species are profiled including all extant and recently extinct Australian endemic, migratory and introduced pigeons and doves including those found on Christmas, Norfolk and Lord Howe Islands. A colour, full page image, and at least one smaller sketch, illustrate all profiled species with small colour images accompanying the five recognised vagrant pigeons and doves.

The text for each species is divided into sub-headings enabling readers to locate specific information quickly. Sections detail other names, descriptions of adults and juveniles and sub-species. I learnt that you can tell the country of origin of Spotted Doves based on their plumage colourations.

I found the general notes section possibly the most fascinating due to my interest in early European accounts of this country. Most accounts in this book tell the

story of pigeons and doves being shot, sometimes in staggering quantities, for food or for sport. Some early European settlers also remarked at the beauty of these birds and the pleasure derived from simply observing them. Release dates and locations from Acclimatisation Society records are presented for introduced species as well as failed attempts to introduce other species such as the English Wood Pigeon.

The habitat and status section discusses historic and current habitat types and geographic distribution, including data from both Atlases of Australian Birds. Population trends since European settlement, if known, are discussed as some species such as the Crested Bronzewings have benefitted from land clearing and availability of human-made resources. On the other hand, rainforest fruit-eating pigeons such as the Rose-crowned Fruit-dove, Wompoo Fuit-dove and Wonga Pigeon have experienced major population declines due to habitat loss and excessive hunting.

The movement and social behaviour section is another fascinating read with details of seasonal fluctuations, and nomadic and migratory behaviours. It is commendable how many researchers have documented their field observations on feeding behaviours, including details of food plants, size and ripeness of fruit/seed, fruit colour, seed size and location of the food plants within the habitat. If something has been written and published about Australian pigeons or doves, it appears in this book.

A distribution map accompanies each species. Where relevant, tables provide results of survey work conducted in Lamington National Park showing species of rainforest fruit eaten per month by rainforest pigeons. Tables are also used to display maximum movement and longevity records from the Australian Bird Banding Scheme. For example, the maximum recorded movement between first banding and subsequent re-captures of a Crested Bronzewing is 41 kms with the oldest recorded individual reaching an age of 9 years and 6 months, whereas a Pied Imperial Pigeon has been recorded moving a maximum distance of 1,443 kms with the oldest individual being 14 years of age.

The diet and feeding section shows how important a diversity of rainforest species are for rainforest pigeons. For example, 11 different references specify over 30 rainforest plant species eaten by Topknot Pigeons from 1952 to 1990 covering north Queensland to northern NSW. Remarkable still is that the Diamond Dove favours seeds that are 0.001-0.003 mm in size. Basically, any page that you open in this book will reveal fascinating facts.

Each species has personal field notes from both Forshaw and Cooper detailing feeding, preferred roosting sites, unusual behaviour such as sunbathing and other memorable sightings of flocks, their calls and movements. There are also sections on vocalisations, courtship, mating, nesting, eggs and aviary notes. An extensive reference list draws from sources such as *Wingspan, Emu, Sunbird, HANZAB* and other ecological journals.

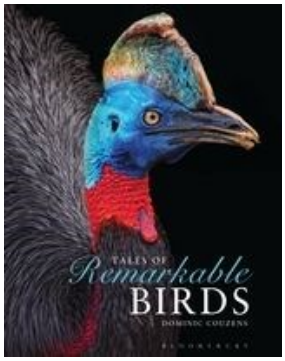
Given its quarto, oblong hardcover format, I found this book tricky to flick through and cumbersome to read when relaxing on a couch or in bed, but it is perfect for a coffee table or desk.

This book is a credit to the author and illustrator and demonstrates years of dedication and diligence. It is the standard reference text and/or portable art gallery for anyone interested in Australian pigeons and doves.

Book Review

Tales of Remarkable Birds

By Dominic Couzens



Published by Bloomsbury Publishing, 2014
Hardback, 224 pages
AU$$39.99
http://www.bloomsbury.com/au

Review by Zali Brookes

Our shared interest in birds means we all have some idea of how truly remarkable they are, and after reading this book you will be left with an even greater appreciation. You may even find yourself thinking about birds and the natural world in an entirely different way. Prepare to be illuminated.

Crammed with fascinating facts and richly illustrated with around 120 colour photographs that bring the text to life, *Tales of Remarkable Birds* is an entertaining and enthralling read. The beauty of this book is that you can dive in and explore it in a number of different ways. Whether your interests lie in a particular part of the world, species or type of behaviour, or whether you prefer to just open at random and allow captivating pictures to be your guide, this book invites you to follow your curiosity wherever it pleases.

The book is broadly sectioned into eight geographical regions: Europe, Africa, Asia, Australasia, North America, South America, Antarctica and a general chapter on Islands, with each region then democratically subdivided into five separate essays on at least one representative species or more.

Additionally, in the 'Introduction' Couzens provides an 'alternative index' (p. 11), consisting of a long list of numerous types of behaviour, such as roosting, infanticide, leks, commensal feeding, ant-following, intelligence and echolocation, to name a few. Many of these behaviours have a number of different species listed beside them, so if you are interested in, for example, 'incubation', you can journey across Antarctica (Rockhopper Penguin), Asia (Pheasant-tailed Jacana), Africa (Ostrich) and finish your trip on some Pacific Ocean islands (Micronesian Scrubfowl). Conversely, some species exhibit a number of different behaviours, for instance, Toucans ('nest-robbing' and 'physical intimidation') and Black-capped Chickadees ('memory' and 'food-storing').

It is clear Couzens is passionate about birds and is keen to impart that same enthusiasm to the reader. He is adept at packing each essay to the brim with in-

formation, intertwining many other curious facts on ecology, biology and natural history. He writes in a conversational, engaging and at times humorous way, which makes the text accessible to any reader. I recently read a monograph on one of the species contained in this book, yet in a few succinct and quirky sentences, Couzens managed to convey something intriguing and memorable about these birds that was missing in the pages of the monograph. That's one of the joys of his writing, an ability to make any bird fascinating, no matter how well you thought you knew them and to do it in such a way that you see them in an entirely new light. This is no surprise given he believes '[i]t would not be an exaggeration to suggest that almost every bird in the world has the capacity to amaze and surprise scientists. It just depends what species and aspects are chosen for study.' (p. 13)

Each essay is around four to five pages long (including photographs) making it an ideal 'pick up and put down' kind of book. Without spoiling the joy of discovery by revealing some of the astounding facts, a small sample of curiosities includes: how the distinctive bill of the Common Crossbill is related to left or right 'footedness'; why the Great Spotted Cuckoo is not your average parasitic cuckoo; the entomological surveillance skills of Antbirds; and the super smart New Caledonian Crows who skilfully fashion tools.

All the essays are connected by a common theme: survival is tenuous, in some cases dependent on just one fragile link to another species of plant or animal that could so easily be broken. The last essay on Hawaiian birds underscores this. Hawaii's bird life is in steep decline and this final 'remarkable tale' is an exclamation mark, made all the more salient after the encounters with the birds in the preceding pages.

Couzens' intention was 'to whet the appetite' and 'entice the reader to find out more about what birds get up to around the world' (p. 8), something he achieves with great success. Consequently, it's disappointing that only one page is devoted to resources for 'further reading', and this is limited to simply 'websites' and 'books' of which there aren't a great deal. Although this book is by no means a technical read, it could easily precipitate one for the curious reader, so journals and articles for those inclined would have been a helpful addition to a more comprehensive list of books and websites. Also, a warning for those irritated by the occasional typo or missed word, there are a couple to be found but these are easily forgiven by the overall enjoyment and fascinating content.

This book would enrich the libraries of those new to birds, experienced birders and everyone in between. Particularly for those of us who have become a little 'Aus-centric' in our reading, it provides an opportunity to meet with birds on other continents and then return home to the White-winged Chough, fairywrens, Great Bowerbird, Southern Cassowary and Varied Sittellas. I'd also recommend it to anyone interested in ecology and natural history.

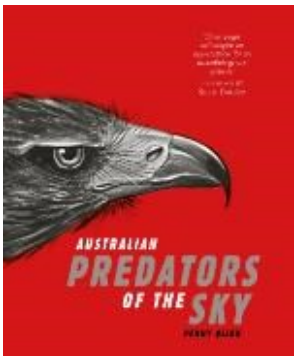
This a rewarding and thought provoking read. Couzens has done an extraordinary job dealing with a diverse topic that could fill tomes. As he states, this book 'is a small taster for a great feast' (p. 8). However, I tend to disagree. It's much more than a taster; it can be savoured over weeks if you so choose. You will dine well on this book and be hungry for more.

Book Review

Australian Predators of the Sky

By Penny Olsen

Foreword by Sean Dooley



Published by the National Library of Australia, 2015
Paperback, 216 pages
AU$39.99
http://publishing.nla.gov.au

Review by Patrick Murphy

'Raptor is derived from the Latin … seize by force…' (P. Olsen, *Discovering Australia's Birds of Prey,* p. 1.).

My first impression is the cover, red, warning, aggressive. Are raptors to be feared?

… Hmmm!

My second impression upon opening the book, the little falcon, surprising, and beautiful. Immediately modifying the first sensation.

From thereon in, I am fascinated and drawn to follow the illustrated story.

This is not a field book, and certainly not intended to be that. The graphic representations in a modern context, offer a clear suggestion of the way early wildlife research was conducted. Records were made without camera, simply from direct observation and memory, and almost certainly with discussion. Suffice to say accuracy was sufficient for the purpose of the day, and just as certainly the illustrations suitable for field reference of the day.

I can do nothing but marvel at the dedication, excitement, patience and expertise required to make such scientific record. Can this type of work be replicated today? Yes, far more easily and accurately with digital imagery and 'the cloud', but 'the person' may not be so expressed, the quiver of hand, the recipe of colour and the pain of proportion.

Early drawings were often done by convicts, '…convict artist Thomas Watling and other illustrators, employed by Surgeon-General John White…' (p. 8). I don't know about you, but to me this reveals more about the diversity of our heritage. Convicted of what? When we begin to understand these are skilled and talented people, perhaps not willing to be here, but willing to do their art (and do it

well!), we understand more of how proud we should be of our heritage.

With each illustration there is an informing text, easily read, based on an obvious depth of knowledge. Accompanying and perhaps more reinforcing, is an illuminating story of the forever evolving world of taxonomy and classification, helped 'now-a-days' by genetic refinement of species and sub-species, 21st century technology assisting the understanding at a far greater depth, and only possible because of those first, inquisitive individuals, from Captain to convict, with their basic tools, who created a foundation withstanding time.

This foundational work however was fraught with difficulty, not just from lack of scientific precedence or tyranny of distance (no internet here!), but also from complex motives generated by the 'make or break' of social status, the pull of patriotic ties. An example might be the scene on page 1, by artist G.F. Angas of Yattagolinga, near Adelaide, with an airborne Wedge-tailed Eagle and Foxes, or indeed, were they Dingoes drawn with an underlying pining for the mother country? Or perhaps the disproportionate body and exaggerated eye depicted by an unknown Port Jackson painter, in order to highlight a specific feature or habit, 'This Bird has a wonderfull power of Contracting and dilating the Iris and Pupil…' (sic, p. 158).

Australian Predators of the Sky also gives insight to the cultural beginnings of this land and the role raptors played. The perspective of new arrivals, 'The English artist, William Strutt, who lived in Australia … illustrated account of three children lost in the Australian bush … rescued an eagle from the coils of a brown snake … wishing, as it flew to freedom, that they too could fly home…' (p. 3). The perspective of the first people, 'In Australia, eagles, in particular, feature in Indigenous culture as ancestral beings and totems …' (p. 3). Or, the seeding of the imagination from which myth or legend may evolve, 'As well as their bark-like wook-wook call … the Barking Owl makes a shrill, woman like sobbing … a possible source of … legends surrounding the Bunyip …' (p. 159). Perhaps because the bird and the legend occupy a similar habitat, we could derive some confirmation of the myth.

Anyone who has, as I have on occasion, handled a sick or injured raptor will know these birds are totally forgiving, accepting of whatever it is you are doing for them, and rather than aggressive or defensive, are somewhat compliant. Contrastingly, a cockatoo or bittern for example will quickly demonstrate their self-defensive measures. Look into the eyes of any raptor and we see power, activity and intelligence.

Throughout, this is an informing ology, describing habit, character and peculiarities of not just each order but also the species: the Accipitriformes, 'The Whistling Kite … small rabbit,…carrion, … quick to pirate fish from ibises and herons.' (p. 65); the Falconiformes, 'Nothing could exceed the delicate beauty … their large full eyes …' (p. 137); and, the Strigiformes, 'To facilitate its movement on the ground … has particularly long legs … In flight (most raptors fly with their feet tucked up) however, the grass-owl's feet protrude beyond the tail.' (p. 186).

This beautifully presented book is for those who already know the birds of

prey, and, equally, for those who want to know more and to acquire affection for these stately birds.

The layout is in two main sections, Diurnal and Nocturnal, each then divided into two headings: 'Hawks, Eagles & Others' and 'Falcons'; and 'Hawk-owls & Others' and 'Barn-owls', respectively.

The rear section of the book, in three parts, includes a concise biography of individuals who, through time, offered their knowledge and skill, an index of illustrations and finally, further reading.

A quote from the front cover, by Sean Dooley, has it in a nutshell, 'These pages will inspire an appreciation for an incredible group of birds'.

I think it inspirational that a history of heritage, of ornithology, of art and of science, together with a refreshing contemporary point of view has been offered to us.

My final impression … a book that warms, and informs and shows raptors for what they are – 'Raptor', from the Latin, and from the same roots, rapturous!

INSTRUCTIONS TO AUTHORS

The Sunbird is a peer-reviewed journal of the Queensland Ornithological Society Incorporated, which publishes original papers about birds in Queensland and adjacent northern regions.

Papers are invited from members and non-members on all aspects of ornithology, e.g. life history, distribution, behaviour, ecology and taxonomy. Papers may take the form of major articles, short notes and book reviews. Intending authors should consult recent issues of *The Sunbird* to see acceptable forms of contributions. Recent issues are available as full text in the Humanities & Social Sciences Collection of the Informit website (http://search.informit.com.au/search;res=IELHSS).

Appropriate referees will assess each submission. If needed, help may be given to authors to find relevant literature.

Submission of a paper implies that the results reported have not been published and are not being considered for publication elsewhere. The Editors reserve the right to submit records of rare birds to the Records Appraisal Committee of the Queensland Ornithological Society as part of the refereeing process.

Manuscripts **in MSWord** should be submitted by e-mail. Common and scientific names of birds should follow International Ornithological Congress (IOC) systematics and taxonomy (see: http://www.birdsqueensland.org.au/bird_lists.php); lists of birds should also follow IOC sequence.

References should be listed in alphabetical order at the end of papers in the following styles:

Fleay, D.H. 1973. Nesting habits of the brush turkey. *Emu* 36: 153–163.

Frith, H.J. (Ed.) 1976. Mallee fowl. Pp. 136–137 in *Complete Book of Australian Birds*. Reader's Digest: Sydney.

Loyn, R.H. 1985. Ecology, Distribution and Density of Birds in Victorian Forests. Pp 33–46 in *Birds of Eucalypt Forests and Woodlands: Ecology, Conservation, Management,* ed. by A. Keast, H.F. Recher, H. Ford & D. Saunders. Surrey Beatty and Sons: Chipping Norton, NSW.

IUCN 2006. *2006 IUCN Red List of Threatened Species*. www.iucnredlist.org. Accessed 14 October 2006.

Serventy, D., Serventy, V.N., & Warham, J. 1971. *The Handbook of Australian Sea-birds*. Reed: Sydney.

Tables and figures should be numbered with arabic numerals. Drawings and diagrams should be in electronic form, preferably as a .jpg file. Authors are encouraged to submit photographs with their manuscripts.

Orders for more than one printed copy are to be placed at the final proof stage.

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