

PHILIPPINE FORESTS

THE Philippine archipelago is remarkable for its high degree of endemism, with c.44% of the (c.395) breeding bird species, and 54 of the 58 threatened forest species which occur in the country, unique to the islands. There are also high levels of localised endemism within the archipelago, which is subdivided here into seven Endemic Bird Areas and two Secondary Areas. In several EBAs (Mindoro; Luzon; Negros and Panay; Mindanao and the Eastern Visayas) the threatened species include both lowland and montane forest specialists, and some of them are highly localised (e.g. Negros Striped-babbler is virtually confined to Cuernos de Negros in southern Negros); conservation measures are therefore required to protect both lowland and montane forests in these EBAs, and in the areas which support localised species. The remarkable total of 22 highly threatened species mainly comprises birds affected by habitat loss within their small ranges, but also includes Philippine Eagle, found at low densities in the remaining forests of Luzon, Samar, Leyte and Mindanao, and Philippine Cockatoo, which is under huge pressure from capture for the wild bird trade. The conservation of waterbirds in the Philippines is covered in W19.

- **Key habitats** Tropical lowland and montane forest.
- **Altitude** 0–2,700 m.
- **Countries and territories** Philippines.

	Threatened species			Total
	CR	EN	VU	
	11	10	33	54
	—	—	1	1
	—	1	2	3
Total	11	11	36	58

Key:  = breeds only in this forest region.
 = also breeds in other region(s).
 = non-breeding visitor from another region.

The Philippine forests region corresponds to Conservation International's Philippines Hotspot (see pp.20–21).

The northern Sierra Madre is the only place in the Philippines where unbroken forests extend from the coast to the mountain peaks, but the proposed construction of new roads into the area could lead to rapid deforestation. PHOTO: MICHAEL POULSEN/BIRDLIFE





Table 1. Outstanding Important Bird Areas in the Philippine forests.

IBA name	Status	Island	Habitats
1 Mt Halcon	—	Mindoro	Largest area of montane forest on Mindoro
2 Siburan	—	Mindoro	Largest remaining lowland forest on Mindoro
3 Balbalasang-Balbalan NP	PA	Luzon	Large area of montane forest
4 Mt Cetaceo	—	Luzon	Large area of montane forest, some lowland forest
5 Northern Sierra Madre Nature Park	PA	Luzon	Large area of lowland and montane forest, extending unbroken from the coast to the highest peaks
6 Central Sierra Madre mountains	—	Luzon	Large area of forest, both lowland and montane
7 Balogo watershed	—	Tablas	Largest area of forest remaining on Tablas
8 North-west Panay (Pandan peninsula)	—	Panay	Probably includes the best quality lowland forests remaining on Negros and Panay
9 Central Panay Mountains	—	Panay	Large area of forest, both lowland and montane
10 Mt Canlaon NP	PA	Negros	Large area of montane forest, some lowland forest; only known locality for Negros Fruit-dove
11 Cuernos de Negros	—	Negros	Large area of forest, both lowland and montane; main locality for Negros Striped-babbler
12 Tabunan	PA	Cebu	One of the few significant areas of forest remaining on Cebu
13 Nug-As and Mt Lantoy	—	Cebu	One of the few significant areas of forest remaining on Cebu
14 Mt Bandila-an	—	Siquijor	Largest area of forest remaining on Siquijor
15 Mt Cabalantian-Mt Capoto-an complex	—	Samar	Large area of lowland forest
16 Mt Hilong-hilong	—	Mindanao	Large area of forest, both lowland and montane
17 Mt Putting Bato-Kampalili-Mayo complex	—	Mindanao	Large area of montane forest, some lowland forest
18 Mt Kaluayan-Mt Kinabalian complex	—	Mindanao	Large area of forest, both lowland and montane
19 Mt Kitanglad	PA	Mindanao	Large area of montane forest
20 Mt Busa-Kiamba	—	Mindanao	Large area of montane forest, some lowland forest
21 Tawitawi island	—	Sulu islands	The largest area of forest known to remain in the Sulu archipelago
22 St Paul's Subterranean River NP	PA ^{BR,WH}	Palawan	Large area of lowland forest
23 Mt Mantalingajan	— ^{BR}	Palawan	Large area of forest, both lowland and montane

Some forest birds of this region breed in two of the IBAs listed in region W19. Note that more IBAs in this region will be included in the *Important Bird Areas in Asia*, due to be published in early 2004.

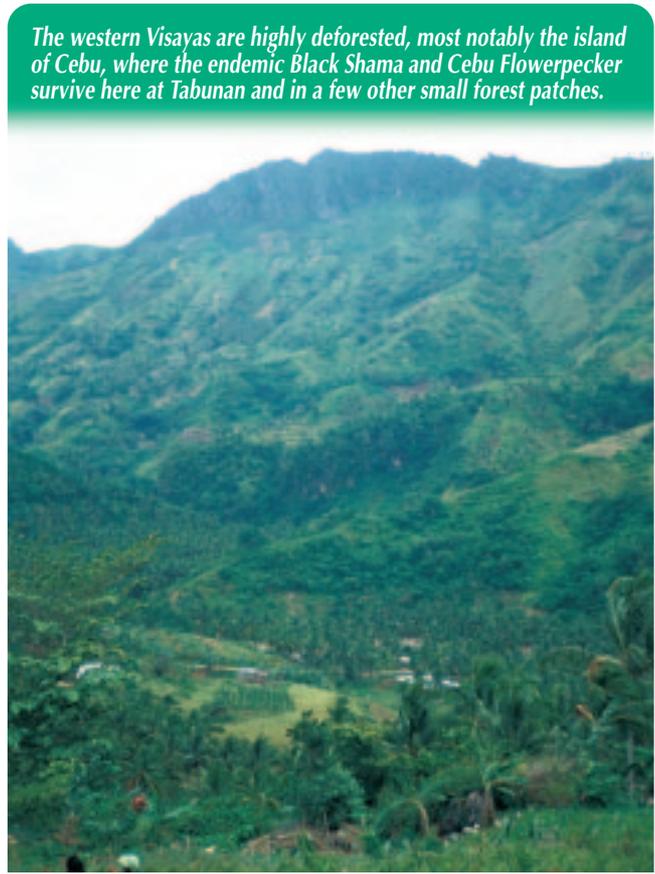
Key IBA name: NP = National Park.
 Status: PA = IBA is a protected area; (PA) = IBA partially protected; — = unprotected; BR = IBA is wholly or partially a Biosphere Reserve (see pp.34–35); WH = IBA is wholly or partially a World Heritage Site (see p.34). Note that the legal status of protected areas in the Philippines is currently being determined under the NIPAS process, so the protection status of many of these IBAs is liable to change.

OUTSTANDING IBAs FOR THREATENED BIRDS (see Table 1)

The Haribon Foundation has identified and documented 117 IBAs in the Philippines, of which 114 are considered to be important for the conservation of globally threatened bird species. Twenty-three of these have been selected as outstanding IBAs, because they include the best remaining examples of the key habitats for threatened birds in all nine subregions (seven EBAs and two SAs) of the Philippines.

CURRENT STATUS OF HABITATS AND THREATENED SPECIES

The Philippines were originally almost entirely forested, but by the end of the nineteenth century large areas had been cleared for agriculture, notably in the Visayas, where Negros, Bohol and Cebu had already lost much of their forest cover. Agricultural expansion continued throughout the twentieth century, but the most extensive and rapid deforestation was caused by commercial logging in the latter half of the century. This had a particular impact on primary lowland dipterocarp forests, the most valuable commercially, which shrunk from an estimated 10 million hectares in the 1950s to only one million by the late 1980s. New logging roads allowed access to farmers and timber collectors, who cleared more forest and prevented the regeneration of logged forest. Civil strife has affected many parts of Mindanao and the Sulu archipelago. Throughout the country insurgents may have prevented logging and



The western Visayas are highly deforested, most notably the island of Cebu, where the endemic Black Shama and Cebu Flowerpecker survive here at Tabunan and in a few other small forest patches.

PHOTO: GUY DUTSON/BIRDLIFE

Table 2. Threatened birds of the Philippine forests.

Species		Distribution and habitat	
MINDORO (EBA 150)			
Japanese Night-heron <i>Gorsachius goisagi</i>	♣ ^s EN	Forest	
Philippine Hawk-eagle <i>Spizaetus philippensis</i>	☉ ^s YU	Forest	
Mindoro Bleeding-heart <i>Gallicolumba platenae</i>	☉ ^s CR	Lowland forest	
Mindoro Imperial-pigeon <i>Ducula mindorensis</i>	☉ ^s YU	Montane forest	
Spotted Imperial-pigeon <i>Ducula carola</i>	☉ ^s YU	Forest	
Philippine Cockatoo <i>Cacatua haematuropygia</i>	☉ ^s CR	Lowland forest	
Black-hooded Coucal <i>Centropus steerii</i>	☉ ^s CR	Lowland forest	
Mindoro Tarictic <i>Penelopides mindorensis</i>	☉ ^s EN	Lowland forest	
Ashy Thrush <i>Zoothera cinerea</i>	☉ ^s YU	Forest	
Luzon Water-redstart <i>Rhyacornis bicolor</i>	☉ ^s YU	Streams near montane forest	
Scarlet-collared Flowerpecker <i>Dicaeum retrocinctum</i>	☉ ^s YU	Lowland forest	
Yellow Bunting <i>Emberiza sulphurata</i>	♣ ^s YU	Scrub, cultivation	
LUZON (EBA 151)			
Japanese Night-heron <i>Gorsachius goisagi</i>	♣ ^s EN	Forest	
Philippine Eagle <i>Pithecophaga jefferyi</i>	☉ ^s CR	Forest	
Philippine Hawk-eagle <i>Spizaetus philippensis</i>	☉ ^s YU	Forest	
Flame-breasted Fruit-dove <i>Ptilinopus marchei</i>	☉ ^s YU	Montane forest	
Spotted Imperial-pigeon <i>Ducula carola</i>	☉ ^s YU	Forest	
Philippine Cockatoo <i>Cacatua haematuropygia</i>	☉ ^s CR	Lowland forest	
Green Racquet-tail <i>Prioniturus luconensis</i>	☉ ^s YU	Lowland forest	
Philippine Eagle-owl <i>Bubo philippensis</i>	☉ ^s YU	Lowland forest	
Philippine Dwarf Kingfisher <i>Ceyx melanurus</i>	☉ ^s YU	Lowland forest	
Whiskered Pitta <i>Pitta kochi</i>	☉ ^s YU	Forest	
Ashy Thrush <i>Zoothera cinerea</i>	☉ ^s YU	Forest	
Luzon Water-redstart <i>Rhyacornis bicolor</i>	☉ ^s YU	Streams near montane forest	
Izu Leaf-warbler <i>Phylloscopus ijimae</i>	♣ ^s YU	Forest	
White-browed Jungle-flycatcher <i>Rhinomyias insignis</i>	☉ ^s YU	Montane forest	
Ashy-breasted Flycatcher <i>Muscicapa randi</i>	☉ ^s YU	Lowland forest	
Celestial Monarch <i>Hypothymis coelestis</i>	☉ ^s YU	Lowland forest	
Yellow Bunting <i>Emberiza sulphurata</i>	♣ ^s YU	Scrub, cultivation	
Green-faced Parrotfinch <i>Erythrura viridifacies</i>	☉ ^s YU	Forest, bamboo	
Isabela Oriole <i>Oriolus isabellae</i>	☉ ^s EN	Lowland forest	
Three Data Deficient species occur on Luzon, Luzon Buttonquail <i>Turnix worcesteri</i> and Brown-banded Rail <i>Lewinia mirificus</i> , which are assumed to inhabit grasslands, and the montane Whitehead's Switftlet <i>Collocalia whiteheadi</i>			
NEGROS AND PANAY (EBA 152)			
Japanese Night-heron <i>Gorsachius goisagi</i>	♣ ^s EN	Forest	
Philippine Hawk-eagle <i>Spizaetus philippensis</i>	☉ ^s YU	Forest	
Negros Bleeding-heart <i>Gallicolumba keayi</i>	☉ ^s CR	Lowland forest	
Negros Fruit-dove <i>Ptilinopus arcanus</i>	☉ ^s CR	Forest	
Spotted Imperial-pigeon <i>Ducula carola</i>	☉ ^s YU	Forest	
Philippine Cockatoo <i>Cacatua haematuropygia</i>	☉ ^s CR	Lowland forest	
Rufous-lored Kingfisher <i>Todiramphus winchelli</i>	☉ ^s YU	Lowland forest	
Visayan Tarictic <i>Penelopides panini</i>	☉ ^s EN	Lowland forest	
Visayan Wrinkled Hornbill <i>Aceros waldeni</i>	☉ ^s CR	Lowland forest	
White-winged Cuckoo-shrike <i>Coracina ostenta</i>	☉ ^s YU	Forest	
Flame-templed Babbler <i>Dasycrotapha speciosa</i>	☉ ^s EN	Lowland forest	
Negros Striped-babbler <i>Stachyris nigrorum</i>	☉ ^s EN	Montane forest	
White-throated Jungle-flycatcher <i>Rhinomyias albigularis</i>	☉ ^s EN	Lowland forest	
Ashy-breasted Flycatcher <i>Muscicapa randi</i>	☉ ^s YU	Lowland forest	
Celestial Monarch <i>Hypothymis coelestis</i>	☉ ^s YU	Lowland forest	
Visayan Flowerpecker <i>Dicaeum haematostictum</i>	☉ ^s YU	Lowland forest	
Scarlet-collared Flowerpecker <i>Dicaeum retrocinctum</i>	☉ ^s YU	Lowland forest	
Green-faced Parrotfinch <i>Erythrura viridifacies</i>	☉ ^s YU	Forest, bamboo	

☉ = breeds only in this forest region; ☉ = also breeds in other region(s); ♣ = non-breeding visitor from another region; s = also occurs in other EBA(s) and/or SA(s) in the Philippines

Table 2 ... continued. Threatened birds of the Philippine forests.

Species	Distribution and habitat		
CEBU (EBA 153)			
Philippine Cockatoo <i>Cacatua haematuropygia</i>	☉ ^s	CR	Forest
Rufous-lored Kingfisher <i>Todiramphus winchelli</i>	☉ ^s	VU	Forest
Streak-breasted Bulbul <i>Ixos siquijorensis</i>	☉ ^s	EN	Forest
Philippine Leafbird <i>Chloropsis flavipennis</i>	☉ ^s	VU	Forest
Black Shama <i>Copsychus cebuensis</i>	☉	EN	Forest
Cebu Flowerpecker <i>Dicaeum quadricolor</i>	☉	CR	Forest
MINDANAO AND THE EASTERN VISAYAS (EBA 154)			
Japanese Night-heron <i>Gorsachius goisagi</i>	☙ ^s	EN	Forest
Philippine Eagle <i>Pithecophaga jefferyi</i>	☉ ^s	CR	Forest
Philippine Hawk-eagle <i>Spizaetus philippensis</i>	☉ ^s	VU	Forest
Mindanao Bleeding-heart <i>Gallicolumba criniger</i>	☉	EN	Lowland forest
Mindanao Brown-dove <i>Phapitreron brunneiceps</i>	☉	VU	Forest
Spotted Imperial-pigeon <i>Ducula carola</i>	☉ ^s	VU	Forest
Philippine Cockatoo <i>Cacatua haematuropygia</i>	☉ ^s	CR	Lowland forest
Giant Scops-owl <i>Mimizuku gurneyi</i>	☉	VU	Lowland forest
Philippine Eagle-owl <i>Bubo philippensis</i>	☉ ^s	VU	Lowland forest
Silvery Kingfisher <i>Alcedo argentata</i>	☉	VU	Lowland forest
Philippine Dwarf Kingfisher <i>Ceyx melanurus</i>	☉ ^s	VU	Lowland forest
Rufous-lored Kingfisher <i>Todiramphus winchelli</i>	☉ ^s	VU	Lowland forest
Blue-capped Kingfisher <i>Actenoides hombroni</i>	☉	VU	Montane forest
Visayan Broadbill <i>Eurylaimus samarensis</i>	☉	VU	Lowland forest
Mindanao Broadbill <i>Eurylaimus steerii</i>	☉	VU	Lowland forest
Azure-breasted Pitta <i>Pitta steerii</i>	☉	VU	Lowland forest
Philippine Leafbird <i>Chloropsis flavipennis</i>	☉ ^s	VU	Lowland forest
Ashy-breasted Flycatcher <i>Muscicapa randi</i>	☉ ^s	VU	Lowland forest
Little Slaty Flycatcher <i>Ficedula basilanica</i>	☉	VU	Lowland forest
Celestial Monarch <i>Hypothymis coelestis</i>	☉ ^s	VU	Lowland forest

Three Data Deficient species occur on Mindanao and the Eastern Visayas, Brown-banded Rail *Lewinia mirificus* (Samar only), which is assumed to inhabit grassland, the montane Whitehead's Swiftlet *Collocalia whiteheadi* and Miniature Tit-babbler *Micromacronus leytenis*

☉ = breeds only in this forest region; ☉ = also breeds in other region(s); ☙ = non-breeding visitor from another region; s = also occurs in other EBA(s) and/or SA(s) in the Philippines
... continued

Negros Bleeding-heart is one of four threatened species in the genus *Gallicolumba* that are endemic to the Philippines.



PHOTO: EBERHARD CURLO/PESCP

Further deforestation must be halted on Luzon, Mindanao and the eastern Visayas if the huge Philippine Eagle is to survive.



PHOTO: TIM LAMAN

Philippine Cockatoo used to be abundant, but its population has crashed because of unsustainable collection of nestlings for commercial trade.



PHOTOS: PH. GARGUIL & O. MORVAN/PYGARGUE PRODUCTIONS

Table 2 ... continued. Threatened birds of the Philippine forests.

Species			Distribution and habitat
SULU ARCHIPELAGO (EBA 155)			
Sulu Bleeding-heart <i>Gallicolumba menagei</i>	☉ ^s	CR	Forest
Tawitawi Brown-dove <i>Phapitreron cinereiceps</i>	☉ ^s	CR	Forest
Grey Imperial-pigeon <i>Ducula pickeringii</i>	☉ ^s	VU	Forest
Philippine Cockatoo <i>Cacatua haematuropygia</i>	☉ ^s	CR	Forest
Blue-winged Racquet-tail <i>Prioniturus verticalis</i>	☉ ^s	EN	Forest
Rufous-lored Kingfisher <i>Todiramphus winchelli</i>	☉ ^s	VU	Forest
Sulu Hornbill <i>Anthracoceros montani</i>	☉ ^s	CR	Forest
Sulu Woodpecker <i>Picoides ramsayi</i>	☉ ^s	VU	Forest
Celestial Monarch <i>Hypothymis coelestis</i>	☉ ^s	VU	Forest
PALAWAN (EBA 156)			
Japanese Night-heron <i>Gorsachius goisagi</i>	☉ ^s	EN	Forest
Philippine Hawk-eagle <i>Spizaetus philippensis</i>	☉ ^s	VU	Forest
Palawan Peacock-pheasant <i>Polyplectron emphanum</i>	☉ ^s	VU	Lowland forest
Grey Imperial-pigeon <i>Ducula pickeringii</i>	☉ ^s	VU	Forest on small islands
Philippine Cockatoo <i>Cacatua haematuropygia</i>	☉ ^s	CR	Lowland forest
Blue-headed Racquet-tail <i>Prioniturus platenae</i>	☉ ^s	VU	Lowland forest
Palawan Hornbill <i>Anthracoceros marcheii</i>	☉ ^s	VU	Lowland forest
Falcated Wren-babbler <i>Ptilocichla falcata</i>	☉ ^s	VU	Lowland forest
Palawan Flycatcher <i>Ficedula platenae</i>	☉ ^s	VU	Lowland forest
TABLAS, ROMBLON AND SIBUYAN (SA 095)			
Philippine Dwarf Kingfisher <i>Ceyx melanurus</i>	☉ ^s	VU	Forest
Rufous-lored Kingfisher <i>Todiramphus winchelli</i>	☉ ^s	VU	Forest
Streak-breasted Bulbul <i>Ixos siquijorensis</i>	☉ ^s	EN	Forest
Celestial Monarch <i>Hypothymis coelestis</i>	☉ ^s	VU	Forest
Spotted Imperial-pigeon <i>Ducula carola</i> is known by old records from Sibuyan, and Philippine Cockatoo <i>Cacatua haematuropygia</i> from Tablas, but they have not been found on these islands during recent surveys and are assumed to be locally extinct			
SIQUIJOR (SA 096)			
Japanese Night-heron <i>Gorsachius goisagi</i>	☉ ^s	EN	Forest
Philippine Hawk-eagle <i>Spizaetus philippensis</i>	☉ ^s	VU	Forest
Spotted Imperial-pigeon <i>Ducula carola</i>	☉ ^s	VU	Forest
Philippine Cockatoo <i>Cacatua haematuropygia</i>	☉ ^s	CR	Forest
Rufous-lored Kingfisher <i>Todiramphus winchelli</i>	☉ ^s	VU	Forest
Streak-breasted Bulbul <i>Ixos siquijorensis</i>	☉ ^s	EN	Forest

☉ = breeds only in this forest region; ☉ = also breeds in other region(s); ☉^s = non-breeding visitor from another region; s = also occurs in other EBA(s) and/or SA(s) in the Philippines

agricultural development, but sometimes they may have promoted these activities, and the deliberate conflagration of forests on Mindanao—associated with insurgency—is a problem, particularly on the Zamboanga peninsula.

Today, forest cover varies considerably across the archipelago but is everywhere drastically reduced—according to satellite data from the late 1980s, Mindoro retained 8.5% forest cover, Luzon 24%, Mindanao 29% and Palawan 54%. In the Eastern Visayas, Samar retained 33%, Leyte 14% and Bohol 6%, and in the Western Visayas, Negros 4% and Panay 8%. These figures are, however, probably overestimates, and only a proportion of the cover estimated on each island was closed-canopy forest. Further forest loss and degradation has taken place since these estimates were made, as a result of *kaingin* farming (otherwise termed ‘slash-and-burn’ or shifting cultivation), fire-maintained pasture and the harvesting of non-timber forest products (such as rattans and other palms). These alarming statistics on remaining forest cover fit badly with a Philippines government report which asserted that the country needs 46% of its land area under forest for both its economic and environmental wellbeing. Deforestation has been most extensive in the lowlands, and the lowland-forest species tend to be the most highly threatened. Only a few small fragments of lowland forest remain on Mindoro, Negros and Panay, Cebu is almost completely deforested, and the only substantial forests known to remain in the Sulu archipelago are on Tawitawi (although it is possible that some forest remains on Jolo island, where the security situation precludes surveys).

CONSERVATION ISSUES AND STRATEGIC SOLUTIONS (summarised in Table 3)

Habitat loss and degradation

■ CONVERSION TO AGRICULTURE

By the late 1980s, almost all commercially valuable timber in the Philippines had been extracted, and since then the greatest threat to forests has been conversion to shifting (*kaingin*) and permanent agriculture practised by landless peasants: well over half of the IBAs in the Philippines are affected by *kaingin*. About 38 million people live in rural areas, half of them, the poorest in the country, in the uplands. The presence of landless people, who rapidly colonise areas when they are opened up by new roads or logging operations, poses enormous difficulties to site and habitat conservation initiatives.

Marginalised farmers should be given greater control over the land that they occupy (through appropriate tenurial instruments), to reduce further encroachment into forested areas. Their *kaingin* practices need to be replaced with agroforestry and improved farming methods, which would enable them to remain longer on established clearings by slowing the loss of soil fertility; simple socio-economic incentives, and awareness and training programmes, could be used to promote these changes. Efforts should be made to rehabilitate abandoned land, for example through community forestry plantations. At selected key sites, projects are required that integrate conservation and local land-use development. An integrated land management project is particularly urgent at Tabunan IBA on Cebu, to restore the remaining tiny area of forest (through replanting with native species to increase and link the isolated forest patches) whilst offering incentives to conserve the area and develop alternative sources of income.

■ FORESTRY AND ILLEGAL LOGGING

Commercial logging was the main cause of deforestation in the Philippines after 1950, but declined from the late 1980s as the harvest of commercially valuable timber was exhausted. In the 1990s logging was banned in all provinces (i.e. 64 out of 73) where forest cover is less than 40%. Commercial logging on Palawan has been suspended by presidential decree, but despite this nearly all of the island’s forests remain under concession. Legal logging operations continue in some areas, for example at Bislig on Mindanao, where good primary forest is being clear-felled (under the PICOP logging concession) and replaced with exotic trees for paper production. Far more worrying is the fact that illegal logging is widespread and often unchecked, including inside protected areas.

Given the perilous state of the Philippines environment and biodiversity, it is now time for an immediate total ban on the logging (and conversion to plantations) of all remaining forest in the country (including secondary growth in the lowlands which is also a critical habitat for biodiversity). There is a need for a national forest management policy, recognising that the remaining natural forests are an important and, in part, renewable resource essential for the future welfare of both Filipino people and wildlife. This policy should make habitat management the central target, and promote reforestation using native species. To implement the policy, foresters in the Philippines, whose training is currently geared to timber extraction as an economic activity, need to be retrained in forest management for biological diversity.

Visayan Tarictic is confined to the few remaining lowland forests in the Negros and Panay EBA, where it is under pressure from continuing forest clearance and hunting for food and sport.



PHOTO: TIM LAMAN

The Philippines has suffered one of the highest rates of deforestation anywhere in the world, which has reduced many formerly forested areas to wasteland.



PHOTO: MICHAEL POULSEN/BIRDLIFE

■ **EXPLOITATION OF FOREST PRODUCTS**

The harvesting of non-timber forest products (such as rattans and other palms) is widespread, and can seriously degrade the forest understorey. Sustainable use of forest products should be promoted, including through community-based tree farms under the jurisdiction of local governments.

■ **MINING**

Mining is an important potential threat, as most remaining forests are covered by mining applications, whose acceptance would give companies the right to clear forests. Ongoing mining activities are already damaging habitats in several important areas, for example northern Dinagat, and there are plans to commence granite mining at Iwahig on Palawan, and for major operations on Samar and Leyte. Mining activities should be prohibited in all critical habitats identified under the National Wildlife Act (which include NIPAS sites and the 117 IBAs identified by the Haribon Foundation). In other areas the impact of proposed mining activities on forests and their biodiversity needs to be carefully evaluated, and mitigation measures imposed to minimise their negative effects.

■ **DEVELOPMENT (URBAN, INDUSTRIAL, ETC.)**

Some of the best remaining forests in the Philippines are in the most inaccessible areas, for example in Luzon's Sierra Madre, but new roads into these areas could lead to rapid forest loss and degradation through illegal logging and settlement by *kaingin* farmers. Other development projects could cause similar projects, such as the construction of a road system for a proposed industrial complex along the coast of the Northern Sierra Madre Natural Park. A rigorous site selection procedure should therefore be

followed for new roads and other proposed development projects, to avoid new development in critical habitats identified under the National Wildlife Act (including NIPAS sites and IBAs).

■ **POLLUTION/PESTICIDES**

Several threatened birds occupy riverine habitats, including Luzon Water-redstart and several kingfisher species. These may be affected by pollution and siltation caused by mining and logging, and the increased use of inorganic or synthetic fertilisers, herbicides and pesticides by farmers. Species at the terminus of food-chains may accumulate pesticides which reduce their reproductive output, including Philippine Eagle and Philippine Hawk-eagle. The Philippine government via DENR must strictly implement laws controlling the pollution of rivers. The indiscriminate use of agrochemicals (especially those already banned) needs to be controlled, and organic agricultural practices promoted.

Protected areas coverage and management

■ **GAPS IN PROTECTED AREAS SYSTEM**

The protected areas system in the Philippines is currently being redeveloped through the National Integrated Protected Area System (NIPAS) process. This fundamentally important new law (passed in 1992) is the only environmental legislation available that can override other land-use legislation, e.g. logging and mining concessions. The old system of reserves and sanctuaries (known as the 'initial component' of NIPAS) has been thoroughly reassessed. Sites no longer suitable as protected areas have been dropped, and many new ones added. A few of the c.200 sites proposed under NIPAS have already received funding; the Conservation of Priority Protected

Areas Project (CPPAP, funded by the World Bank Global Environment Facility) and the National Integrated Protected Areas Project (NIPAP, funded by the European Union and implemented by DENR) have provided major funding for 18 sites, with others supported by the Foundation for the Philippine Environment (FPE) and other initiatives. The recent Local Government Code legislation is a vital mechanism for the conservation of many sites, as it devolves responsibility for land management to Local Government Units, so that the management of NIPAS sites and local protected areas can be closely integrated with other local land-use plans.

It is vital that the NIPAS fully represents the unique biological diversity of the Philippine archipelago. In order to achieve this for birds (and for many other animal and plant groups, given that many of these share similar patterns of endemism to birds), NIPAS sites should be selected to cover the main forest types and endemic bird species in all seven EBAs and two SAs in the Philippines. The Haribon Foundation's IBA analysis, especially the outstanding IBAs listed above, provides an ideal dataset for a 'gap analysis' of the sites selected and proposed under NIPAS; for example, the sites currently funded under CPPAP and NIPAP do not include any on Cebu or the Sulu archipelago. The proposed NIPAS network therefore needs to be analysed to identify IBAs such as Tabunan on Cebu and Tawitawi in the Sulu archipelago, which should then be proposed for establishment under NIPAS. Given limited resources, and the difficulties in managing sites in parts of the Philippines, NIPAS cannot provide adequate protection for all important areas. The Haribon Foundation and others have ongoing projects at several IBAs, to promote these sites for designation and management as local protected areas under the Local Government Code. These projects are developing a model of how this legislation can be used for effective site conservation, which should be followed at many other IBAs.

■ **WEAKNESSES IN RESERVE MANAGEMENT**

Serious management problems affected the old system of reserves and sanctuaries in the Philippines, linked to a lack of resources. Most sites being designated under NIPAS do not yet have large-scale funding, and a major challenge is to provide the resources and infrastructure necessary to ensure their permanent and complete protection. The capacity and resources of the Protected Areas and Wildlife Bureau (PAWB) need to be increased at all levels, especially to develop sufficient site management capability within local PAWB offices to protect the NIPAS sites under their jurisdiction.

Exploitation of birds

■ **HUNTING**

Hunting is a major problem, with firearms widely available, and 40% of the country's threatened birds are affected. Some species are hunted for food, notably pigeons and hornbills; many are particularly vulnerable because they congregate at fruiting trees, and some ground-dwelling birds (e.g. pigeons) are trapped using snares. However, much hunting is for sport, and even Philippine Eagles are occasionally shot for trophies. Hunting of all bird species is illegal, but enforcement is lacking, and local people in many areas are likely to resist attempts at strict control. Concerted programmes of education and awareness are needed within the communities in and around key sites for threatened species, to demonstrate the effects of hunting on the threatened birds. Efforts need to be made to regulate the large-scale netting of migratory birds (known as 'ik-ik') that occurs at several sites, notably at Dalton Pass on Luzon, through the promotion of alternative livelihoods, for example tourism.

■ **WILD BIRD TRADE**

Collection for commercial trade affects almost 20% of the Philippines' threatened birds, including several pigeons, parrots and hornbills, and Palawan Peacock-pheasant. The

Table 3. Conservation issues and strategic solutions for birds of the Philippine forests.

Conservation issues	Strategic solutions
Habitat loss and degradation	
<ul style="list-style-type: none"> ■ CONVERSION TO AGRICULTURE ■ FORESTRY AND ILLEGAL LOGGING ■ EXPLOITATION OF FOREST PRODUCTS ■ MINING ■ DEVELOPMENT (URBAN, INDUSTRIAL, ETC.) ■ POLLUTION/PESTICIDES 	<ul style="list-style-type: none"> ➤ Reduce encroachment into forest by giving marginalised farmers greater control over the land that they occupy ➤ Develop agro-forestry and improved agricultural practices to allow more permanent settlement of land cleared for <i>kaingin</i>, and rehabilitate abandoned land ➤ Declare a national logging ban, and develop a national forest management policy, with foresters retrained to implement it ➤ Promote sustainable use of forest products, including through the development of community-based tree farms ➤ Assess the environmental impact of proposed mines, roads and other developments, and minimise development at key sites ➤ Enforce laws to prevent river pollution, and promote organic agricultural practices
Protected areas coverage and management	
<ul style="list-style-type: none"> ■ GAPS IN PROTECTED AREAS SYSTEM ■ WEAKNESSES IN RESERVE MANAGEMENT 	<ul style="list-style-type: none"> ➤ Ensure that NIPAS fully represents the unique biodiversity of the Philippines, by covering the main forest types in all seven EBAs and two SAs ➤ Establish and manage additional IBAs as local protected areas under the Local Government Code ➤ Increase the capacity of the Protected Areas and Wildlife Bureau, especially local offices
Exploitation of birds	
<ul style="list-style-type: none"> ■ HUNTING ■ WILD BIRD TRADE 	<ul style="list-style-type: none"> ➤ Conduct education and awareness programmes around key sites, to reduce hunting of threatened species ➤ Strengthen enforcement of CITES and other legislation to combat illegal trade in Philippine Cockatoo ➤ Establish nest protection schemes for hornbills and Philippine Cockatoo
Gaps in knowledge	
<ul style="list-style-type: none"> ■ OUTDATED INFORMATION ON FOREST COVER ■ INADEQUATE DATA ON THREATENED BIRDS 	<ul style="list-style-type: none"> ➤ Analyse satellite images or aerial surveys to locate undetected forest sites, particularly on the most deforested islands and in lowland Mindanao ➤ Survey poorly known islands and sites, to identify new areas for conservation action ➤ Study the ecology of Philippine Eagle and other keystone species

Hunting is a major problem in the Philippines, and ground-dwelling birds are trapped using snares.



PHOTO: DES ALLEN

previously abundant Philippine Cockatoo has suffered most conspicuously: huge numbers were trapped in recent decades, and its populations have plunged towards extinction in the wild. On Palawan, chicks are taken from virtually every known accessible nest, and in the south of the island tribesmen purposely leave nest-trees in otherwise cleared land. Nestling cockatoos collected have a mortality rate of 50%, and only 20% of Palawan Peacock-pheasants survive capture. Seven threatened Philippines species (six endemic) are listed on Appendix I of CITES, meaning that their international trade is prohibited, and 14 threatened species are listed on Appendix II, which permits strictly regulated international trade; however, enforcement has been problematic, while much trade is domestic and not directly affected by CITES legislation.

Drastic measures therefore need to be considered to combat illegal trade in Philippine Cockatoo, possibly including the establishment of DENR-manned posts at airports (with appropriate training and equipment for DENR staff), major ferry terminals (e.g. Puerto Princesa) and the Rio Tuba nickel-ore port. Education and awareness campaigns are needed to improve understanding of the plight of this and other species affected by trade. These campaigns could incorporate components of the parrot conservation projects in the Caribbean, whereby local communities are encouraged to become active participants in conservation efforts. Despite this, however, illegal trade may only be countered by introducing economically viable alternatives: local income-generating activities that lessen threats to birds and their habitats should be promoted. Nest protection schemes involving local communities should be considered for some highly threatened species, including Philippine Cockatoo, Visayan Tarictic and Visayan Wrinkled Hornbill.

Gaps in knowledge

■ OUTDATED INFORMATION ON FOREST COVER

Forest cover maps produced from satellite images and aerial surveys in the 1980s and 1990s are now outdated. During their IBA project, the Haribon Foundation used these maps to identify ornithologically unexplored areas of forest in the more inaccessible areas, but then assessed the current condition of the habitat by consulting local officials or by visiting the sites. This process identified several IBAs that are likely to be very important for threatened birds on the basis of the habitat present. Further studies are required using satellite images and aerial surveys to locate unexplored areas of forest, followed by consultations and site visits to assess habitat quality. This would be particularly valuable on the most deforested islands (e.g. Cebu, Mindoro, Negros) where even small patches of forest are of conservation value, and on Mindanao where it is unclear which are the best sites for the conservation of lowland forest birds.

■ INADEQUATE DATA ON THREATENED BIRDS

The distribution and status of most threatened birds in the Philippines are incompletely known. Most islands have been explored ornithologically, and most parts of the larger islands, but the data are old and incomplete. This problem is exacerbated by the pattern of habitat loss in the islands. The areas visited by naturalists in the past are also the places where access has been easiest for logging and agriculture, so many 'old' sites for threatened birds have now lost their habitats. Surveys are required at poorly known IBAs, and other forested areas located using satellite images or aerial surveys, to assess their importance and hence to identify new areas for NIPAS or other conservation initiatives. Some threatened birds are difficult to locate and survey, and require special techniques such as tape-playback (e.g. for owls) and mist-netting (e.g. for some babblers and flycatchers). Interviews with bird trappers could provide information on species affected by hunting and trade.

The ecology of most threatened forest birds is poorly known, and studies are required to clarify their needs, and hence the most appropriate ways to manage their habitats. In the case of Philippine Eagle, work is needed on its survival rates and breeding success in different types of forest and at different elevations; prey composition, and constraints on prey abundance, on the four islands it inhabits; reasons for different densities on different islands; effects of habitat fragmentation on survival and breeding; and optimum habitat and the value of corridors between areas of such habitat. Radio-telemetry (or satellite-based) studies of Philippine Eagles would help determine territory size, home-range size and dispersal capability; this technique can also elucidate the daily and seasonal movements of birds which need to locate fruiting trees, including keystone species such as pigeons (some of which may prove to be inter-island migrants) and hornbills.