

**BIRDS OF THE MANEMBONEMBO NATURE RESERVE,  
NORTH SULAWESI, INDONESIA**

by

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**ABSTRACT**

Manembonembo Nature Reserve in North Sulawesi, Indonesia was established in 1978. To date, virtually no ecological research has been carried out in the reserve. We describe the first systematic survey of birds at Manembonembo. As with many Sulawesi protected areas, this 6,500 ha reserve is relatively small, but in 11 days of fieldwork we sighted 72 species of birds. Of particular relevance for conservation is the presence of several threatened species such as *Prioniturus flavicans*, *Megapodius cumingii*, and *Zoothera erythronota*. Manembonembo is seriously threatened by several factors: its small size, hunting, timber collection, and agricultural encroachment

**Introduction**

The 159,000 km<sup>2</sup> island of Sulawesi, (Fig 1) is the largest island in the biogeographical subregion of Wallacea, the transition zone between Asian and Australian plants and animals. In part due to its size, geographic isolation, and paleo tectonic history Sulawesi is characterized by remarkably high levels of species endemism. Consequently, Sulawesi is one of the most important Endemic Bird Areas (EBA) in Indonesia supporting a documented 380 species of bird of which 96 are endemic and 60 are restricted to a particular range (Sujatnika *et al.* 1995, Coates & Bishop 1997). North Sulawesi is particularly important because it appears to support the highest level of bird species endemism (62 % in all of Sulawesi (FAO 1982, Sujatnika *et al.* 1995).

The province of North Sulawesi lies just above the equator, between 00°00' 01°45' N and 121°30' 126°00' E, and extends over an area 50 100km in width and approximately 450km in length. Its topography is characterized by steep mountains that were formed by recent volcanic events, with elevations reaching over 2,200 m in the Tentolo Matinan mountains in the west of the province. Although North Sulawesi still harbors some large forest tracts, most forests are small. Nevertheless, these forests are important refuges for many globally threatened birds including Maleo *Macrcephalon maleo*, Minahasa Masked owl *Tyto inexpectata*, Snoring Rail *Aramidopsis plateni*, and Heinrich's Nightjar *Eurostopodus diabolicus* (White & Bruce 1986, Coates & Bishop 1997).

In recent years, faunal populations in North Sulawesi have dramatically declined (O'Brien & Kinnaird 1996, Lee 1999, Lee *et al.* 1999a, Lee in press). Wildlife is intensively hunted, and fanning practices continue to raze and compromise the integrity of natural landscapes. Furthermore, trapping for the bird trade, both within and outside reserves, is common (Lambert *pers. comm.*, Bishop *per. obs.* 1981 1999). Due to these increasing pressures on wildlife, protected areas have become even more critical than before to the conservation of Sulawesi's fauna.

We document the first systematic survey of bird populations at Manembonembo Nature Reserve between 16–22 September and 27 October–3 November 1999, and discuss conservation implications from this survey.

### Study area

Manembonembo Nature Reserve (Cagar Alam) (0°18'–1°24' N, 124°35'–124°38' E) is a 6,500 ha reserved located approximately 30 km southwest of Manado. MANembonembo was established as a wildlife reserve (Suaka Margasatwa) in 1978 for its populations of protected species and for its watershed value (FAO 1982). Its status was later changed to strict nature reserve. Virtually no extensive ecological work has been carried out in Manembonembo. John MacKinnon carried out a brief rapid assessment in the late 1970s to determine its conservation value (FAO 1982). Since that date no ornithologists have visited the reserve.

The reserve extends; from 50 m above sea level to the peak of Mount Tanuwatik at 665m (see Fig 1). Much of the terrain is very steep, exceeding 40° in slope. There are primarily three types of habitat found at Manembonembo: alang alang grassland, secondary forest, lowland forest. Grassland fringe the reserve, dominated by alang alang *Imperata cylindrica*. Other plant species, predominantly introduced species, such as *Lantana camara*, *Piper aduncum* and *Melia azedarach*, and *Mimosa* sp. are common. Near the forest edge, the vegetation consists of small trees (2 to 5 m tall) such as *Macaranga* sp., *Piper aduncum* and *Pipturus argentea*. This scrubby vegetation gives way to secondary forest where dominant species include *Livistona rotundifolia*, *Drypeters* sp., *Callophyllum saulatri*, and *Homalium celebicum*.

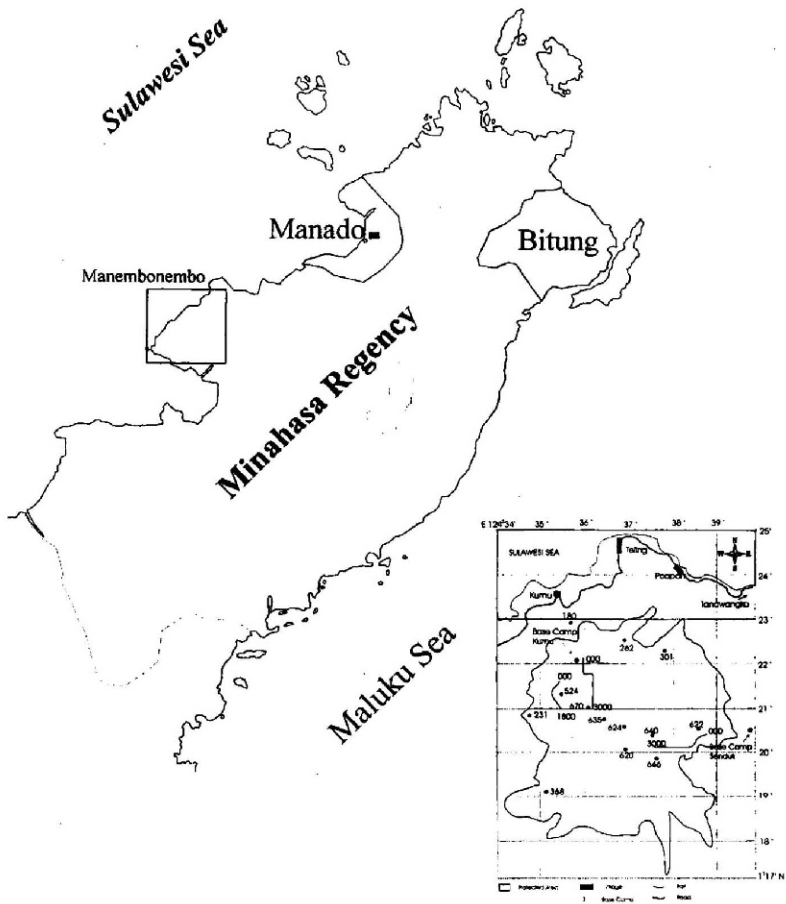
Lowland rainforest is the most extensive habitat type in Manembwembo. Dominant species include *Livistina rotundifolia*, *Palaquium obtusifolium*, *Homalium foetidum*, *Dracontomelon doo*, *Ficus* spp., and *Calamus* spp. Much of the land on the periphery of the reserve is occupied by ladang (shifting gardens for subsistence crops), and coconut and clove gardens.

Our surveys, conducted over a period of 15 days, used the line transect sampling method, entailing systematic walks on transects. Three trails were walked between 05.30 and 10.00 hrs and a total of 51.6 km of trails were surveyed with 9% of survey effort in secondary forest and 91% in primary forest. These systematic surveys were complimented by opportunistic observations made around camp sites (located in areas of grassland), whilst night birds were sought during nightly bat mist netting session. Two camps were established: at Kumu to the north of the reserve and at Senduk to the south (see Figure 2 for location of transects and camps). Some cryptic species detectable mainly by call may have been under recorded owing to our surveys focussing on sight records only. Trees were identified by team members using field characters.

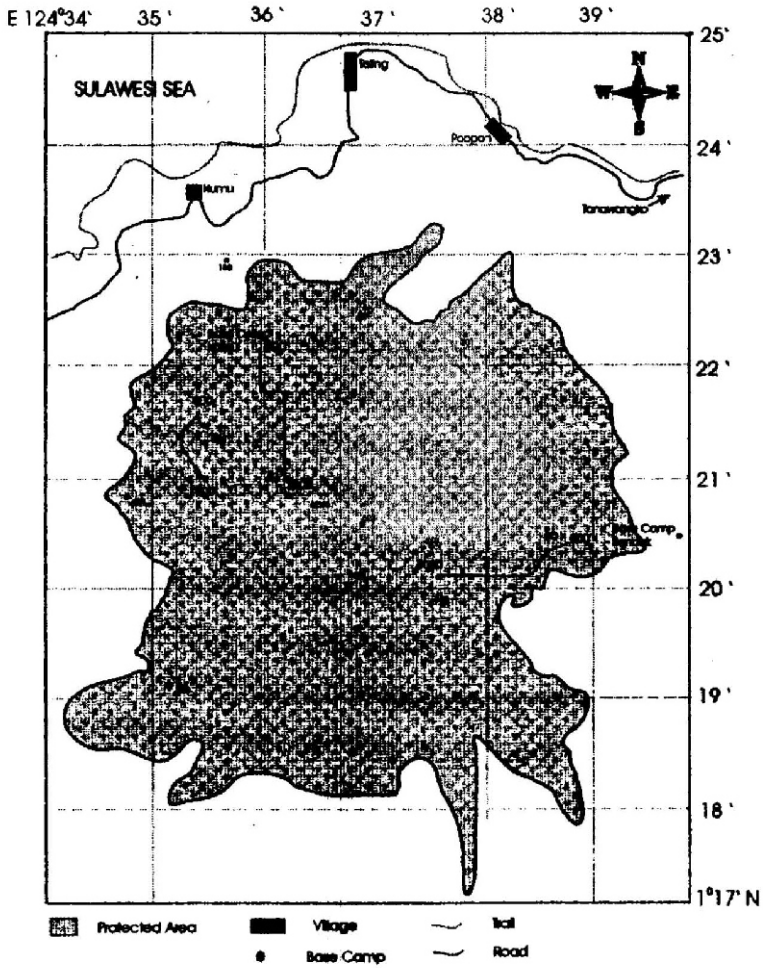
### Selected species accounts

This section provides ecological details on selected species from the present survey. Species names and nomenclature follow Coates & Bishop (1997). The following codes are used to indicate the status of each species: R (resident), 119 (endemic to Wallacea), and V (visitor), after Coates & Bishop (1997).

# Minahasa Regency



### Manembonembo Nature Reserve



**Fig\_p61 Sulawesi Serpent Eagle *Spilornis rufipectus* E**

Three records; two birds were observed on September 19, and the next day a single was seen perched in secondary forest. Finally, on September 22 a single bird was heard calling in primary forest.

**Black Eagle *Ictnatus malayensis* R**

On September 21 an adult carrying a large rat was observed circling over secondary forest.

**Spot tailed Goshawk *Accipiter trinotatus* E**

Heard calling almost daily in secondary and primary forest between 350m and 625m. A single bird was seen on 22 September. The call is very similar to that of Lilac checked Kingfisher *Cittura cyanotis* and is a loud, repeated, laughing “khee...khee...khee...khee...khee” or “ki ki ki kiki”.

**Philippine Scrubfowl *Mogapodius cumingii* R, NT**

Uncommon at Manernbonembo with just two records. Single birds were seen on 22 September, in primary forest at 400m, and on 30 October, in secondary forest at 575m.

**Sulawesi Black Pigeon *Turacoena mandennis* E**

Fairly common at Manembonembo in primary and secondary forest between 200 and 625m, although usually seen singly.

**Brown Cuckoo dove *Macropygia amboinensis* R**

A commonly observed species in secondary habitats but most common in primary forest. Usually noted in pairs or singly, with a group of 4 birds seen on 29 October.

**Green Imperial Pigeon *Ducula aena* R**

Seen almost daily in groups of up to seven birds, in both primary and secondary forest between 175 and 625m.

**White bellied Imperial Pigeon *Ducula forsteni* E**

Three records of single birds, all in secondary forest, on 16, 20 and 22 September,

**Grey headed Imperial Pigeon *Ducula radiate* E**

Seen every afternoon in the hills around the Kumu base camp. The only notable concentration was a flock of 25 birds feeding on *Ficus altissima* fruits, on 20 September at 250m in secondary forest. Birds were observed for approximately 15 minutes, together with 2 *D. aenea*.

**Maroon chinned Fruit Dove *Ptilonopus subularis* E**

Three records on 17 September of 2 birds, 29 October of 4 birds and 3 November of 2 birds suggest this species is uncommon at Manembonembo. Two records were of birds feeding on fruit in *Ficus* sp. in primary forest at 600m.

**Superb Fruit Dove *Ptilinopus superbus* R**

On September 19, a pair was observed nest building in a *Ficus virens* tree. The nest was located on a main branch some 5m away from the trunk and 11m from the ground. The male carried nesting material, mainly twigs, and presented them to the female who was constructing the nest.

**Black naped Fruit Dove *Ptilinopus melanospila* R**

Recorded in secondary and primary forest between 200 and 650m. Normally seen in pairs or small flocks of up to eight birds, commonly feeding in *Ficus* sp. trees. On 22 September a pair was observed feeding on fruits of *Pipturus argenteus*.

**Pink necked Green Pigeon *Treron vernans* R**

A single pair seen in secondary forest at 325m on 21 September was the only record.

**Grey cheeked Green Pigeon *Treron griseicauda* R**

Observed twice: a single bird on 21 September, and a flock of 15 birds in secondary forest on 22 September.

**Ornate Lorikeet *Trichoglossus ornatus* E**

Seen and heard almost daily in primary forest between 200 and 600m. This species was most commonly observed in groups of 1-5 birds flying fast above the canopy.

Yellow breasted **Racquet tail** *Prioniturus flavicans* E Whilst we observed just two birds in primary forest on September 20 this species was easily detected by its loud, bell like calls. These calls most closely resemble Blue naped Parrot *Tanygnathus lucionensis* on the Talaud islands

**Golden mantled Racquet tail *Prioniturus platurus* E**

A flock of seven seen flying above the canopy in primary forest on September 19 was the only observation. The noisy calls of this species are similar to *P. flavicans* - **but** higher pitched and less varied and were heard almost daily throughout the survey period.

**Blue backed Parrot *Tanygnathus sumatranus* R**

Commonly heard and seen in primary and secondary forest between 350 and 600m. Usually observed perched in tall canopy trees and often giving a loud, harsh "krooooeeaak.....krooooeeaakk" call. Observed singly, except for a pair noted on 20 October.

**Small Sulawesi Hanging parrot *Loriculus exilis* E**

Recorded once, a single bird noted perched in a dead tree in primary forest at 250m on 2 November.

**Large Sulawesi Hanging parrot *Loriculus stigmatus* E**

Recorded once, a flock of five birds feeding on *Ficus* sp. fruits in primary forest at 665m on 3 November.

**Black billed Koel *Eudynamis melanoryncha* E**

Although only seen three times, the call of this species was noted every morning and evening in forested habitat between 375 and 600m.

**Yellow billed Malkoha *Rhamphococcyx calyborhynchus* E**

Moderately common throughout the second survey period in tall secondary forest, palm vegetation and primary forest between 425–625m. Small groups of up to 10 birds were noted and malkohas were often recorded following groups of Crested Black Macaque *Macaco nigra*, together with Hair crested Drongo *Dicrurus hottentotus* and Bay Coucal *Centropus celebensis*.

**Bay Coucal *Centropus celebensis* E**

Common during the second survey period 27 October to 1 November with 2–4 birds noted in primary forest between 175 and 600m. Often forms flocks with Yellow billed Malkoha. Attention was drawn to this species by its haunting call.

**Sulawesi Scops owl *Otus manadensis* E**

Heard each night around the Kumu camp, but less common at Senduk. This species was recorded to an altitude of 375m in primary forest. However, despite mist netting on three nights we failed to record this species at higher elevations.

**Great Eared Nightjar *Eurostopodus macrotis* E**

The only record was of nine birds seen close to the Senduk camp on 29 October. Birds were observed feeding over corn fields close to the forest edge between 17.30 and nightfall.

**Green backed Kingfisher *Actenoides monachus* E**

Recorded twice. A single female (weight 150g) was caught in a bat mist net at 18.30 on 30 October. The bird was caught 1.5m from the ground at 325m in primary forest. This was followed by a single male observed in primary forest at 575m on 1 November.

**Ruddy Kingfisher *Halcyon coromanda* R**

The only record was a single bird on 19 September observed flying along a small creek surrounded by secondary scrub at 175m. The bird could not be sub-specifically identified.

**Lilac Kingfisher *Cittura cyanotis* E**

Observed once, on September 17, perched on a rattan *Calamus* sp. stem in primary forest at 500m. A single bird was heard calling from primary forest on September 22 at 250m.

**Sulawesi Dwarf Kingfisher *Ceyx fallax* E**

A common species at Manembonembo in primary and secondary forest and in plantations. On September 21 and 22 we observed up to three birds at 500m in primary forest. On September 21 a single bird was observed perched on a branch of a dead rattan *Calamus* sp. two metres from the ground. The next day we observed three birds together at the same location attention being drawn by a chirping "siiiiiiiiit.....siiuiiiiiit....siiiiii" call. One bird was bobbing its head and lifting its wings open frequently whilst calling, directing its display towards the other two birds. The birds were observed for about 3 minutes before they flew off in different directions.

Two birds were caught: on 28 October, an adult (weight 18g) was netted in secondary scrub dominated by *Macaranga* sp. and *Piper aduncum* close to the Kumu camp; on 30 October, a single bird was caught when it flew into the Senduk camp and was caught under a sleeping bag.

**Red knobbed Hornbill *Aceros cassidix* E**

Manembonembo still supports a good population of this species, with flocks of up to 40 birds seen daily. Seen feeding on fruits of *Ficus altissima*.

**Sulawesi Dwarf Hornbill *Penelopides exarhatus* E**

Heard calling daily, and observed twice: five birds four males and 1 female on September 21 and four birds three males and one female feeding on *Gymnocranthera paniculata* fruit on September 22.

**Purple bearded Bee eater *Meropogon forsteni* E**

On 21 and 22 September, a single bird was seen at the same location in secondary forest at 325m. On both occasions the bee eater was perched on a liana in the mid storey approximately 10m from the ground. The bird perched for minutes at a time, slowly waving its tail back and forth, before sallying out to catch a prey item then returning to the same perch.

**Ashy Woodpecker *Mulleripicus fulvus* E**

Seen daily in primary and secondary forest up to 625m. Normally seen foraging on tree trunks and uttering a characteristic gentle laughing "tuk..tuk..tuk".

**Sulawesi Pygmy Woodpecker *Dendrocopos temminckii* E**

This species was noted twice: on 30 October a single in primary forest at 600m, and on 2 November a single in secondary forest at 250m.

**Blue breasted Pitta *Pitta erythrogaster* R**

One record of a single bird in secondary scrub close to the Kumu camp on 27 October.

**Pechora Pipit *Anthus gustavi* V**

A single bird in primary forest at 625m on 29 October.



**Sulawesi Cicadabird *Coracina morio* E**

Seen daily, with pairs often observed in tall canopy trees in primary forest, although the species was also noted in secondary forest.

**[Triller sp. *Lalage* sp.] R**

Whilst locally common in Sulawesi as far north as Palu, Coates & Bishop (1997) do not mention any records of White shouldered Triller *Lalage suerii* from North Sulawesi. At Manembonembo a single bird on September 21 in forest edge habitat was believed to be this species, based on its white wing coverts which would distinguish it from the endemic Sulawesi Triller *L. leucopygialis*. However the rump colour a diagnostic feature was not noted.

**Hair crested Drongo *Dicrurus hottentotus* R**

Single birds and pairs commonly seen in all habitats between 175 and 625m. On 27 October, four birds were observed following a group of Crested Black Macaques *Macaca nigra*, and feeding on invertebrates disturbed by the monkeys. On 21 September, at Kumu, a pair was observed displaying in gardens bordering the reserve: both birds were calling noisily from tall trees before one bird flew steeply to a height of 35m before parachuting down with its wings held behind its back, whilst calling continuously.

**Sulawesi Babbler *Trichastoma celebense* E**

A commonly heard, but rarely seen species, most frequent in scrubby habitats but also noted in forest areas between 250 650m. Babblers were heard every morning and evening giving their characteristic four or five note call. Birds were seen feeding close to the ground in dense scrub, on fallen trees and in low bushes.

**Red backed Thrush *Zoothera erythronota* E, NT**

This species was seen rarely, with just two records on 29 and 31 October. Both records were of single birds feeding on the forest floor in primary forest between 600 and 650m.

**Citrine Flycatcher *Culicicapa helianthea* E**

Three observations of two birds in primary forest between 550 and 600m on 31 October, 1 November and 3 November.

**Ivory backed Wood swallow *Artamus monachus* E**

Common in forested habitats between 250 and 450m. Around the Kumu camp birds were seen daily, with a maximum of seven birds on 3 November.

**White necked Myna *Streptocitta albigollis* E**

Uncommon at Manembonembo, with one or two birds seen daily in primary forest between 400 and 600m. On 21 September a pair were observed attending a nest hole in a dead tree located at 400m in primary forest. The nest hole was approximately 10cm diameter and 15m from the ground in the trunk of the dead tree. The nest contained at least one chick and adults were observed feeding the young bird fruits from a *Glocidion pillipicum* tree.

**Grosbeak Starling *Scissirostrum dubium* E**

Although usually extremely common in forested habitat elsewhere in north Sulawesi, at Manembonembo we found this to be a relatively uncommon species. However, we recorded it on nine occasions over the 14 day survey period, with birds being encountered in flocks of 15-40 in primary and secondary forest.

**Sulawesi Crested Myna *Basilornis celebensis* E**

Seen on three occasions between 28 October and 3 November. Up to 3 birds were noted in the canopy of primary forest between 350 and 650m. Birds often gave a call which was likened to the calls of an immature chicken.

**Scarlet Honeyeater *Myzomela sanguinolenta* R**

Single males were seen on 20 September and 3 November in primary forest between 500-600m.

**Crimson Sunbird *Aethopyga siparaja* R**

Recorded twice, with single males noted on 20 and 22 September in secondary forest at 250m.

**Yellow sided Flowerpecker *Dicaeum aureolimbatum* E**

Common in primary and secondary forest in groups of 2-3 birds or forming flocks with Black fronted White eye *Zosterops atrifrons* and Black Sunbird *Nectarinia aspasia*. On 27 October, birds were seen feeding on the fruits of *Pipturus argenteus*.

**Grey sided Flowerpecker *Dicaeum celebicum* E**

Very common in all habitats. Usually seen singly or in pairs and often accompanied by Olive backed Sunbird *Nectarinia jugularis*. On 3 November, birds were seen feeding on the flowers of *Pipturus argenteus*.

**DISCUSSION**

Threats to the wildlife populations in Indonesia have become more serious than ever before. A recent study (Shannaz *et al.* 1995) showed that a large majority (81%) of Indonesian threatened bird species are under threat from habitat loss and disturbance. Restricted ranges compound the problem by confining bird species to isolated patches of forest which may be few and far between. Manembonembo Nature Reserve is no exception. Resource practices by the communities bordering Manembonembo have led to dramatic forest and wildlife loss in recent years as evidenced by degraded forests and small and scattered wildlife populations (Lee *et al.* 1999b).

The structure of the forest reflects this heavy disturbance (see Lee *et al.* 1999b for further details). Our surveys showed that average tree girth was much lower than in previous years, and tree density was much higher, suggesting that much of the canopy size trees are now gone and replaced by many smaller girth trees. The population of trees was heavily skewed toward smaller tree sizes. Tree species diversity was quite low (81 species at > 10 cm dbh); this is most likely due to continued harvesting. Furthermore, the use of certain tree species for domestic use has led to the scarcity of these

species. For example, the lingua tree *Pterocarpus indicus* is heavily used for building houses, boats, and furniture.

Two plant families, Anacardiaceae and Moraceae, contribute significantly to the diets of frugivorous birds, especially hornbills (Kinnaird & O'Brien 1995). Tree species in these families are important for two reasons. First, because they are almost always canopy size, large amounts of fruits are available to a large group of birds at a single time. Second, they produce large fruits that are fleshy (i.e. high water content) and which contain high levels of sugar, essential for obtaining enough calories for daily activities, and calcium for physical growth (O'Brien *et al.* 1998). There has been a great reduction in the number of trees in these two families both in species diversity and density at Manembonembo in recent years.

A third family, Palmae, has also been reduced dramatically in recent years. Palms are important to the functioning of a forest the fleshy layer in the sarcotesta (fruit wells) are eaten by birds and Rattan *Calamus* spp. and woka *Livistona rotundifolia* are used by animals for shelter. They also provide economic benefits to local communities who harvest woka leaves to be used as roofing thatch and rattan stems to be sold as a cash crop. Over exploitation of these three tree families has led to the observed decline and this will presumably affect, in as yet unquantified ways, the dynamics of the Manembonembo forest.

The findings from the present survey noted the presence of at least 72 bird species. Although the majority of species are not listed as 'threatened' (IUCN 1996), it is reasonable to state that very little is known about their status in the wild. Few systematic surveys have been carried out, and most studies on endemic Sulawesi birds have been either of the descriptive type or have been short in duration. Three species *Megapodius cumingii*, *Prioniturus flavicans* and *Zoothera erythronota* are currently listed as 'near threatened' (Stattersfield *et al.* 1998), partly because of their dependence on lowland forest.

Bird populations in the reserve are threatened by a combination of pressures. First, the small size of the forest, coupled with the fact that nearby areas are denuded of forest, restrict most bird species to a small patch of habitat. It is accepted that, even when area size is not considered, small populations face a greater risk of extinction than large populations because of random variation in genetic and demographic events.

This problem is compounded by the fact that many of the bird species found at Manembonembo are lowland specialists that feed on fruit. For the great many vertebrate species in tropical forests that rely on fruit as a source of food, species diversity of fruit trees can influence the dynamics of the frugivore community (Chivers & Raemaekers 1980). Vegetation structure, distribution, and composition, particularly fruit bearing trees, can have significant implications for their ranging and foraging patterns and, ultimately, their survival. Therefore, it seems likely that bird species such as hornbills, *Ducula* pigeons, *Ptilinopus* fruit doves and parrots are being negatively affected by habitat degradation brought about by unsustainable resource extraction from the reserve.

Whilst hunters target the larger species of mammal (Lee *et al.* 1999a), birds, particularly large species such as *Ducula* pigeons, are also hunted. This hunting pressure may explain the relatively low numbers of pigeons recorded during our surveys. Thus, a restricted habitat area, habitat degradation and hunting pressure, combine to reduce the value of Manembonembo for bird populations.

MacKinnon (FAO 1982) felt that Manembonembo had little conservation value due to the level of disturbance. Certainly in comparison to other larger, considerably better studied reserves in North Sulawesi, Manembonembo appears to support a relatively low diversity of bird species 72 compared to Tangkoko Nature Reserve (156 species, Kinnaird & O'Brien, 1995) and Gunung Ambang Nature Reserve (113 species, WCS IP, Sulawesi unpublished data). Nevertheless, Manembonembo is still a valuable tract of lowland forest – an increasingly rare habitat throughout Sulawesi – and supports populations of several little known, globally threatened and endemic Sulawesi birds.

Despite the fact that threats are pervasive and intense, given the small area set aside for wildlife protection, Manembonembo still represents an important area for biodiversity conservation. The forests of Manembonembo provide critical habitats, particularly riverine habitats, for lowland species in North Sulawesi. If wildlife populations are to persist into the future, the reserve must be given more protection. In turn, the people in surrounding areas will reap the economic and ecological benefits from having an intact ecosystem.

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**APPENDIX I Bird species recorded at Manembonembo Nature Reserve, Sep Oct 1999.**

A: Agricultural plantations R: River  
 G: Grass S: Secondary Forest  
 P: Primary Forest Se: Secondary Scrub  
 PV: Palm Vegetation V: Village

Altitude range: The minimum and maximum altitude (meters above sea level) at which the species was recorded

Common Name	Latin Name	Altitude Range	Habitat
Brahminy Kite	<i>Haliastur Indus</i>	0-50	A
Sulawesi Serpent-eagle	<i>Spilornis rufipectus</i>	350-625	S,P
Black Eagle	<i>Icrinaetus malayensis</i>	100-300	S
Spot-tailed Goshawk	<i>Accipiter trinitatus</i>	300-400	S
Philippine Scrubfowl	<i>Megapodius cumingii</i>	400-575	S,P
Red Junglefowl	<i>Gallus gallus</i>	100-200	S
Buff-banded Rail	<i>Gallirallus philippensis</i>	0-50	Sc
Barred Rail	<i>Gallirallus torquatus</i>	0-50	A,Sc
Spotted Dove	<i>Streptopelia chinensis</i>	100-200	A,S
Sulawesi Black Pigeon	<i>Turacoena manadensis</i>	200-625	S,P
Brown Cuckoo-dove	<i>Macropygia amboinensis</i>	200-625	S,P
Green Imperial Pigeon	<i>Ducula aenea</i>	175-625	S,P
White-bellied Imperial Pigeon	<i>Ducula forsteni</i>	125-625	S,P
Grey-headed Imperial Pigeon	<i>Ducula radiata</i>	100-500	P
Maroon-chinned Fruit Dove	<i>Ptilinopus subgularis</i>	175-600	S,P
Superb Fruit Dove	<i>Ptilinopus superbus</i>	250-610	S,P
Black-naped Fruit Dove	<i>Ptilinopus melanospila</i>	200-650	S,P
Pink-necked Green-pigeon	<i>Treron vernans</i>	250-350	S
Grey-cheeked Green-pigeon	<i>Treron griseicauda</i>	185-325	S
Ornate Lorikeet	<i>Trichoglossus ornatus</i>	200-600	S,P
Yellow-breasted Racquet-tail	<i>Prioniturus flavicans</i>	250-450	S,P
Golden-mantled Racquet-tail	<i>Prioniturus platurus</i>	175-650	S,P
Blue-backed Parrot	<i>Tanygnathus sumatranus</i>	350-600	S,P
Large Sulawesi Hanging-parrot	<i>Loriculus stigmatus</i>	665	P
Small Sulawesi Hanging-parrot	<i>Loriculus exilis</i>	250	S
Black-billed Koel	<i>Eudynamis melanorhyncha</i>	375-600	S,P
Yellow-Billed Malkoha	<i>Rhamphococcyx calyrorhynchus</i>	425-625	S,P,PV
Lesser Coucal	<i>Centropus bengalensis</i>	0-100	A,Sc
Bay Coucal	<i>Centropus celebensis</i>	425-625	P,PV
Speckled Boobook	<i>Ninox punctulata</i>	175-375	S,P
Sulawesi Scops-owl	<i>Otus manadensis</i>	175-375	S,P
Great Eared Nightjar	<i>Eurostodopus macrotis</i>	400	A,S
Glossy Swiftlet	<i>Collocalia esculenta</i>	0-625	V,A,S,P
Grey-rumped Tree-swift	<i>Hemiprocne longipennis</i>	175-500	V,A,S
Green-backed Kingfisher	<i>Actenoides monachus</i>	325-575	P
Ruddy Kingfisher	<i>Halcyon coromanda</i>	175	S

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Lilac cheeked Kingfisher	<i>Cittura cyanotis</i>	250 500	P
Collared Kingfisher	<i>Halcyon chloris</i>	0 100	V,A
Common Kingfisher	<i>Alcedo atthis</i>	150 250	R
Sulawesi Dwarf Kingfisher	<i>Ceyx fallax</i>	175 575	P
Sulawesi Dwarf Hombill	<i>Penelopides exarhatus</i>	250 625	S,P
Knobbed Hombill	<i>Rhyticeros cassidix</i>	180 600	S,P
Purple bearded Bee eater	<i>Meropogon for stem</i>	325	S
Ashy Woodpecker	<i>Mulleripicus fulvus</i>	250 625	S,P
Sulawesi Pygmy Woodpecker	<i>Dendrocopos temminckii</i>	250 600	S,P
Blue Breasted Pitta	<i>Pitta erythrogaster</i>	150 250	S
Pacific Swallow	<i>Hirundo tahitica</i>	0 175	V,A
Pechora Pipit	<i>Anthus gustavi</i>	625	P
Sulawesi Cicadabird	<i>Coracina mono</i>	250 625	S,P
[Triller sp.]	<i>Lalage sp.</i>	400	P
Hair crested Drongo	<i>Dicrurus hottentottus</i>	175 625	A,S,P
Black naped Oriole	<i>Oriolus chinensis</i>	250 650	S,P
Slender billed Crow	<i>Corvus enca</i>	0 100	A
Sulawesi Babbler	<i>Trichastoma celebense</i>	250 650	S,P
Red backed Thrush	<i>Zosteria erythronota</i>	625 650	P
Golden headed Cisticola	<i>Cisticola exilis</i>	0 500	G
Black fronted White eye	<i>Zosterops atrifrons</i>	0 600	A,S,P
Black naped Monarch	<i>Hypothymis azurea</i>	250 665	S,P
Citrine Flycatcher	<i>Cuticicapa helianthea</i>	575	P
Ivory backed Wood swallow	<i>Artamus monachus</i>	250 450	S,P
White necked Myna	<i>Streptocitta albigollis</i>	400 600	S,P
Grosbeak Starling	<i>Scissirostrum dubium</i>	175 600	S,P
Sulawesi Crested Myna	<i>Basilomis celebensis</i>	350 650	P
Scarlet Honeyeater	<i>Myzomela sanguinolenta</i>	500 600	P
Brown throated Sunbird	<i>Anthreptes malacensis</i>	300 350	P
Black Sunbird	<i>Nectarinia aspasia</i>	325 625	P
Olive backed Sunbird	<i>Nectarinia jugularis</i>	0 300	A,S
Crimson Sunbird	<i>Aethopyga siparaja</i>	250	S
Yellow sided Flowerpecker	<i>Dicaeum aureolimbatum</i>	175 625	S,P
Grey sided Flowerpecker	<i>Dicaeum celebicum</i>	175 625	S,P
Black faced Munia	<i>Lonchura molluca</i>	0 50	G,A
Tree Sparrow	<i>Passer montanus</i>	0 50	V