

Significant records of birds in forests on Cebu island, central Philippines

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Information on threatened endemic birds of Cebu, generated over three years of monitoring (2001–2004), revealed a number of supposedly extinct bird taxa surviving in small, degraded forest patches. Methods used in our surveys included mist-netting, line transects, point counts and interviewing key local persons. Four threatened Philippine endemic birds were observed in at least two sites on Cebu Island. Seven of the twelve endemic subspecies from Cebu were confirmed extant. Twenty forest birds presumed extinct in Cebu were rediscovered. In addition, we mist-netted the first Chinese Goshawk for Cebu and one *Phylloscopus* warbler showing characteristics of Yellow-browed Warbler, a species not previously known from the Philippines. On the other hand, we did not find the Cebu endemic races of White-bellied Woodpecker *Dryocopus javensis cebuensis*, Blackish Cuckooshrike *Coracina coerulescens altera*, Bar-bellied Cuckooshrike *Coracina striata cebuensis* and Philippine Oriole *Oriolus steerii assimilis* along with 16 other forest bird species that may now be extinct or nearly extinct on Cebu. The surviving populations of threatened and endemic birds of Cebu largely depend on the persistence of small forest patches; hence, the condition of these populations is precarious.

INTRODUCTION

The island of Cebu, located in Central Visayas, is considered as the most denuded island in the central Philippines (Collar *et al.* 1999). Despite its close proximity to Negros, Siquijor and Bohol, its avifauna is distinct from these islands. There are two bird species and twelve subspecies endemic to the island, making Cebu one of the nine Endemic Bird Areas in the Philippines (Collar *et al.* 1999, Mallari *et al.* 2001).

The forest cover of Cebu Island is now less than 1% of its total land area (Mallari *et al.* 2001). The almost complete deforestation of Cebu Island has apparently led to the extinction of many birds and other wildlife (Brooks *et al.* 1995). Several forest species recorded in the late 1950s are now considered locally extinct (Rabor 1959, Magsalay *et al.* 1995, Brooks *et al.* 1995, Collar *et al.* 1999). However, the recent increase in ornithological fieldwork in Cebu has resulted in the rediscovery of several species of supposedly extinct taxa such as Everett's White-eye *Zosterops everetti everetti* and White-vented Whistler *Pachycephala homeyeri major* (Dutson 1993, Magsalay 1994, Brooks *et al.* 1995). In this paper, we describe the condition of three remaining forest patches and the status of endemic and threatened forest birds of Cebu that are found in these patches. We also compare the number of threatened species between sites.

Historical review of ornithological work in Cebu

There have been only a few bird studies conducted in Cebu, almost all of which focused on collecting birds and very few on the relationship of species (particularly the endemics) to their habitat (Timmins 1992, Dutson *et al.* 1993, Brooks *et al.* 1995, Magsalay *et al.* 1995).

Meyer collected birds in April 1872, followed by the Challenger expedition in April 1875. Steere conducted his expedition from May 1874 to April 1875, visiting different islands in the Philippines including Cebu. Everett followed in March–April 1877, making collections for Lord Tweeddale. Koch visited Cebu in March 1881 followed by Steere in 1888. The Menage Expedition conducted their study in June 1891 and June–July the following year. McGregor made collections in September 1906 followed by Forbes in June 1913 and Celestino in late 1920. In the late 1940s, Rabor began collecting for

20 years (Dickinson *et al.* 1991). Timmins (1992) visited Tabunan in early 1990s and first reported the presence of the supposedly extinct Cebu Flowerpecker *Dicaeum quadricolor*. This was confirmed by Dutson *et al.* (1993). Shortly after, Magsalay (1993) published a paper on the rediscovery of four endemic subspecies of birds in Cebu. Papers by Brooks *et al.* (1995) and Magsalay *et al.* (1995) discussed extinctions and rediscoveries in Cebu. This was followed by an island-wide survey and a report on the conservation status of the forests in Cebu and its threatened wildlife in 1998 (Gonzalez *et al.* 1999). Extensive mist-netting of birds was conducted in Alcoy in March 2000 by Marisol dG. Pedregosa (Pedregosa, 2000). Many results of these latter two unpublished surveys are included here with permission of the authors.

STUDY AREA

The island of Cebu is the ninth largest in the Philippine archipelago. It has a land area of 5,008 km², with a hilly landscape (Orlanes 2002). It is a long, narrow island with a low central mountainous ridge running parallel to the coast in a north-south direction. Mount Calbalasan in the south, which rises to 1,018 m in elevation, is the highest point on the island. There are seven forest patches distributed across the island; we surveyed three.

Tabunan Forest (10°26'17"N 123°49'34"E)

Tabunan holds the most significant forest cover within Central Cebu Protected Landscape (Gonzalez *et al.* 1998, Orlanes 2002). It is the only remaining closed-canopy forest in Central Cebu, with large trees over 25 m tall covering an area of at least 1.85 km² (Orlanes 2002). It forms a thin, segmented strip of forest on steep limestone hillside, with closed-canopy areas of less than 0.1 km². The vegetation is dominated by *Ficus* spp., *Homolanthus* sp., *Syzygium* sp., *Macaranga* sp., *Leeia* sp., *Sterculia philippinensis*, *Dillenia* sp., *Leucosyke* sp., *Diospyros philippensis* and *Mangifera* sp. The elevation ranges from 400 to 880 m. The gradient changes drastically from a gentle 11–34% at the interface between the forest and abandoned farmlands to over 40–50% at the forest edge

(Orlanes 2002). Active and abandoned farmland is found within the forest perimeter and in the middle of the forest, these are gradually splitting the forest into two main blocks.

Mt Lantoy, Argao (9°71'30"N 123°45'3"E)

Mt Lantoy is part of the Argao-Dalaguete Watershed Forest Reserve declared by a Presidential Proclamation (No. 414, 29 June 1994). The watershed area totals to 72.5 km² but less than 0.5 km² of Mt Lantoy is covered with natural vegetation. The forest in Mt Lantoy is surrounded by cultivation, coconut plantations, plantations of non-indigenous trees and scrubland, which is also used by local communities for grazing their livestock. Seasonal crops like cabbage, corn, onion and carrots are planted in agricultural farms surrounding the forests.

Alcoy Forest (9°71'N 123°44'E)

The natural limestone forest in Alcoy covers 12 km². It is located in the central portion of the municipality of Alcoy and Boljo-on. It covers five barangays (villages), namely Nug-as, Atabay, San Agustin, Poblacion and Nangka. The natural limestone forest is mostly composed of secondary forest dominated by *Syzygium* and *Ficus* spp., and is surrounded by tree plantations, scrubland and agriculture. *Casuarina rumphiana* and *Cinnamomum* sp. are distributed in clumps with *Melia dubia*, *Macaranga* sp. and *Melastoma* sp. forming a dense undergrowth. The forest is thick with climbing bamboo, rattan (*Calamus* sp.) and spiny vines. The substrate is basically limestone and closed-canopy forest is only observed in gullies while ridge tops have smaller trees. Notable indigenous plants include *Palaquim philippense*, *Canarium* sp., *Helicia* sp., *Eugenia* sp., *Syzygium* sp. and *Ficus* spp. Rare plants noted were *Medinilla albiflora*, various epiphytic ferns (e.g. *Asplenium*, *Platyserium*) and orchids.

Among the three forest patches studied, Nug-as has the largest total forest cover (12 km²) followed by Tabunan (1.85 km²) and Mt Lantoy in Argao (0.5 km²). Nug-as forest also appears to be the least disturbed followed by Tabunan and Mt Lantoy.

METHODS

We carried out fieldwork between 2001 and 2004. The forest patches in Tabunan were visited from 27 February 2001 to 2 March 2001 and during 7–10 November 2002. Alcoy forest was visited during 16–19 November 2002, 22–27 January 2003, 18–22 March 2003, 22–26 March 2004 and 10–13 November 2004. Mt Lantoy in Argao was visited on 8–13 October 2004. We conducted bird observations at designated point count areas at Mt Lantoy and Tabunan forests, including the surrounding smaller forest patches. In each station, observers waited for at least two minutes after arriving and then recorded birds within a 20 m radius for six minutes. Each station was placed at least 200 m apart. Observations were carried out from 06h00 to 08h00 and from 16h00 to 18h00. Six point-count stations were established in the forest patches of Tabunan, and a total of 9 hours and 6 minutes of observation time was spent there. In Mt Lantoy, there were three point-count stations, and total observation time was 3 hours and 6 minutes.

In Alcoy where the forest cover was larger, six 1-km transects were laid. Transects followed established routes inside the forests and were at least 200 m apart. All transects were walked simultaneously and birds seen or heard calling within a 20 m belt on either side of the transect were recorded. Observations were conducted during 06h00–08h00 and 16h30–18h00. A total of 228 observation hours was spent in the area. Mist-nets measuring 6×4 m (height×length) were also used in Argao and Alcoy forests to record birds that cannot easily be seen or heard. Nets were opened during 05h00–18h00 and were checked every hour for captured birds. Nets were closed only at night and during heavy rain. Details of mist-netting effort at each site are shown in Table 1.

Birds were identified using the Kennedy *et al.* (2001), whose taxonomy and nomenclature we follow, except for some species (Variable Kingfisher *Ceyx lepidus*, Sulphur-billed Nuthatch *Sitta oenoclamys* and Red-striped Flowerpecker *Dicaeum australe*) where we follow the English names in Howard and Moore (2003). Scientific names of bird taxa are listed in Table 2. Square brackets indicate uncertain identification. Threatened status follows BirdLife International (2008).

Table 1. Sampling effort at each survey site on Cebu Island, Philippines.

Area	No. of nets	Total length of nets (m)	No. of hours operated	Total net-metre hours
Tabunan				
27 February–2 March 2001	62	372	8	2,976
7–10 November 2002	4	24	8	192
				3,168
Alcoy				
16–19 November 2002	30	180	8	1,440
22–27 January 2003	60	360	8	2,880
18–22 March 2003	48	288	6	1,728
22–26 March 2004	48	288	6	1,728
10–13 November 2004	12	72	8	576
				8,352
Mt Lantoy, Argao				
8–13 October 2004	90	540	8	4,320
				4,320

RESULTS

We found different numbers of species in the three forest patches surveyed—58 in Alcoy, 53 in Tabunan and 44 in Argao. Among these were several species of interest because of their endemism or threatened status or both.

Threatened Philippine endemic species

This study confirmed the presence of several threatened endemic birds in Alcoy and Mt Lantoy, thus extending their local distribution from Tabunan to at least these two forest patches. The Black Shama and Streak-breasted Bulbul were observed in all three sampling sites while the Cebu Flowerpecker and the Green-faced Parrotfinch were recorded only in Tabunan and Nug-as (Alcoy) forests. The Nug-as forest supported the highest number of threatened species followed by Tabunan, then Mt Lantoy. The Rufous-lored Kingfisher was not observed in Tabunan but a single sighting of a cobalt blue kingfisher with a reddish mark on the collar was made in Nug-as.

CEBU FLOWERPECKER *Dicaeum quadricolor*

Critically Endangered. This species was encountered six times in Tabunan forests, usually between 11h00 and 13h00. On one occasion (November 2002, 13h00), two male birds and one female were observed feeding in a *Ficus* tree at a forest edge for at least five minutes. The forest patch was located northwest of the main Tabunan forest at 780 m elevation. A male bird was again seen gleaning insects and feeding on *Ficus* fruits in February 2003. In Nug-as forests, the species was observed on several occasions in different locations. In July 2003, a pair was observed feeding on *Loranthus* fruit in an abandoned farm beside the forest at 700 m elevation. Another male was observed gleaning insects from under the leaves of a *Macaranga* tree in April 2004. This bird stayed for about 10 seconds before moving away from sight. We observed the bird moving silently and rarely giving calls. On 11 July 2004, a male was seen feeding on the fruits of a *Loranthus* plant in a forest edge at 860 m elevation. In November 2004, another male was observed for at least five minutes, feeding on *Loranthus* fruits 6 m away at 670 m elevation.

STREAK-BREASTED BULBUL *Ixos siquijorensis*

Endangered. This species was usually encountered singly or in pairs, feeding on *Ficus* fruits together with Philippine Bulbul, Coppersmith Barbet and White-eared Brown Dove in Nug-as forest. Two individuals were also observed in Mt Lantoy, while the bird appears uncommon in Tabunan forest. The birds were slightly larger than Philippine Bulbul, with a white chin and light brown throat streaked with white, extending to the belly region. The lower belly was white and rump was pale yellow. The crown was greyish-brown. This species was seen only in areas with natural vegetation although some observations were at forest edges.

GREEN-FACED PARROTFINCH *Erythrura viridifacies*

Vulnerable. This species was first recorded in Alcoy forest in March 2000 (Pedregosa 2000) when two individuals were mist-netted in the subcanopy. During our study, a single individual was sighted in June 2001, perched on a 4 m tall mahogany tree *Sweetenia macrophylla*. The area was surrounded by *Imperata cylindrica* grass and second-

growth plants were observed near edges of *Acacia mangium* plantations. The general body coloration was characteristically green with distinctive red elongated central tail feathers, red rump and uppertail coverts. We observed the bird for at least 10 seconds before it flew towards the grassland. The bird was also sighted in Alcoy forest in June 2004, where a single individual was seen perched on a low lying bush surrounded by *Imperata* and then flew in the direction of the forest. Another individual was sighted in January 2004 when it flew across the trail in an abandoned agricultural area next to a secondary forest; it perched on the branches of a small tree before disappearing into the bushes. This species has previously been recorded only from Negros and Panay and Luzon islands (Kennedy *et al.* 2001) and this is the first record of the species in Cebu.

Endemic subspecies

Both Tabunan and Nug-as forests yielded eight endemic subspecies. Seven of the 12 endemic subspecies of birds in Cebu were considered possibly extinct by Brooks *et al.* (1995). These are White-bellied Woodpecker, Philippine Oriole, Orange-bellied Flowerpecker, Amethyst Brown Dove, Blackish Cuckooshrike, Bar-bellied Cuckooshrike and Streak-breasted Bulbul. Our study recorded two of these seven supposedly extinct endemic subspecies—Amethyst Brown Dove and Orange-bellied Flowerpecker—as well as other subspecies.

AMETHYST BROWN DOVE *Phapitreron amethystina frontalis*

This subspecies was thought to be extinct on Cebu (Brooks *et al.* 1995). Two possible individuals of Amethyst Brown Dove were observed in Alcoy forest in November 2004. One individual was seen perched on an exposed branch of a sub-canopy tree along a forest trail in Alcoy. It was perched upright, and had a distinctive grayish band on the undertail, an iridescent pink and purple neck and upper back, and a dark line under the eye contrasting with the buff line under it. The legs were purplish-red. The other individual was observed at least 700 m away from the location of the first; it was perched on a woody vine for at least a minute before moving out of sight. Further confirmation of the identification of this subspecies is needed.

[COLASISI *Loriculus philippensis chrysonotus*]

This taxon was historically recorded in Tabunan forests but recent sightings have not been able to confirm the identification of the *chrysonotus* subspecies. We have observed a Colasisi in Tabunan forest, perched on a rattan *Calamus* leaf. It had a light yellow colour from the top of the head up to the back region. The *chrysonotus* subspecies has orange coloration on the back rather than yellow. Brooks *et al.* (1995) mention escaped caged Colasisi birds in Tabunan, and the bird we observed in the area may actually be an escapee and not the *chrysonotus* subspecies. A Colasisi fitting the description of the *chrysonotus* subspecies was reported by locals in Nug-as in August 2004 but this has not been verified.

COPPERSMITH BARBET *Megalaima haemacephala cebuensis*

This barbet was observed in all three sites. The bird was common-to-uncommon in all three sites and usually perched on exposed branches of canopy trees from which it was seen to call. The species also congregated in fruiting

Table 2. Comparison of records of resident forest birds of Cebu recorded in this study (2001–2004), with those recorded in earlier studies (based on Kennedy *et al.* 2000). The 1957 records are taken from Rabor (1959); the 1992 records from Brooks *et al.* (1995); the 1998 records from Gonzalez *et al.* (1999); and the 2000 records from Pedregosa (2000). New records, including those from Pedregosa (2000), are marked with an asterisk. Question marks indicate unconfirmed records.

Species	Survey year				
	1957	1992	1998	2000	2001–2004
BRAHMINY KITE <i>Haliastur indus</i>	X	X	X	X	X
CHINESE GOSHAWK <i>Accipiter soloensis</i>					X
PHILIPPINE SERPENT EAGLE <i>Spilornis holospilus</i>	X	X	X		
RED JUNGLEFOWL <i>Gallus gallus</i>			X	X	X
PINK-NECKED GREEN PIGEON <i>Treron vernans</i>		X	X	X	X
WHITE-EARED BROWN DOVE <i>Phapitreron leucotis</i>	X	X	X	X	X
AMETHYST BROWN DOVE <i>Phapitreron amethystinus frontalis</i>				?	X
YELLOW-BREASTED FRUIT DOVE <i>Ptilinopus occipitalis</i>	X	X	X	X	X
BLACK-CHINNED FRUIT DOVE <i>Ptilinopus leclancheri</i>			X	X	X
* PINK-BELLIED IMPERIAL PIGEON <i>Ducula poliocephala</i>					X
METALLIC PIGEON <i>Ducula poliocephala</i>					X
PHILIPPINE CUCKOO-DOVE <i>Macropygia tenuirostris</i>	X	X	X	X	X
COMMON EMERALD DOVE <i>Chalcophaps indica</i>	X	X	X	X	X
BLUE-CROWNED RACQUET-TAIL <i>Prioniturus discurus</i>		X	X	X	X
[COLASISI <i>Loriculus philippensis</i>]		?	?	?	?
PHILIPPINE HAWK CUCKOO <i>Cuculus pectoralis</i>	X	X	X	X	X
PLAINTIVE CUCKOO <i>Cacomantis merulinus</i>	X	X	X	X	X
RUSTY-BREASTED CUCKOO <i>Cacomantis sepulcralis</i>	X	X	X	X	X
COMMON KOEL <i>Eudynamis scolopaceus</i>			X	X	X
PHILIPPINE COUCAL <i>Centropus viridis</i>	X	X	X	X	X
BROWN HAWK OWL <i>Ninox japonica</i>			X	X	X
PHILIPPINE HAWK OWL <i>Ninox philippensis</i>			X	X	X
PHILIPPINE NIGHTJAR <i>Caprimulgus manillensis</i>	X	X	X	X	X
SAVANNA NIGHTJAR <i>Caprimulgus affinis</i>		X	X	X	X
GLOSSY SWIFTLET <i>Collocalia esculenta</i>	X	X	X	X	X
PYGMY SWIFTLET <i>Collocalia troglodytes</i>	X	X	X	X	X
GREY SWIFTLET <i>Aerodramus amelis</i>	X	X	X	X	X
PHILIPPINE SWIFTLET <i>Aerodramus mearnsi</i>			X	X	X
PURPLE NEEDLETAIL <i>Hirundapus celebensis</i>	X	X	X	X	X
PHILIPPINE SPINETAILED SWIFT <i>Mearnsia picina</i>			X	X	X
VARIABLE KINGFISHER <i>Ceyx lepidus</i>					X
[RUFIOUS-LORED KINGFISHER <i>Todiramphus winchelli</i>] (VU)				?	?
WHITE-COLLARED KINGFISHER <i>Todiramphus chloris</i>	X	X	X	X	X
WHITE-THROATED KINGFISHER <i>Halcyon smyrnensis</i>			X	X	X
COPPERSMITH BARBET <i>Megalaima haemacephala cebuensis</i>	X	X	X	X	X
[WHITE-BELLIED WOODPECKER <i>Dryocopus javensis cebuensis</i>]			?	?	
PHILIPPINE WOODPECKER <i>Dendrocopos maculates</i>				X	X
RED-BELLIED PITTA <i>Pitta erythrogaster</i>				X	X
HOODED PITTA <i>Pitta sordida</i>				X	X
[BAR-BELLIED CUCKOOSHRIKE <i>Coracina striata cebuensis</i>]				?	
[BLACKISH CUCKOOSHRIKE <i>Coracina coerulescens altera</i>]				?	
[PHILIPPINE LEAFBIRD <i>Chloropsis flavipennis</i>]			?	?	

Table 2. Continued.

Species	Survey year				
	1957	1992	1998	2000	2001–2004
PIED TRILLER <i>Lalage nigra</i>				X	X
STEAK-BREADED BULBUL <i>Ixos siquijorensis monticola</i> (EN)			X	X	X
PHILIPPINE BULBUL <i>Ixos philippinus</i>		X	X	X	X
BALICASSIAO <i>Dicrurus balicassius</i>		X	X	X	X
PHILIPPINE ORIOLE <i>Oriolus steerii</i>					
BLACK-NAPED ORIOLE <i>Oriolus chinensis</i>		X	X	X	X
ELEGANT TIT <i>Parus elegans visayanus</i>		X	X	X	X
ORIENTAL MAGPIE-ROBIN <i>Copsychus saularis</i>		X	X	X	X
BLACK SHAMA <i>Copsychus cebuensis</i> (EN)		X	X	X	X
LEMON-THROATED WARBLER <i>Phylloscopus cebuensis</i>		X	X	X	X
[YELLOW-BROWED WARBLER <i>Phylloscopus inornatus</i>]					?
MANGROVE BLUE FLYCATCHER <i>Cyornis rufigastra</i>		X	X	X	X
PIED FANTAIL <i>Rhipidura javanica</i>		X	X	X	X
BLACK-NAPED MONARCH <i>Hypothymis azurea</i>		X	X	X	X
WHITE-VENTED WHISTLER <i>Pachycephala homeyeri major</i>		X	X	X	X
* CITRINE CANARY FLYCATCHER <i>Culicicapa helianthea</i>					X
WHITE-BREADED WOODSWALLOW <i>Artamus leucorhynchus</i>			X	X	X
ASIAN GLOSSY STARLING <i>Aplonis panayensis</i>		X	X	X	X
COLETO <i>Sarcops calvus</i>		X	X	X	X
PLAIN-THROATED SUNBIRD <i>Antheptes malacensis</i>					X
CRIMSON SUNBIRD <i>Aethopyga siparaja</i>		X	X	X	X
HANDSOME SUNBIRD <i>Aethopyga bella</i>		X	X	X	X
CEBU FLOWERPECKER <i>Dicaeum quadricolor</i> (CR)		X	X	X	X
RED-STRIPED FLOWERPECKER <i>Dicaeum australis</i>		X	X	X	X
ORANGE-BELLIED FLOWERPECKER <i>Dicaeum trigonostigma pallidus</i>				X	X
PYGMY FLOWERPECKER <i>Dicaeum pygmaeum</i>			X	X	X
EVERETT'S WHITE-EYE <i>Zosterops everetti everetti</i>		X	X	X	X
* GREEN-FACED PARROTFINCH <i>Erythrura viridifacies</i> (VU)				X	X
Total number of species	16	37	49	54	62

Note: Threat categories for globally threatened species are provided in parenthesis following BirdLife International (2008): VU=Vulnerable, EN=Endangered, CR=Critically Endangered.

Ficus trees to feed on ripe fruits, often accompanied by Streak-breasted Bulbul, Philippine Bulbul, White-eared Brown Dove, Black-chinned fruit dove and Pink-necked Green Pigeon. One individual was caught in a mist-net in November 2004 in Alcoy forest.

ELEGANT TIT *Parus elegans visayanus*

Elegant Tit was also observed in all three sites, following mixed-species flocks or moving in small groups of 3–4 individuals. Two juveniles were observed following their parents feeding in the forest understorey and sub-canopy in June 2004 in Alcoy forest. The juveniles made constant begging calls and the parents fed them occasionally, while moving along the foliage. One juvenile was caught in a mist-net set at the forest edge in August 2004 in Alcoy forest.

WHITE-BELLIED WHISTLER *Pachycephala homeyeri major*

This subspecies was also observed in all three forest patches. It was observed feeding in the understorey and in sub-canopy trees, gleaning and flycatching for insects among vines and leaves, in both Alcoy and Tabunan. One individual was caught in a mist-net in Alcoy in 2003.

ORANGE-BELLIED FLOWERPECKER

Dicaeum trigonostigma pallidus

The taxon was first reported by a birdwatcher in Tabunan forest in 2000. We saw a male and female on February 2003 in one of the trees in the understorey in Tabunan. The male was silently feeding on a berry-like fruit and then moved out of sight. The female stayed for about one minute before flying away. The bird was rare in second growth and forest edges in Nug-as forest except when

Loranthus plant was present. The bird was usually observed in mixed-species flocks with Crimson Sunbird, Lovely Sunbird Red-striped Flowerpecker, Pygmy Flowerpecker and Olive-backed Sunbird.

EVERETT'S WHITE-EYE *Zosterops everetti everetti*

Everett's White-eye was also recorded in all three sites. It was usually observed feeding in small groups of 4–6 individuals, gleaning for insects in shrubs and small trees in forest edges, or participating in mixed-species flocks in the forest interior. Four individuals mist-netted on four separate occasions in Alcoy forest.

Despite systematic searches for the remaining four endemic subspecies of birds—White-bellied Woodpecker, Philippine Oriole, Blackish Cuckooshrike and Bar-bellied Cuckooshrike—these birds were not observed in any of the three forests covered during our survey.

Rediscoveries

Several species thought to be extinct from Cebu were found either during our survey, or during the surveys of Gonzales *et al.* (1999) or Pedregosa (2000).

RED JUNGLEFOWL *Gallus gallus*

This species was presumed extinct (Brooks *et al.* 1995) but was reported by local communities in Nug-as in 1998 (Gonzales *et al.* 1999) and 2000 (Pedregosa 2000). We have observed five males and three females (two of which were accompanied by 4–6 chicks) in Alcoy forest on August 2004, scratching leaf litter and moving along the forest understorey.

PINK-NECKED GREEN PIGEON *Treron vernans*

We observed this pigeon feeding on ripe *Ficus* fruits in small groups of three to large groups of at least 20 individuals in Nug-as forest in August 2004. Small groups were also seen feeding and moving around scrubland and farmlands adjacent to forest. This species was first rediscovered in Alcoy, Tabunan and Argao in 1998 (Gonzalez *et al.* 1999).

BLACK-CHINNED FRUIT DOVE *Ptilinopus occipitalis*

This species was feared extinct in Cebu (Brooks *et al.*, 1995) but we observed it on several different occasions within the forest and in forest edges at Alcoy, Tabunan and Argao. It was usually seen feeding on ripe *Ficus* fruits or perched on exposed branches of trees. The bird was recorded in 1998 in all three forest areas (Gonzalez *et al.* 1999). We found at least 12 active nests between 2002 and 2004 during the months of April–June.

PINK-BELLIED IMPERIAL PIGEON *Ducula poliocephala*

We recorded this species only from Alcoy forest. It was first reported by locals in 2003. We saw one individual in November 2004 feeding silently on the ripe fruits of a *Ficus* tree. The bird flew to a nearby tree and remained still for less than a minute before disappearing from view. The bird had a green breast with pinkish grey lower belly and dark rufous on the vent. The tail had a grayish white subterminal band, and the feet were bright red.

METALLIC WOOD PIGEON *Columba vitiensis*

Two individuals were first seen in Alcoy in March 2004. They were feeding in the canopy of a *Ficus* tree at 700 m

elevation. Three other birds, one of which appeared to be a juvenile (based on the smaller size), were seen perched on an exposed branch of a canopy tree in November 2004. They remained perched for at least five minutes before moving to another location. In a separate occasion in November 2004, two individuals were observed flying low in the subcanopy and then perched on a branch of a sub-canopy tree. This species was observed only in Alcoy forest and was not seen or reported by locals in other forest patches.

PHILIPPINE HAWK OWL *Ninox philippensis spilonota*

One juvenile was caught by a local at the forest edge in Nug-as forest beside a tree hollow inside which was a nest. A photograph was taken of the bird before release. Few individuals were heard calling in Nug-as forest but several were heard and seen in Tabunan forest. The call was very distinct from the Philippine Hawk Owl in Negros and the local name for the bird on Cebu is *pakpak-tuhok*. This bird was feared extinct (Brooks *et al.* 1995) until it was found in 1998 in all three forests patches (Gonzalez *et al.* 1999).

NORTHERN BOOBOOK *Ninox japonica*

An individual was accidentally entangled in a network of nylon strings used by local farmers as a trellis in Alcoy in 2003. After we examined it, we released back into the adjacent forest. This species was also presumed extinct on Cebu (Brooks *et al.* 1995) and ours is the first recent confirmation of its existence in the area.

VARIABLE KINGFISHER *Ceyx lepidus*

This species was presumed extinct (Brooks *et al.* 1995) but we mist-netted a single individual in a forest patch beside a small stream in Mt Lantoy in 2004. This is the first time the presence of this species has been confirmed in the area.

WHITE-THROATED KINGFISHER *Halcyon smyrnensis*

We observed this species close to the river in Mt Lantoy in Argao and in abandoned fishponds with patches of mangroves in the coastal areas of Argao.

PHILIPPINE SWIFTLET *Collocalia mearnsi*

This species was also presumed extinct on Cebu until found in 1998 (Gonzalez *et al.* 1999). We observed several small nesting colonies in limestone caves in Alcoy and Mt Lantoy areas.

PHILIPPINE NEEDLETAIL *Mearnsia picina*

This is another species that was presumed extinct on the island, until it was found in Nug-as forest in 1998 (Gonzalez *et al.* 1999). We have seen the bird twice flying above the forest canopy in ridges.

DOLLARBIRD *Eurystomus orientalis*

We observed this species on three occasions in Nug-as forest in 2004. It was also reported in 1998 in Alcoy forest (Gonzalez *et al.* 1999).

CITRINE CANARY FLYCATCHER *Culicicapa helianthea*

This species was thought to be extinct in Cebu (Rabor 1959). We first saw it in November 2002 in the forest of Alcoy, flycatching for insects among woody vines in the forest sub-canopy. The bird was small with bright yellow

head, breast, neck, belly and tail. The eye-ring and lores were also yellow. The species was seen again in January 2003, and three individuals were observed participating in a mixed-species flock in June 2004 accompanied by Everett's White-eye, Black-naped Monarch, Orange-bellied Flowerpecker, Elegant Tit, Crimson Sunbird and Olive-backed Sunbird. Alcoy appears to be the only forest in Cebu where the bird survives.

LEMON-THROATED WARBLER *Phylloscopus cebuensis*

We mist-netted one individual of this species in Alcoy forest in November 2004. The species was also observed in several occasions in Mt Lantoy in Argao as well as in Tabunan forest.

PLAIN-THROATED SUNBIRD *Anthreptes malacensis*

We observed this species feeding on the nectar of a *Loranthus* plant growing on a 4 m tree beside the road in Nug-as. The species was rare in Alcoy forest and was not recorded in the other sites.

PHILIPPINE PYGMY FLOWERPECKER *Dicaeum pygmaeum*

We saw this species in Nug-as and Mt Lantoy forests. It was presumed extinct on Cebu (Brooks *et al.* 1996) until reported in Nug-as forest in 1998 (Gonzalez *et al.* 1999) and it has been observed in the area several times since then. We saw solitary individuals feeding on ripe fruits of *Loranthus* and on small fruits of *Ficus* trees. They were noisy and moved quickly from branch to branch searching for insects and picking ripe fruits.

New records for Cebu

During our surveys, we found several species new to Cebu.

CHINESE GOSHAWK *Accipiter soloensis*

One individual of this species was caught in a mist-net on 14 November 2004 at 820 m elevation in the forest edge in Alcoy forest. The bird was perched on a canopy tree, from where it flew into the mist-net. The inner tail feathers had five bars, and the tarsus was yellow-orange. The upper-back was bluish-gray. The chin was white and the breast was orange with whitish belly. The cere was yellow-orange. Measurements of this individual are in Table 3. A large migrating flock of c.80 individuals were also observed

soaring above the area. This species has not been reported from Cebu before.

[YELLOW-BROWED WARBLER *Phylloscopus inornatus*]

A *Phylloscopus* warbler was caught in the forest in Alcoy at 820 m elevation on 25 January 2003. The bird was small, with a shorter wing span and tail than the larger Lemon-throated Leaf Warbler *P. cebuensis*, Ijima's Leaf Warbler *P. ijimae* or Philippine Leaf Warbler *P. olivaceus*. There was little or no yellow in its rather short whitish supercilium (unlike these three species). The bill was narrow with quite an extensive yellow base as compared to the wide bill bases of the other species. The upperparts were duller olive-green with no traces of yellow in the ventral area, contrasting with the larger three species. The median and greater covert feathers on each wing were growing, hence wing bars could not be distinguished. The flight feathers were variegated dark and lighter green, with the darker parts towards the edges, creating a patterned effect on the folded wing.

The descriptions and the range of features exhibited by this individual suggests that it is a Yellow-browed Warbler *P. inornatus*, a common wintering species in Japan's Ryukyu islands and in Taiwan, and expected in small numbers in the Philippines between November and March. This assessment is shared by Fergus Crystal (*in litt.* 2007), who has examined the photographs of the bird. The bird does not appear to show any pale stripe on the central crown (ruling out Pallas's Leaf Warbler *P. proregulus* and Chinese Leaf Warbler *P. sichuanensis*, although individuals of *P. inornatus* do occasionally show a faint pale central crown stripe). Biometrical measurements are in Table 3.

DISCUSSION

The number of species recorded differed substantially among the three forest patches surveyed. This unevenness in bird species richness can be partly attributed to differences in the habitat type and quality. Nug-as forest, being the largest continuous patch, holds the most intact forest, thus most of the forest and non-forest species were found here. Each site held a diversity of microhabitats: although large trees still occur in all three forests patches,

Table 3. Biometric measurements of some of the birds caught in mist-nets during surveys from 2001 to 2004 on Cebu Island, Philippines. All birds were adults except for Elegant Tit. Measurements were taken with a dial caliper; culmen is measured from skull, wing chord on folded wing, wingspan on flattened wing, tarsus from rear middle of the intertarsal joint to the distal edge of the last complete scale before the toes begin, tail from the base of feathers and mass with a spring balance with the bird in a bag of known mass.

Species	Sex	Culmen length (mm)	Tarsus length (mm)	Tail length (mm)	Wingspan (mm)	Wing chord (mm)	Mass (g)
CHINESE GOSHAWK <i>Accipiter soloensis</i>	F	19.1	28.8	139		180	
COPPERSMITH BARBET <i>Megalaima haemacephala</i>	M	18.8	23.5	36		70.1	41
PIED TRILLER <i>Lalage nigra</i>	F	14	10.5	68.3	121	85.9	28
ELEGANT TIT <i>Parus elegans</i>	Unk	11.25	21.9	40.2	79	62	8
[YELLOW-BROWED WARBLER <i>Phylloscopus inornatus</i> ?]	Unk	11.5	21.7	50	80	56	
BLACK SHAMA <i>Copsychus cebuensis</i>	M	17.1	27.5	104.2	121	41.36	31
	M	6.2	27.8	95.3		83.8	30
	M	14.5	29.5	90.2	122	89	20.5
	M	14.7	27.4	113.8		89.7	28

there are also a number of abandoned clearings, creating breaks in the canopy and openings inside the forest at all sites.

The presence of Black Shama on Nug-as and Mt Lantoy forests was not unexpected. The species is known to occur in a variety of habitats, including secondary forests, tree plantations, scrub and bamboo plantations (Dickinson *et al.* 1991, Collar *et al.* 1999, Kennedy *et al.* 2000, Mallari *et al.* 2001). Black Shama was usually encountered in areas with dark understorey and dense vegetation, and both Alcoy and Argao still retain such habitat.

The discovery of Cebu Flowerpecker in Nug-as forests is especially significant. This species was rediscovered first in Tabunan forests in 1992 (Timmins 1992, Dutson 1993) and the documented population was only four individuals (Collar *et al.* 1999). The discovery of another population in Nug-as forest gives some hope that more thorough field surveys in other forest patches may reveal extant populations of native forest birds not currently thought to survive. Cebu Flowerpecker appears to be intolerant to habitat disturbance and degradation (Collar *et al.* 1999, Mallari *et al.* 2001), so the integrity of the remaining forests on Cebu must be maintained if this species is to persist.

Further surveys are also needed to confirm the subspecific identification of the Amethyst Brown Dove in Alcoy. This bird was claimed to occur in a separate forest patch in the western part of the island (Gonzalez *et al.* 1999) but, although we observed one individual, we were unable to positively identify it as belonging to the subspecies *frontalis*.

Although we found some taxa that were formerly thought to be extinct, we were unable to find others. Among these were the Philippine Leafbird *Chloropsis flavipennis*, Philippine Oriole, Blackish Cuckooshrike, Bar-bellied Cuckooshrike, White-bellied Woodpecker, Philippine Tailorbird *Orthotomus castaneiceps*, Rufous Paradise Flycatcher *Tersiphone cinnamomea* and Sulphur-billed Nuthatch. Except for Philippine Tailorbird and Sulphur-billed Nuthatch, the rest of the presumed extinct species are medium- to large-sized birds, requiring tall forest trees (Dickinson *et al.* 1991, Kennedy *et al.* 2000). These birds are also gregarious and give distinctive calls that are difficult to miss in a small patch of forest such as Tabunan and Nug-as. There is very little forest left in Cebu and we found that all of the three forest patches consisted mostly of regenerating second growth or scrubland. Within these forests, very few large trees persisted. Even in the largest forest patch of Nug-as, large trees were rare and sparsely distributed. With the absence of large standing trees, it is quite likely that the White-bellied Woodpecker and the three canopy-dwelling birds (Philippine Oriole, Blackish Cuckooshrike and Bar-bellied Cuckooshrike) are nearly or already extinct on the island. Further observations are needed (including sound playback) in order to ascertain the status of these species in other forest patches.

Threats and conservation initiatives

The remaining forests in central Cebu, including Tabunan forests, fall within the Strict Protection Zone of the Central Cebu Protected Landscape (CCPL). In this landscape we observed agricultural farms and a growing number of settlements surrounding the forest. Most of the local

people make a living through agriculture. In several instances we observed locals illegally cutting trees for timber and fuel wood. Every year, parts of the forest were slowly cleared to allow crops to be planted. A landslide in the middle of the largest forest patch (Tabunan) was converted into a farm, gradually splitting the forest into two main blocks. We also observed portions of the adjacent land in Cantipla being slowly developed for cut-flower production and guava plantations by private individuals. Rest houses and private resorts were also being built beside the forest.

Hunting was prevalent in Mt Lantoy, mostly targeting larger species of pigeons and doves, orioles, Coletos and bats. We saw locals keeping birds in cages, and two hunters were encountered during field sampling. We did not observe or hear of hunting of birds in Tabunan; however, some locals keep birds in cages. Among the species kept in cages were Black-chinned fruit dove, White-eared Brown Dove, Blue-crowned Racquet-tail, Colasisi, Brahminy Kite and imported parrots, lorries and parakeets. We were told that most of the birds had been caught from the nearby islands of Leyte, Negros and Mindanao.

The forest in Alcoy is managed by people's organisations, including Kapunungan sa mga Mag-uuma sa Yutang Lasangnon sa Bulalacao (KMYLB), Bag-ong Alayon sa Kalambuan (BALAK) and San Agustin Multi-Purpose Cooperative (SAMPC) under the Community-based Forest Management Agreement (CBFMA) with the government Department of Environment and Natural Resources (DENR). Under this agreement, the local communities are organised into cooperatives and work together to maintain the biodiversity of the forest, and to protect it from a further reduction in size for at least 25 years. Local forest wardens are organised to patrol and monitor the wildlife and the forests. The cleared parts of the forest have been replanted with native species of trees. Importantly, these local organisations have the strong support of other non-governmental organisations, local government units and government agencies in their work of managing and protecting the forest.

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