

BIRDS OF THE RAWA AOPA WATUMOHAI NATIONAL PARK

SOUTH EAST SULAWESI

by

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Summary

The Rawa Aopa Watumohai National Park was visited between 9 September and 9 November 1995 and surveys conducted from a range of localities within the park. This constitutes the first study of the avifauna of this large protected area. A total of 157 different species were recorded (155 to species level) including *Mycteria cimerea*, *Macrocephalon maleo*, *Cacatua sulphurea* and *Zoosterops consobrinorum*. An annotated list of selected species is presented and a full species list appears as an appendix.

Introduction

The Rawa Aopa Watumohai National Park (henceforth referred to as RAWNP) was gazetted in 1990, becoming Sulawesi's fourth national park. The RAWNP covers a variety of lowland habitats up to an elevation of 980 metres at the southern tip of Sulawesi's southeast peninsula. The southern half of the Aopa swamp makes up the northern section of the park. The Aopa swamp is considered Southeast Sulawesi's most important conservation area (Whitten *et al.* 1987), and one of the six most important in the Sulawesi faunal region (J. & K. Mackinnon, 1986). Although the swamp and the areas surrounding it have been the subject of a general ecological study (Zwahlen, 1992) and a detailed botanical study (Jacobs, 1979), it has not previously been surveyed by ornithologists.

The observations presented here the first detailed examination of the avifauna of the RAWNP, in the biologically least explored of Sulawesi's four provinces. A University of Leeds/ University of Indonesia team visited sites in all broad habitat types within the park from 9 September to 9 November 1995, producing an inventory of bird species encountered. An annotated list of selected species is given and a preliminary species list appears as Appendix 1.

THE RAWA AOPA WATUMOHAI NATIONAL PARK

Location

The RAWNP covers an area of 105,194 hectares in the province of Southeast Sulawesi, between 121°56' 122°9' E longitude, and 4°4' 4°39' S latitude (see Figure 1).

Figure 2. MAP OF HABITAT TYPES IN RAWNP

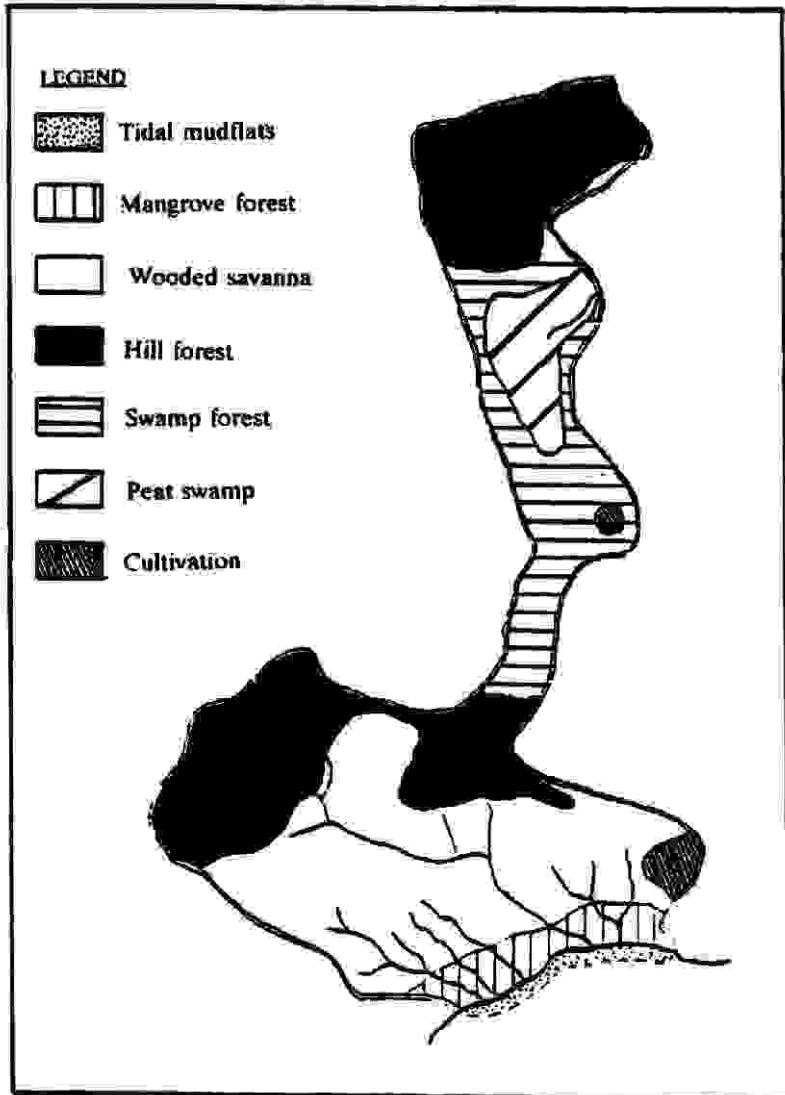
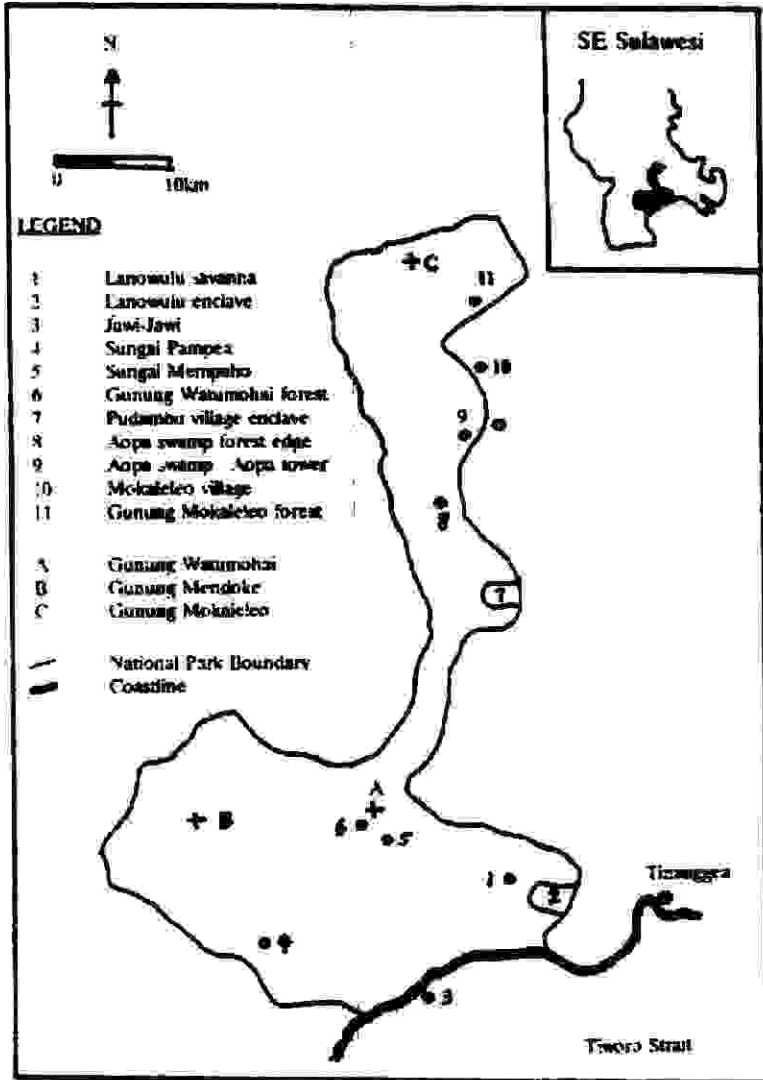


Figure 1. MAP OF RAWA AOPA WATUMOHAI NATIONAL PARK, SOUTHEAST SULAWESI



Habitat Types

For this study seven main natural habitat types were identified: tidal mudflats, mangroves, wooded savanna, forest on ultrabasic soils, swamp forest, peat swamp and cultivated areas with settlements. Figure 2 shows the distribution of the main habitat types.

Tidal mudflats: The southern edge of RAWNP is coastal and is fringed by intertidal mudflats. 1 extending over 200 m from the coast at low tide.

Mangrove forest: Mangrove formations extend up to 3 km inland from the southern coast of RAWNP. The vegetation is dominated by a *Rhizophora/Bruguera* association, with *Sonneratia spp.*, and *Nypa fruticans* also present. The mangroves are accessible through a network of broad channels of slow flowing brackish water, and it is in these channels that local people fish. These mangroves remain in a relatively undisturbed condition.

Wooded savanna: Much of the southern half of the national park, approximately 40,000 ha, comprises a wooded savanna on Quaternary age alluvium deposits (Simandjuntak *et al.* 1994). The vegetation is dominated by 'alang alang' grassland *Imperata cylindrica*, forming a habitat mosaic with discrete patches of lowland forest. In addition, Thorn Bamboo *Bambusa spinosa* and the palms *Corypa utan* and *Borassus flabellifer* are patchily distributed, and a number of small rivers run through the savanna supporting narrow wooded corridors. Succession of natural vegetation on the grassland is prevented by regular fires, both of natural origin and as a result of deliberate burning to facilitate the hunting of the introduced Timor Deer *Cervus timorensis*. These fires, particularly prevalent at the end of the dry season, appear to be self contained and cause relatively little damage to the surrounding forest.

Forest on ultrabasic soils: Large areas of continuous forest are to be found on the mountains of Gunung Watumohai (550m) and Gunung Mendoke (980m) in the centre of the park, and on Gunung Mokaleleo (790m) at the park's northern limits. Such forest covers approximately 35,000 ha within RAWNP. These mountains are formed on ultrabasic rocks of Cretaceous age, which give rise to soil\$.: with low levels of available minerals and high levels of metals such as nickel (Whitten *et al.*, 1987), In the RAWNP, these soils support a heterogeneous, closed canopy, partly deciduous forest characterised by trees of medium height with relatively few large buttressed trees. Common tree 'i species include *Ficus* spp. and *Canarium* spp., with an understorey of small palms including *Livistona rotundiflora*, *Licuala celebensis*, *Caryota mitis* and many climbers, notably rattan palms *Calamus* sp. Larger trees and palms result in a shaded lower storey with few shrubs. The forest is generally dry, with few epiphytic plants.

Swamp forest: Swamp forest is found on the south western edge of the Aopa swamp, south to the forest of Gunung Watumohai, where there is a gradual transition in forest types. This seasonally flooded

forest on a peat soil covers approximately 10,000 ha within RAWNP. By the edge of the swamp, the forest is composed of small trees, with many pandans *Pandanus* spp. and climbing rattans, and has quite an open canopy. Further away from the swamp edge the trees are larger and the undergrowth thinner.

Peat swamp: The Aopa swamp is an extensive wetland ecosystem encompassing several distinct habitat types. Only half the swamp lies within RAWNP, this south western portion covering approximately 10,000 ha. Open water channels in the centre of the swamp have floating leaves of Lotus *Nelumbium nelumbo* and *Nymphoides indica*. Floating mats of vegetation surround the open centre and consist mainly of a sedge *Cyperus* sp. and expanses of a tall grass *Saccharum spontaneum*. A ten metre high observation tower has been built on the small island of Pulau Harapan near the swamp's centre, which is accessible by canoe from the village of Aopa.

Cultivated areas with settlements: The villages of Lanowulu and Pudambu form enclaves on the eastern edge of RAWNP. Coreal crops are grown in both wet and dry fields. Coconut palm around these villages. Coconuts and other fruit trees are also grown in small plantations. Some observations were also made in the village of Mokaleleo which lies on the edge of RAWNP, and whose residents practice similar cultivation.

Text Localities

<u>Locality</u>	<u>Latitude</u> (S)	<u>Longitude</u> (E)	<u>Altitude</u> (m)	<u>Habitat</u>
Lanowulu savanna	4°27'	122°07'	30	W
Lanowulu enclave	4°27'	122°09'	30	C
Jawi Jawi	4°33'	122°04'	0	T/M
Sungai Pampea	4°33'	122°00'	30	W
Sungai Mempaho	4°28'	122°03'	40	W
Gunung Watumohai forest	4°28'	122°01'	150	U
Pudambu village	4°17'	122°05'	80	S/C
Aopa swamp forest edge	4°09'	122°04'	80	S/P
Aopa swamp/ Aopa tower	4°07'	122°05'	80	P
Mokaleleo village	4°06'	122°05'	90	C
Gunung Mokaleleo forest	4°04'	122°04'	200	U

Habitat Key:

M = Mangrove forest; T = Tidal mudflats; W = Wooded savanna; U = Forest on ultrabasic soils; S = Swamp forest; P = Peat swamp; C = Cultivated area with settlements.

Conservation and human pressures

In 1995, thirteen staff patrolled, protected and administered RAWNP on behalf of the Directorate General of Forest Protection and Nature Conservation (PHPA) of the Ministry of Forestry. The southern part of the park is guarded by nine guards based in the Lanowulu enclave, who patrol the wooded savanna and man the road checkpoint at Lanowulu around the clock. The guards maintain a small hostel and guide visitors, but mostly concern themselves with preventing hunting within the park's southern boundaries. Such illegal hunting activity mainly concerns the Timor Deer, but also affects the Sulawesi Pig *Sus celebensis* and the nesting grounds of the Malec, *Macrocephalon maleo*. Four guards are positioned at one man stations around the northern border of RAWNP, from which patrols are mounted. Habitat degradation and signs of hunting within the park were noticeable in the northern section, especially within and around the Aopa swamp. In 1996, RAWNP staff attended training workshops held by Wetlands International, and their role in the conservation of the park is being developed (Sibuea, *pers comm.*).

Selected species accounts

This section provides details on selected species where the information from the present survey adds to records already published for South east Sulawesi, principally in White & Bruce (1986). Nomenclature is based on Andrew (1992). Birds not identified to species level have been bracketed. The suffix symbol E refers to species endemic to Sulawesi and its satellite islands. Threat status is given in brackets and follows Collar *et al.* (1994).

Anhinga melanogaster **Oriental Darter** (Near threatened)

One bird in the Lanowulu enclave on various dates throughout. Up to 26 individuals regularly seen flying over the Aopa swamp and adjacent swamp forest, from 16 to 30 Oct. One bird, carrying a long twig, presumably being used as nesting material, flying toward the Aopa swamp forest edge on 24 October.

Ardea sumatrana **Great billed Heron** (Near threatened)

Two individuals perched in trees overhanging creeks in the Jawi Jawi mangroves on 16 September.

[*Casmerodius* / *Egretta* / *Bubulcus* spp. **Egret spp.**]

Over 300 birds coming to roost at dusk on the Aopa swamp forest edge were too distant to be specifically identified.

Casmerodius albus **Great Egret**

Up to 11 birds fishing in shallow water on the Jawi Jawi tidal flats from 16 to 18 September. 12 observed from the Aopa tower on 24 October.

Egretta intermedia **Intermediate Egret**

Only one bird positively identified as this species, a non breeding adult feeding on marshy ground in the Lanowulu enclave on 14 October.

Egretta garzetta **Little Egret**

33 on the Jawi Jawi tidal flats on 17 September. 2 observed from the Aopa tower on 24 October.

Nycticorax caledonicus **Rufous Night heron**

Uncommon in the swamps, with just four records of one's or two's in flight.

Ixobrychus sinensis **Yellow Bittern**

Up to 6 recorded daily in the Aopa swamp from 10 to 25 October. Always in reed swamp, and seen flying short distances before disappearing into swamp vegetation.

Ixobrychus cinnamomeus **Cinnamon Bittern**

In the Aopa swamp, the most rarely encountered of the *Ixobrychus* species, with up to 3 birds recorded daily. Often visible on the fringes of reed swamp. 2 in the Lanowulu enclave on various dates throughout.

Ixobrychus flavicollis **Black Bittern**

The most commonly encountered *Ixobrychus* species in the Aopa swamp, with up to 8 birds recorded daily. In reed swamp and often perched on top of bushes emerging from the reeds, particularly at dawn and dusk. Up to 4 birds in the Lanowulu enclave on various dates throughout.

Mycteria cinerea **Milky Stork** (Vulnerable)

Observed flying over all habitats, singularly and in small groups, on almost all field days. 19 birds flying south along Sungai Mempaho on 12 September, 13 birds perched in mangrove trees, their flying north over Jawi Jawi on 16 September, three flocks totaling 88 birds soaring on early morning thermals then slowly flying southwest into the Aopa swamp over the village of Mokaleleo on 18 October; 17 birds seen from the Aopa tower, roosting in trees on the Aopa swamp foerst edge at dusk on 24 October.

No nesting sites were found and breeding was not confirmed for RAWNP. It seems likely that a population centred in the Aope area (swamp both within and beyond the boundaries of RAWNP) also uses the savanna and mangrove habitats within RAWNP to the south. Outside the park, the team occasionally recorded small groups of this species elsewhere in South east Sulawesi. It is known that *M cinerea* can range over 200 km in a single day (Allport & Wilson 1986) and these records may also refer to birds from the Aopa population,

Ciconia episcopus **Woolly necked Stork**

Up to 6 birds seen flying over all savanna localities, daily. Highest count of 13 birds over the Lanowulu savanna on 21 September. 2 birds feeding on marshy ground in association with Water Buffalo in the Lanowulu enclave on 14 October. Birds occasionally came to savanna fires at Lanowulu and Mempaho to feed on insects fleeing the heat.

Plegadis falcinellus **Glossy Ibis**

A flock of 36 seen from the Aopa tower on the morning of 25 October was the only record.

Elanus caeruleus **Black winged Kite**

Single birds hunting at the savanna locations on seven separate dates. One in the Pudambu area on 26 October.

Spilornis rufipectus **Sulawesi Serpent eagle** E

Commonly encountered flying over all localities, except Jawi Jawi, and most frequently seen on the savanna. Both adult and immature birds were recorded.

Circus assimilis **Spotted Harrier**

Commonly encountered at all savanna localities. Observed hunting for large grasshoppers on freshly burned savanna at Mempaho, on 13 October.

Accipiter griseiceps **Sulawesi Goshawk** E

Recorded only on the Lanowulu savanna, where single adult birds were encountered on seven occasions and 2 adults soaring together on 8 November.

Accipiter soloensis **Chinese Goshawk**

Two adult birds circling over forest on Gunung Mokaleleo on 19 October, identified by white underwings with black tips to the primaries, and grey upperparts.

Accipiter trinitatus **Spot tailed Goshawk** E

An adult on the Lanowulu savanna on 11 September, observed again on 13 and 15 September, flying into and within a small savanna forest patch. A single bird observed on the same sub canopy perch in the Gunung Watumohai forest on 28 September and again on 10 October. The observers were not at the time familiar with the distinctive call of this species.

[*Accipiter* sp. **Sparrowhawk**sp.]

Small *Accipiter* species were seen in the Gunung Watumohai forest on 10 October, and in the Pudambu swamp forest on 26 October. These birds are likely to have been Vinous breasted Sparrowhawk *A.*

rhodogaster, though field separation from Small Sparrowhawk *A. nanus* was not possible.

Butastur indicus **Grey faced Buzzard**

Single adults flying over the Lanowulu savanna on 10 and 15 September, and circling over Mokaleleo village on 19 October.

Ictinaetus malayensis **Black Eagle**

Single birds soaring just above the canopy of the Gunung Watumohai forest on 24 September and 9 October. One to two birds regularly seen over the Gunung Mokaleleo forest, from 18 to 27 October.

Spizaetus lanceolatus **Sulawesi Hawk eagle** E (Near threatened)

An adult male, recently captured in nearby forest, was being kept in Mokaleleo, village, was acquired by the team on 29 October. The bird roosted overnight and was successfully released the following morning. The bill was dark horn black with dark cere, the iris was yellow, the tarsi were all feathered with yellow feet, and the tail had five evenly spaced bars.

Falco severus **Oriental Hobby**

An adult seen perched high in a dead tree along Sungai Mempaho at 11.00 hrs on 13 October. An adult flying over the Gunung Mokaleleo forest at 08.30 hrs on 29 October.

Anas superciliosa. **Pacific Black Duck.**

Up to eight present throughout in marshy fields in the Lanowulu enclave, with a maximum of ten on 24 Oct.

Megapodius cumingii **Phillippine Scrubfowl** (Near threatened)

Single birds seen briefly in the Gunung Watumohai forest on 10 and 11 October. The birds were not heard to call and no nest mound could be located. It seems likely that both records refer to the same individual.

Macrocephalon maleo **Maleo** E (Vulnerable)

A single bird roosting high in a tree, and a pair in low trees on the banks of Sungai Pampea on the morning of 20 September. A pair feeding on the forest floor on Gunung Watumohai on 24 September. Up to 40 nest hole excavations, of various ages were discovered along and around a 2 km stretch of Sungai Pampea. The unshaded sandy banks of the small river, and sandy areas on the open savanna close by showed obvious signs of nesting activity. The timing of the breeding season is not known, but freshly dug nestholes were observed on 20 September. The behavior of the birds at Pampea on the same date is also indicative of active nesting (Jones *et al.*, 1995).

The Rangers who showed the team the nest sites along Sungai Pampea, said they usually observed one or two pairs every time they visited the area. A number of nest excavations showed evidence of egg collection by illegal poachers. Rangers perceived such poaching and nest predation by the Monitor Lizard *Varanus salvator* to be the main threat to the survival of the species at the site. A large Monitor Lizard was seen digging at nest holes near Sungai Pampea on 23 September. As a consequence of the above, the Maleo must be considered threatened at this site.

It appears that the Maleo is resident in the forest on Gunung Watumohai, and possibly other hill forest within RAWNP, coming down to Sungai Pampea only to lay eggs.

Gymnocrex rosenbergii **Blue faced Rail E** (Vulnerable)

A single bird was seen in a dry stream bed in the Gunung Watumohai forest on 26 September. The bird stopped at a stagnant pool amongst bare rocks before running for cover. This record is the first for South east Sulawesi and represents an important expansion in the known range of this rarely observed endemic species.

Porzana fusca **Ruddy breasted Crake**

One bird seen from the Aopa tower on 25 October.

Porphyrio porphyrio **Purple Swamphen**

Up to 5 present in a small reedswamp within the Lanowulu enclave throughout the survey, and up to 3 birds regularly seen from the Aopa tower, 18–25 October

Irediparra gallinacea **Comb crested Jacana**

Up to 5 birds seen walking on Lotus leaves, from the Aopa tower and canoes, 18–25 October.

Charadrius mongolus **Lesser Sand plover**

A single bird on the Jawi–Jawi tidal flats, 17 September.

Numenius minutus **Little Curlew**

Two birds on the muddy edge of a mangrove creek at Jawi–Jawi, 16 September.

Numenius madagascariensis **Far Eastern Curlew** (Near threatened)

4 on the Jawi–Jawi tidal flats, 16 September, and 12 there on the following day.

Tringa totanus **Common Redshank**

The most commonly encountered wader species, with at least 25 on the Jawi–Jawi tidal flats on 17 September. Up to 4 birds present in wet rice fields in the Lanowulu enclave throughout.

Siltia isabella **Australian Pratincole**

Three flying south over the Lanowulu savanna on 8 November, with 4 there on the following day.

Chlidonias leucopterus **White winged Tern**

From the Aopa tower, 3 observed on 17 October and 2 on 25 October.

Sterna albifrons **Little Tern**

Three at Jawi Jawi on 17 September.

Treron griseicauda **Grey checked Green Pigeon**

Recorded only in savanna habitat, where it is common and regularly encountered. Highest count of 22 near Sungai Pampea, 19 September. Birds seen carrying nesting material into park trees, 9 November.

Treron vernans **Pink necked Green Pigeon**

A pair seen near the park gate at Lanowudi 14 September, was the only record for the savanna. Common in the Aopa swamp and around the villages of Aopa and Mokaleleo. Highest count of 28 birds from the Aopa tower, 25 October.

Ptilonopus superbus **Superb Fruit dove**

The only record was of an adult male in the Gunung Mokaleleo forest, 21 October.

Ducula radiata **Grey headed Imperial Pigeon E**

A pair feeding in a fruiting tree on the savanna at Sungai Mempaho, close to the Gunung Watumohai forest edge, on the mornings of 8 and 9 October. This sighting, at an elevation of 40 m, is very low for this montane species which normally occurs above 1600m but is rarely recorded as low as 200 m (Coates & Bishop 1997).

Ducula luctuosa **White Imperial Pigeon E**

Commonly encountered at all savanna localities, and very occasionally over and around the Aopa swamp. Not recorded at hill forest localities.

Turacoena manadensis **Sulawesi Black Pigeon E**

Single birds seen most days at all savanna localities. The distinctive call was heard at all hill forest localities. A bird was observed giving gliding display flights over the Lanowulu savanna on 8 November.

Gallicolumba tristigmata Sulawesi Ground dove E

In the Gunung Watumohai forest, this was the most commonly encountered bird of the forest floor, with 2–4 birds being seen each day. This shy and retiring species was not recorded at other localities. The plumage agreed with published descriptions (Coates & Bishop 1997) and with specimens of the subspecies *auripectus*. It is difficult to obtain good views. It walks on the forest floor with a hesitant, strutting manner and quickly runs away when alarmed. The call was similar to that of *Chalcophaps indica* but with shorter notes: 'de de de de de' at varying speed and length, usually at two per second for some eight seconds, but faster if alarmed.

Trichoglossus ornatus **Ornate Lorikeet** E

Encountered most days at all savanna localities. Highest count of a flock of 17 birds on the Lanowulu savanna on 14 October.

Cacatua sulphurea **Yellow crested Cockatoo** (Endangered)

The following observations were made in wooded savanna: 5 along Sungai Pampea, 21 September; a single on the Gunung Watumohai forest edge at Sungai Menipaho, 23 September; a single over the Lanowulu enclave, 27 September; a flock of 19 birds moving along Sungai Mempaho, 7 October; 12 birds at the same locality on Sungai Mempaho, 8 October, and 8 birds on the 9 October; 2 birds in the Lanowulu enclave, 14 October. The flocks at Sungai Mempaho were feeding in a fruiting tree, believed to be a *Canarium* sp. and given the local name 'Ninifo'.

All birds observed belong to the endemic Sulawesi subspecies *sulphurea*, whose population has been considered to have declined beyond recovery (Cahyadin *et al.*, 1994). The only other recent records of this species in Sulawesi are of 5 birds near Rantepao, South Sulawesi on 26 June 1989 (Bishop in Kukild (5:17)) and a total of 24 birds recorded from five localities along 91 kilometres of transect in Central and North Sulawesi, with no more than 8 birds seen at any one locality (Mallo & Setiawan, 1996). The presence of this population, of perhaps Wallacea's most endangered species, in the heart of a protected area is of considerable significance.

Prioniturus platurus **Golden mantled Racquet tail** E

Commonly encountered in small groups of up to 6 birds at all savanna localities, and in the Gunung Mokaleleo forest edge area. Highest counts of 62 flying over the Lanowulu enclave, 13 October, and 11 birds over the Mokaleleo forest, 20 October.

Tanygnathus sumatranus **Blue backed Parrot**

Seen most days in small groups of up to 6 birds on the Lanowulu savanna, and around the Lanowulu enclave. Often heard calling after dusk.

Loriculus stigmatus **Sulawesi Hanging Parrot** E

Common at savanna and forest localities. Highest count of 13 birds feeding in a flowering tree on the Lanowulu savanna 14 September.

Loricadus exilis **Red billed aHanging Parrot** E

Uncommon in the sayanna with singles on 19 ad 21 September at Sungai Panapea. In the Gunung Mokaleleo forest, 6 on 22 October, and 4 on 24 October.

Cuculus saturatus **Oriental Cuckoo**

A single in the Gunung Mokaleleo forest on 23 October, and one on the Lanowulu savanna on 8 November.

Surniculus lugubris **Drongo Cuckoo**

Two sanging males present near the park gate at Lanowulu throughout. Two singing male on the savanna at Sungat Pampea, 20 September. A pair displaying by Sungai Mampeho, 9 October. Heard at the Gunung Mokaleleo forest edge, 28 October.

Eudynamys melanorhyncha **Black billed Koel** E

A female on the Lanowulu savanna 14 September. More in evidence on the savanna in October and November, with males constantly calling from the tops of trees. Heard at all hill forest localities.

Rhaniphococcyx calyrorhynchus **Yellow billed Malkoha** E

Commonly seen in savanna forest patches, at all forest localities and around plantations. Small groups were occasionally seen in associaw with the Bay Coucal *Centropus celebensis*, or following troops of Booted Macaque *Macaca ochreata*. The largest group seen was of 9 birds in ffile Pudambu. swamp forest, 26 October.

Centropus celebensis **Bay Concal** E

Four to five birds heard each day at all savanna and hill forest localities. This shy species was seen on eight separate dates, always in association with the previous species.

Tyto rosenbergii **Sulawed Owl** E

A single flew past the Aopa tower at dusk 18 October.

Otus manadensis **Sulawesi Scops owl** E

Regularly heard calling after dusk at all savanna and hill forest localities. One bird spot lighthed in the Gunung Watumohai forest 6 October.

[*Ninox* sp. **Boobook sp.**]

Unidentified *Ninox* owls were heard after dusk in the Gunung Watumohai forest on 10 October and on the Lanowulu savanna on 14 October. The birds in savanna remain unidentified, a hoarse 'coo' similar to the call of the Spotted necked Dove *Streptopelia chinensis*, but birds in Gunung Watumohai forest agree with the call description of the Speckled Boobook *Ninox punctulata* in Coates & Bishop (1997).

Eurostopodus macrotis **Great Eared Nightjar**

Up to 4 present each night at all savanna localities and several over the Gunung Watumohai forest at dusk each day. Over the Aopa swamp, commonly seen hunting at dusk and dawn, with a highest count of at least 75 birds hawking over the swamp at dusk on 18 October.

Caprimulgus affinis **Savanna Nightjar**

Occasionally heard at dusk and dawn at all savanna localities. One roosting in a Lanowulu savanna forest patch, 12 September, and 3 birds roosting in grass on the savanna at Sungai Mempalin, 7 October.

Hirundapus caudacutus **White throated Needletail**

Birds actively feeding over the Gunung Mokaleleo forest, 6 on 21 October, and at least 13 on 23 October. A single bird over the Aolia swamp, 25 October.

Cypsiurus balasiensis **Asian Palm swift**

Regularly seen in groups of 3 to 5 birds at all savanna localities. A bird was seen visiting a nest in it dead *Livistona* palm on 12 September. Not recorded in other habitats.

Ceyx fallax **Sulawesi Dwarf Kingfisher** E

An adult in the Gunung Watumohai forest, 27 and 28 September. This bird was observed feeding on small insects on the surface of a stagnant pool, less than one metre in diameter, in a dry stream bed., The bird perched on a branch 1.5 metres above the pool, and dived down every 3 to 4 minutes. This behavior was observed for over an hour, until dusk.

Pelargopsis melanorhyncha **Black billed Kingfisher** E

A single in creek side mangrove trees at Jawi Jawi, 16 September, with 3 there on 18 September.

Cittura cyanotis **Lilac checked Kingfisher** E

A pair seen in the Gunung Watumohai forest at dawn, 11 October. One bird, presumably the male, appeared to be displaying to the other: perched on a horizontal perch two metres above the ground, the bird slowly raised and fanned its tail, the head also being raised, pointing the bill up at a sharp, angle,

whilst giving a grating trill, lasting approximately four seconds. This was repeated four times, in two minutes, before the bird flew off.

Halcyon sancta **Sacred Kingfisher**

One in the Jawi Jawi mangroves, 16 September, and one in the Lanowulu enclave, 29 September.

Merops philippinus **Blue tailed Bee eater**

Commonly encountered at all savanna localities. Occupied nest holes discovered at three sites on open savanna on 13 and 15 October. One such site close to Sungai Mempaho supports over 20 pairs. These records appear to be the first for South Sulawesi.

Merops ornatus **Rainbow Bee eater**

Commonly encountered at all savanna localities. Highest count of 26 birds over the Lanowulu savanna on 10 September.

Over 100 unidentified bee eaters were seen flying out of the Jawi Jawi mangroves at dawn on 17 and 18 October, and flying high to the north. It is presumed that birds that food over the savanna roost in adjacent mangrove forest. Up to 10 unidentified bee eaters were also seen high over the Gunung Watunohai forest each day.

Coracias teminckii **Purple winged Roller** E

Small groups seen on the Lanowulu savanna, 11 September, and by Sungai Mempaho, 6 October. 3 birds at a nest hole 10m up in a dead palm trunk on the Lanowulu savanna, 8 November.

Erythronotus orientalis **Common Dollarbird**

A single in the Lanowulu enclave on various dates throughout October

Penelopides exarhatus **Sulawesi Hornbill** E

Family groups occasionally seen at savanna mid bill f~ localities. Highest counts of 4 birds on the Lanowulu savanna 14 September, and 5 in the Gunung Watunohai forest 12 October.

Rhyticeros cassidix **Knobed Hornbill** E

Pairs seen most days at all savanna and hill forest localities. Up to 8 seen each day, often in pairs, in the Gunung Watunohai forest, feeding on a fruiting fig trees *Ficus* sp., with 11 birds there on 24 September.

Mulleripicus fulvus **Ashy Woodpecker** E

Pairs regularly seen in forest patches on the Lanowulu savanna and by Sungai Pampea. Heard in the Gunung Watunohai forest and a family group of a pair with an immature male seen in the Gunung Mokaleleo forest on 23 October.

Dendrocopos temminckii **Sulawesi Woodpecker** E

A pair seen in the Gunung Mokaleleo forest on 20 and 23 October.

Motacilla flava **Yellow Wagtail**

Two in rice fields in the Lanowulu enclave, 29 September. Flocks of >2,000 in total flying north east over the Aopa swamp each day at dusk, 17–28 October. These flocks may have contained some Grey Wagtail *M. cinerea* which was also recorded in RAWNP.

Coracina bicolor **Pied Cuckoo shrike** E (Near threatened)

Commonly encountered in wooded savanna, swamp forest, and around village gardens, where it is a noisy and conspicuous bird. A family group with 2 immatures on the Lanowuhi savanna on 17 September was seen to join a mixed species feeding flock in a forest patch. Four females or immatures seen calling and chasing each other and later perching together, with drooped wings, on low, exposed bushes on the Lanowulu savanna on 8 November.

It is significant that the White rumped Cuckoo shrike *C. leucopygia* was not recorded in the RAWNP, although it is said to be common throughout the lowlands of Sulawesi, both in wooded areas and in cultivation (White & Bruce, 1986).

Coracina morio **Sulawesi Cicadabird** E

Commonly encountered at all savanna and hill forest localities.

Lalage sueurii **White shouldered Triller**

Trillers were regularly seen at all savanna localities but most were not conclusively identified. The impression was gained that both this species and Sulawesi Triller *L. leucopygialis* were present. A female White shouldered Triller was positively identified on the Lanowulu savanna on 7 November.

Saxicola caprata **Pied Bushchat**

Regularly encountered at all savanna localities, also by the forest edge at Gunung Mokaleleo.

Trichastoma celebense **Sulawesi Babbler** E

Commonly heard and occasionally sighted at dawn, at all savanna and hill forest localities. Also regularly heard in the Lanowulu enclave.

Megalurus timoriensis **Tawny Grassbird**

Three on the savanna near Sungai Pampea on 20 September, and a single bird on the Lanowulu savanna, 15 October and 8 November. There are few records of this species in Sulawesi and anywhere in Wallacea (Coates & Bishop 1997).

Acrocephalus orientalis **Oriental Reed warbler**

Up to 6 birds seen and heard in the Aopa swamp, 18 to 30 October.

Cisticola juncidis **Zitting Cisticola**

A common bird at all savanna localities, with evidence of breeding during October.

Cisticola exilis **Golden headed Cisticola**

The least numerous of the two cisticola species, but present at all savanna localities.

Muscicapa griseisticta **Grey streaked Flycatcher**

Single birds on the savanna at Sungm Paimpea, 20 September and in the Gunung Mokalelo, 21 October.

Ficedula rufigula **Rufous throated Flycatcher** E (Near threatened)

A family group of 2 adults and 2 immature birds coming to bathe in a small stagnant pool in a dry stream bed in the Gunung Watumohai forest, 26 September. Two birds singing and moving rapidly through the undergrowth near the same locality, 13 October. The song was a thin, high pitched 'sweet wee seee', about 3 to 4 seconds in duration and somewhat reminiscent of a hanging parrot *Loriculus* sp: The contact call was a quite 'chik'.

Dicaeum aurlolimbatum **Yellow sided Flowerpecker** E

Commonly encountered at all savanna and hill forest localities.

Dicaeum celebicum **Grey sided Flowerpecker** E

Commonly encountered in all habitats.

Aethopyga siparaja **Crimson Sunbird**

The least common of the four sunbird species present. Single birds were occasionally encountered at all savanna and hill forest localities.

Zosterops chloris **Lemon bellied White eye**

Common around all villages and at all savanna localities, but not recorded in forest. A tight, fast moving single species feeding flock of around 30 birds was observed on the Lanowulua savanna on the morning of 8 November. Features exhibited by these birds agree with those of the sub species *Z. c. intermedius*. These records are the first for mainland South east Sulawesi.

Zosterops consobrinorum **Pale bellied White eye** E (Near threatened)

Commonly encountered in forest at Gunung Watumohai and Gunung Mokaleleo. Occasionally observed at wooded savanna sites and around villages, where it is less common than *Z. c. chloris*. An

adult was observed feeding an immature bird in the sub canopy of the Gunung Mokaleleo forest on 22 October. Further details are provided in Wardill (in prep.).

This species, the only bird endemic to the region of South east Sulawesi, was previously known from only four scattered localities on the peninsula (Holmes & Holmes, 1985). *Z. consobrinorum* appears to be able to utilize secondary habitats, and consequently not to be threatened within its relatively restricted range.

Lonchura pallida **Pale headed Munia**

Resident. Up to 4 individuals in a large Munia flock in rice fields in the Lanowulu enclave, between 22 and 30 September.

Basilornis celebensis **Short-crested Myna E**

Pairs occasionally encountered at all savanna localities, and 9. birds seen together on the Lanowulu savanna, 12 September. In the Gunung Mokaleleo forest, groups of between 4 and 15 birds were seen on most days. These groups consisted mostly of adults, but a group of 3 adults and 3 immatures was seen on 20 October.

Streptocitta albigollis **White necked Myna E**

Up to four birds occasionally encountered at all savanna localities, and in plantations around the village of Mokaleleo.

Artamus monachus **Ivory backed Wood swallow E**

Up to 8 seen daily over the Gunung Mokaleleo forest, 18–23 October, 7 seen going to roost in nearby swamp forest, 20 October, and 2 on the Lanowulu savanna, 8 November.

Corvus typicus **Piping Crow E**

Two seen well in flight, giving their very distinctive calls, over Pudambu village, 26 October, were, the only recorded (the 'C' habitat coding in Appendix One merely describes where it was seen, not the typical habitat).

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APPENDIX ONE:

APPENDIX ONE:

Species recorded in the Rawn Aopa Watumohai National Park, 9 Sept - 9 Nov 1995

Key to habitat codes: if the species was recorded in the broad habitat type, then the appropriate code appears in the habitat column.

M = Mangrove forest	U = Forest on ultra basic rock
T = Tidal mudflats;	P = Peat swamp
W = Wooded savanna	C = Cultivated areas with settlements

		<u>Habitat</u>
<i>Fregata ariel</i>	Lesser Frigatebird	T
<i>Phalacrocorax melanoleucos</i>	Little Pied Cormorant	T/ P
<i>Anhinga melanogaster</i>	Oriental Darter	M/ P
<i>Ardea sumatrana</i>	Great billed Heron	M
<i>Ardea purpurea</i>	Purple Heron	M/ W/ P/ C
<i>Casmerodius albus</i>	Great Egret	T/ P
<i>Egretta intermedia</i>	Intermediate Egret	C
<i>Egretta garzetta</i>	Little Egret	T/ P
<i>Bubulcus ibis</i>	Cattle Egret	P/ C
<i>Ardeola speciosa</i>	Javan Pond heron	M/ P
<i>Butorides striatus</i>	Striated Heron	M/ T/ W
<i>Nycticorax caledonicus</i>	Rufous Night heron	P
<i>Ixobrychus sinensis</i>	Yellow Bittern	P

<i>Ixobrychus cinnamomeus</i>	Cinnamon Bittern	P/ C
<i>Ixobrychus flavicollis</i>	Black Bittern.	P/ C
<i>Mycteria cinerea</i>	Milky Stork	M/ W/ P
<i>Ciconia episcopus</i>	Woolly necked Stork	M/ W/ C
<i>Plegadis falcinellus</i>	Glossy Ibis	P
<i>Pandion haliaetus</i>	Osprey	M/ P
<i>Elanus caeruleus</i>	Black winged Kite	W/ C
<i>Haliaeetus indus</i>	Brahminy Kite	M/ W/ P
<i>Haliaeetus laucogaster</i>	White bellied Sea eagle	M/ W/ U/ P
<i>Spilornis rufipectus</i>	Sulawesi Serpant eagle	W/ U
<i>Circus assimilis</i>	Spotted Harrier	W
<i>Accipiter griseiceps</i>	Sulawesi Goshawk	W
<i>Accipiter soloensis</i>	Chinese Goshawk	U
<i>Accipiter trinitatus</i>	Spot tailed Goshawk	W/ U
<i>Accipiter sp.</i>	Sparrowhawk sp	U
<i>Butastur indicus</i>	Grey faced Buzzard	W
<i>Ictinaetus malayensis</i>	Black Eagle	U
<i>Spizaetus lanceolatus</i>	Sulawesi Hawk eagle	U
<i>Falco moluccensis</i>	Spotted Kestrel	W
<i>Falco severus</i>	Oriental Hobby	W/ U
<i>Dendrocygna arcuata</i>	Wandering Whistling duck	P/ C
<i>Anas gibberifrons</i>	Sunda Teal	M/ P/ C
<i>Anas superciliosa</i>	Pacific Black Duck	P/ C
<i>Macropygia</i>	Philippine Scrubfowl	U
<i>Macrocephalon maleo</i>	Maleo	W/ U
<i>Coturnix chinensis</i>	Blue breasted Quail	W
<i>Gallus gallus</i>	Red Jungl fowl	W/ U
<i>Gallirallus philippensis</i>	Buff banded Rail	C
<i>Gallirallus torquata</i>	Barred Rail	M/ W
<i>Gymnocrex rosenbergii</i>	Blue faced Rail	U
<i>Porzana fusca</i>	Ruddy breasted Crake	P
<i>Porzna cinerea</i>	White browed Crake	P/ C
<i>Amauornis phoenicurus</i>	White breasted Waterhen	P/ C
<i>Gallinula tenebrosa</i>	Dusky Moorhen	P/ C
<i>Gallinula chloropus</i>	Common Moorhen	P/ C
<i>Porphyrio porphyrio</i>	Purple Swampphen	P/ C
<i>Irediparra gallinacea</i>	Comb crested Jocama	P
<i>Pluvialis fulva</i>	Pacific Golden Plover	T
<i>Charadrius mongolus</i>	Lesser Sand plover	T

<i>Charadrius leschenaultii</i>	Greater Sand plover	T
<i>Numenius minutus</i>	Little Curlew	T
<i>Numenius phaeopus</i>	Whimbrel	T
<i>Numenius madagascariensis</i>	Far Eastern Curlew	T
<i>Limosa lapponica</i>	Bar tailed Godwit	T
<i>Tringa totanus</i>	Common Redshank	T/ C
<i>Tringa glareola</i>	Wood Sandpiper	T/ C
<i>Xenus cinereus</i>	Terek Sandpiper	T
<i>Actitis hypoleucos</i>	Common Sandpiper	T
<i>Heteroscelus brevipes</i>	Grey tailed Tattler	T
<i>Calidris ruficollis</i>	Red necked Stint	T
<i>Stiltia isabella</i>	Australian Pratincole	W
<i>Chlidonias hybridus</i>	Whiskered Tern	W
<i>Chlidonias leucopterus</i>	White winged Tern	P
<i>Sterna sumatrana</i>	Black naped. Tern	T
<i>Sterna albifrons</i>	Little Tern	T
<i>Sterna bergii</i>	Great crested Tern.	T
<i>Treron griseicauda</i>	Grey cheeked Green Pigeon	W
<i>Treron vernax</i>	Pink necked Green Pigeon	W/P/C
<i>Ptilinopus superbus</i>	Superb Fruit dove	U
<i>Ptilinopus melanospila</i>	Black naped Fruit dove	W/P/C
<i>Ducula radiata</i>	Grey headed Imperial Pigeon	W
<i>Ducula aenea</i>	Green Imperial Pigeon	MMU/P/C
<i>Ducula luctuosa</i>	White Imperial Pigeon	W/P/C
<i>Turacoena manadensis</i>	Sulawesi Black Pigeon	W/U
<i>Macropygia amboinensis</i>	Slender billed Cuckoo dove	W/U
<i>Streptopelia chinensis</i>	Spotted Dove	W
<i>Chalcophaps indica</i>	Emerald Dove	U/C
<i>Gallinolumba tristigmata</i>	Sulawesi Ground dove	U
<i>Trichoglossus ornatus</i>	Ornate Lorikeet	W
<i>Cacatua sulphurea</i>	Yellow crested Cockatoo	W/ C
<i>Prioniturus platurus</i>	Golden mantled Racquet tail	M/ W/ U/ C
<i>Tanygnathus sumatranus</i>	Blue backed Parrot	W/ C
<i>Loriculus stigmatus</i>	Sulawesi Hanging parrot	M/W/ U/ C
<i>Loriculus exilis</i>	Red billed Hanging parrot	W/U
<i>Cuculus saturatus</i>	Oriental Cuckoo	W/U
<i>Cacomantis merulinus</i>	Plaintive Cuckoo	W/U/P/C
<i>Cacomantis sepulchralis</i>	Rusty breasted Cuckoo	W/ C
<i>Chrysocoeyx russatus</i>	Gould's Bronze Cuckoo	W/ U/ C

<i>Surniculus lugubris</i>	Drongo Cuckoo	W/ U
<i>Eudynamis melanorhyncha</i>	Black billed Koel	W/ U/ C
<i>Rhamphoccyx calyorynchus</i>	Yellow bellied Malkoha	W/ U/ CF
<i>Centropus bengalensis</i>	Lesser Coucal	W/P/C
<i>Centropus celebensis</i>	Bay Coucal	M/U/C
<i>Tyto rosenbergii</i>	Sulawesi Owl	P
<i>Otus manadensis</i>	Sulawesi Scopsowl	W/U/ C
<i>Ninox punctulata</i>	Speckled Boobook	U
<i>Ninox sp.</i>	Boobook sp.	W/ U
<i>Eurostopodus macrootis</i>	Great Eared Nightjar	W/U/P/C
<i>Caprimulgus affinis</i>	Savanna Nightjar	W
<i>Aerodramus vanikorensis</i>	Uniform Swiftlet	M/W/U/P/C
<i>Hirundapus caudacutus</i>	White throated Needletail	U/P
<i>Cypsiurus balasienensis</i>	Asian Palm swamp	W
<i>Hemiprocne longipennis</i>	Grey rumped Tree swift	M/W/U
<i>Ceyx fallax</i>	Sulawest Dwarf Kingfisher	U
<i>Pelargopsis melanorhyncha</i>	Black billed Kingfisher	M
<i>Cittura cyanotis</i>	Lilac cheeked Kingfisher	U
<i>Halcyon sancta</i>	Sacred Kingfisher	M/C
<i>Halcyon chloris</i>	Collard Kingfisher	M/T/W/P/C
<i>Merops philippinus</i>	Blue tailed Bee eater	M/ W/ P/ C
<i>Merops ornatus</i>	Rainbow Bee eater	M/ W/ U/ C
<i>Coracias temminckii</i>	Purple winged Roller	W
<i>Eurystomus orientalis</i>	Common Dollarbird	C
<i>Penelopides exarhatus</i>	Sulawesi Hornbill	W/U
<i>Rhyticeros cassidix</i>	Knobbed Hornbill	W/U
<i>Mulleripicus fulvus</i>	Ashy Woodpecker	W/U
<i>Dendrocopos temminckii</i>	Sulawesi Woodpecker	U
<i>Hirundo rustica</i>	Barn swallow	W/ P/ C
<i>Hirundo tahitica</i>	Pacific Swallow	M/ W/ U/ P/ C
<i>Motacilla flava</i>	Yellow Wagtail	P/C
<i>Motacilla cinerea</i>	Grey Wagtail	W
<i>Coracina bicolor</i>	Pied Cuckoo shrike	W/ C
<i>Coracina morio</i>	Sulawesi Cicadabird	W/ U
<i>Lalage sueurii</i>	White shouldered Triller	W
<i>Saxicola caprata</i>	Pied Buschat	W
<i>Trichastoma celebensis</i>	Sulawesi Babbler	W/U/C
<i>Megalurus timorensis</i>	Tawny Grassbird	W
<i>Acrocephalus orientalis</i>	Oriental Rged warbler	P

<i>Cisticolajuncidis</i>	Zitting Cisticola	W/P
<i>Cisticola exilis</i>	Golden headed Cisticola	W
<i>Muscicapa griseisticta</i>	Grey streaked Flycatcher	W/U
<i>Ficedula rufzgula</i>	Rufous throated Flycatcher	U
<i>Gerygone sulphurea</i>	Flyeater	W/P/C
<i>Hypothymis azurea</i>	Black naped Monarch	W/U
<i>Dicaeum auriolimbatum</i>	Yellow sided Flowerpecker	M/W/U/C
<i>Dicaeum celebicum</i>	Grey sided Flowerpecker	M/W/U/P/C
<i>Anthreptes malacensis</i>	Brown throated Sunbird	M/W/U/P/C
<i>Nectarinia aspasia</i>	Black Sunbird	M/W/U
<i>Nectarinia jugularis</i>	Olive backed Sunbird	W/P/C
<i>Aethopyga siparaja</i>	Crimson Sunbird	W/U
<i>Zosterops chloris</i>	Lemon bellied White eye	W/C
<i>Zosterops consobrinorum</i>	Pale bellied White eye	W/U/C
<i>Lonchura molucca</i>	Black faced Munia	W/C
<i>Lonchura punctulata</i>	Scaly breasted Munia	W/C
<i>Lonchura malacca</i>	Chestnut Munia	W/P/C
<i>Lonchura pallida</i>	Pale headed Munia	C
<i>Aplonis minor</i>	Short tailed Starling	W
<i>Basilornis celebensis</i>	Short crested Myna	W/ U
<i>Streptocitta albicollis</i>	White necked Myna	W/U/C
<i>Oriolus chinensis</i>	Black naped Oriole	W/U/C
<i>Dicrurus hottentottus</i>	Hair crested Drongo	W/U/C
<i>Artamus leucorhynchus</i>	White breasted Wood swallow	M/W/P/C
<i>Artamus monachus</i>	Ivory backed Wood swallow	W/U
<i>Corvus enca</i>	Slender billed Crow	W/C
<i>Corvus typicus</i>	Piping Crow	C