

The Status and Conservation of Birds of Prey in the Sondaic and Wallacean Regions of Indonesia

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ABSTRACT

In the Oriental subregions of the Sundas and Wallacea, which comprise the Malay Peninsula and the larger part of the Indonesian Archipelago, deforestation is proceeding rapidly and at the present rate little will be left within a few decades.

In the area a number of 36 birds of prey *Accipitridae* and *Falconidae* are exclusively dependent on tropical forest. Thirteen amongst these are endemic to one or both of the subregions, four of them being generally considered as globally threatened (*Spilornis kinabaluensis*, *Accipiter nanus*, *Spizaetus bartelsi*, *Spizaetus nanus*), and two near-threatened (*Spizaetus lanceolatus*, *Microhierax latifrons*) whilst most other seven species are still widely distributed, though information on some is still needed (*Accipiter griseiceps*, *A. henicogrammus*, *A. erythrauchen*, *A. rhodogaster*, *Spizaetus alboniger*).

In this paper an overview is presented of all raptors of the Indonesian part of the subregions, with special reference to the endemic and resident forest species. A summary is given of our present fragmentary knowledge on their status and distribution and an attempt is made to reassess the conservation status of each species.

INTRODUCTION

An important part of the world's raptors are found as residents in the Sondaic (Malay Peninsula, Sumatra, Borneo, Kalimantan, Java and Bali) and Wallacean (Sulawesi, Moluccas, Lesser Sundas) subregions in the Orient. Forty-three species (two of which are found only in the non-Indonesian, northern part of Borneo - *Spilornis kinabaluensis* and *Microhierax latifrons*) are found in the area, which number is considerably increased during northern and southern winters by migratory species. A few species have both migrant and resident races in the archipelago (e.g., Osprey *Pandion haliaetus*, Oriental Honey-buzzard *Pernis ptilorhynchus*).

In the past and more recently, reports have been produced on the status of birds, in particular diurnal raptors (e.g. Brown *et al.*, 1978; King 1978, 1979; Meyburg 1986; Collar & Andrew 1988), in which, as a matter of fact, the species discussed did not always cause the same concern, as more information about their status in the wild became available. A number of species are consistently

considered as rare and threatened. These are exclusively forest-dwelling species and will receive special attention in this paper. The status of all other species, including non-forest, is also elucidated, in view of the increasing deterioration of the forests and the difficulties in determining the forest dependence of some of them. Even open country species such as Black-shouldered Kite *Elanus caeruleus*, Black Kite *Milvus migrans* and Spotted Kestrel *Falco moluccensis* become increasingly dependent on secure places within protected areas, i.e. forests in most cases. Mangrove forests offer suitable nesting sites for coastal, open country species, such as the Brahminy Kite *Haliastur indus*.

In certain periods a large number of migrants, some just on passage, some wintering, increase the number of birds of prey in the region. It is not clear what the impact may be on the breeding populations, though in some cases the species seem to be segregated by habitat. In the species accounts, the migrants will be mentioned under the supposedly competing resident sibling species or sub-species.

STUDY AREA

Three major islands are included in the Indonesian part of the Sondaic sub-region:

Sumatra: the third largest island of Indonesia, still has large areas of tropical rainforest, but logging activities and forest clearance by smallholders, transmigration projects, etc. are still devastating, especially in the lowlands. The numerous islands along the east and west coasts of the island have a high degree of endemism, expressed in some distinct raptor races. Large nature reserves have been established throughout, amongst which the most important are the national parks Mt Leuser, Way Kambas and Mt Kerinci Seblat.

Borneo: the second largest island, of which the southern two-thirds, Kalimantan, is Indonesian territory. Two endemic raptors, *Spilornis kinabaluensis* and *Microhierax latifrons*, occur in the northern, Malaysian part. Especially the central, hilly part of the island is covered by extensive forest; logging and other destructive activities in most of the rest, especially the lowland parts, will not leave much of the original vegetation. Most important natural areas are the national parks of Kutai, Tanjung Puting and (proposed) Kayan Mentarang.

Java: heavily populated, with only 2% and 30% of the lowland and montane forest respectively left. Natural vegetation survives in the lowlands as patches of tropical rainforest along the south coast, and dry monsoon forest, especially along the north coast of Central and Eastern Java. One endemic species, *Spizaetus bartelsi* and a few endemic races occur on Java. The smaller islands of Madura and Bali, geographically belonging to Java, have impoverished avifaunas, but especially the latter is important for migrating raptors. Important reserves are the national parks of Ujung Kulon, Mt Gede/Cibodas, Meru Betiri and Baluran.

Wallacea is separated as follows:

Sulawesi: still largely covered by forest, though much has disappeared through cultivation (especially in the south and north-east parts) and logging. High degree of endemism, with four endemic Accipiters occurring and an endemic serpent-eagle and hawk-eagle. Numerous associated small islands, of which Peleng, Banggai and the Sula Islands are in particular of importance. The most important reserves are the Lore Lindu and Dumoga Bone national parks, and perhaps Morowali and Mts Peruhumpenai nature reserves.

Lesser Sundas: comprise numerous islands of small to moderate size. Most of the area was once covered by monsoon forest, woodland and grass steppes under the influence of extreme arid climatic conditions. However, much of the natural habitat has been drastically altered by man's agricultural activities. No endemic elements at species level in the raptor fauna, although the Flores Hawk-eagle is a very distinct endemic race, if not a species (P. Andrew, pers. comm.) despite a high degree of endemism in many other species. Important reserves include the Komodo national park near Flores and the Mt Rinjani on Lombok.

Moluccas: a large number of islands once covered with lush forest, which however has largely disappeared under cultivation and logging activities. Two endemic Accipitrines occur on the islands. Major nature reserves include the Manusela national park on Seram and a number of small proposed reserves.

SPECIES ACCOUNT

Data on distribution and status in the subregions have mainly been extracted from standard works and reports published more or less recently, such as Van Marle & Voous (1988: M&V) for Sumatra, Smythies (1981: S) and Holmes & Burton (1987: H&B) for Kalimantan (the Indonesian part of Borneo); McKinnon (1988: M) for Java and Bali; and White & Bruce (1986: W&B) for Wallacea. Furthermore numerous recently published papers and unpublished reports have been consulted. The following paper, however, does not pretend to be exhaustive, as not all recent unpublished reports were available. During 1979-1992 the author visited 19 out of 26 Indonesian provinces included in the study area for special bird surveys. Species order, scientific and English names follow Andrew (1992).

For each species the widely used IUCN/ICBP Red Data Book categories are applied: endangered, vulnerable, rare, indeterminate, insufficiently known and, additionally, no immediate danger.

Pandion haliaetus - Osprey

No immediate danger

Widespread in coastal areas and along rivers, and presumably resident in part of the area, though breeding data are available only from Lombok (W&B) and Sulawesi (Kukila 1990; Meyburg & van Balen, this volume.) Only two recent records from Kalimantan (Eve & Guigue 1989; van Balen, in prep.) of birds of uncertain status, but apparently more common elsewhere. Two migrant races, *haliaetus* from the north, *cristatus* from the south, increase periodically the resident population *melvillensis*. Taxonomic affinities of these birds need further study, however.

Aviceda jerdoni - Jerdon's Baza

No immediate danger

An allospecies of the following. Uncommon and sparsely distributed in the western part of the region, where it is found in different, well-marked races: *jerdoni* (Sumatra), endemic *borneensis* (Kalimantan) and Wallacean endemic *celebensis*. Only few recent records from Sumatra (M&V) and Sulawesi (Van den Berg & Bosman 1986; Rozendaal & Dekker 1989; K.D. Bishop, pers. comm.; Gibbs 1990.), more widely distributed in Kalimantan (H&B). In northern winter the Black Baza *Aviceda leuphotes* visits Sumatra in numbers (M&V) and occasionally reaches Java (van Balen 1984); this, however, is much less a forest species than Jerdon's and interspecific competition seems unlikely. Inconspicuous canopy feeder and consequently overlooked (K.D. Bishop pers. comm.)

Aviceda subcristata - Crested Baza

No immediate danger

Widespread in the eastern part of the region, not overlapping with the previous species; occurring in five Wallacean endemic races: *timorlaoensis* (Lombok to Timor), *pallida* (Kei), *reinwardtii* (Seram, Ambon), *stresemanni* (Buru) and *rufa* (N. Moluccas). Recent records from Seram (Bowler & Taylor 1989; Andrews 1988; Halmaheira (1983-1992), K.D. Bishop, pers. comm.), Flores and Timor (Gibbs 1990; own obs. 1992).

Pernis ptilorhynchus - Oriental Honey-buzzard

No immediate danger

Widespread resident in the western part of Indonesia, where the Sondaic endemic *torquatus* occurs on Sumatra and Kalimantan, and *ptilorhynchus* is endemic to Java. In the northern winter the migrant race *orientalis* is a common visitor to Sumatra, Kalimantan, Java and Bali, but only one recent record from Wallacea, in Timor in Jan 1990; (Gibbs 1990).

Pernis celebensis - Barred Honey-buzzard

No immediate danger

The resident *celebensis* is widespread in Sulawesi and neighbouring islands of Muna and Peleng (a second race, *steerei* is resident in the Philippines). The species was insufficiently known to determine its status in Sulawesi (Meyburg 1986), but a survey in 1987 showed that, after this species was safely distinguished from the very similar Celebes Serpent-eagle, still fair numbers are present in Central Sulawesi, where it was recorded at seven localities between south of Lake Poso and Tinombo, 4-11 Aug 1987 (Kukila 1990; Meyburg & van Balen, this volume.); further recent records, e.g., from Lore Lindu (Gibbs 1990; Watling 1983), five probable records in Jul-Aug 1979 and in 1988 at Soroako in C (Holmes & Wood 1979; Andrews 1988), from Dumoga-Bone: one in Oct 1981, two in Jan 1983 (Rozendaal & Dekker 1989). Often, like other honey-buzzards, seen above open country and along forest edges and presumably secure in most of its range.

Macheiramphus alcinus - Bat Hawk

Insufficiently known

Widespread but scarce resident in Sumatra, Kalimantan, and in 1981 discovered in Sulawesi (Klapste 1982; one unconfirmed record from the south coast of Java (van Lavieren, pers. comm.). Recent Kalimantan records from Tanjung Puting (Nash & Nash 1988) and Barito Ulu (Wilkinson *et al.* 1991); only recent record from Sumatra at Padang-Sugihan (Nash & Nash 1985). Harrison (in Smythies 1981) considers that the species decreased markedly, perhaps as a result of being hunted by bird cave owners in the 1930s. Though the species is not confined to the vicinity of limestone caves (e.g. P. Andrew, pers. comm.), this could still apply to-day, as raptors near commercial bird (and bat) caves are unscrupulously persecuted.

Elanus caeruleus - Black-shouldered Kite

No immediate danger

Generally common and widespread in open country, benefits from forest clearance, race *sumatranus* endemic to Sumatra, *hypoleucus* in the other parts. Numbers in Java appear to have decreased, since only few recent records are available as compared with its former commonness.

Milvus migrans - Black Kite

No immediate danger

The resident race *affinis* is uncommon and local in open country in Sulawesi, and scattered populations are found in the Lesser Sundas and Timor. Somewhat erratic distribution in Sulawesi where locally common, but has disappeared from former haunts (Kukila 1990). The migrant race *lineatus* is a scarce visitor to Sumatra and Borneo, and an unconfirmed record exists from Bali (Mason & Jarvis 1989).

Haliastur indus - Brahminy Kite

No immediate danger

Widespread in coastal areas and along major rivers throughout Indonesia in two resident races: *girrenera* in the Moluccas, and *intermedius* in the rest of the area. Though still common and locally abundant in most of its range, the Javan population causes concern, as numbers have shrunk alarmingly since the early 1960s (van Balen *et al.* 1993).

Haliaeetus leucogaster - White-bellied Eagle

No immediate danger

Widespread and common resident throughout the area. Largely restricted to nature reserves with coastal territories in Java, especially off-shore islands, but more widely occurring in the other areas.

Ichthyophaga humilis - Lesser Fish-eagle

No immediate danger

Widespread but uncommon resident along forested coasts and rivers in Sumatra, Kalimantan and Sulawesi. Scattered records in Kalimantan (H&B); uncommon in Sumatra (M&V), with recent records, e.g. from Way Kambas (Southampton University Expedition) and Padang-Sugihan (Nash & Nash 1985); uncommon and very local, with few records in Sulawesi, e.g., two records Dumoga-Bone (Rozendaal & Dekker 1989); Lore Lindu (van den Berg & Bosman 1986; Andrews 1988; Gibbs 1990) S Sulawesi (Meyburg & van Balen, this volume) and in 1991 discovered on Taliabu (Sula Islands), the easternmost locality (UEA Expedition, in prep.).

Ichthyophaga ichhyaetus - Grey-headed Fish-eagle

No immediate danger

Uncommon, but widespread in Sumatra, rare on Java; only few records from Kalimantan (H&B; Wilkinson *et al.* 1991) and only recently confirmed for Sulawesi (King *et al.* 1990).

Circus gallicus - Short-toed Eagle

No immediate danger

Isolated population of cf. *heptneri* occurs widely in open country in the Lesser Sundas, with probable stragglers to Java (van Balen & Compost 1989), whereas migrant cf. *gallicus* is a visitor during raptor migration from Bali (Ash 1984). Recent records from Wallacea: Timor (Andrew 1985; Gibbs 1990), Flores (1992 pers. obs.; Bishop & Coates, in press), Lombok (1990, pers. obs.) and Sumba (Jones & Banjaransari 1990).

Spilornis cheela - Crested Serpent-eagle

No immediate danger

Widespread and common in woodlands and forest edges in the western half of the Malay archipelago; *malayensis* occurs in north Sumatra, whilst in the other parts eight endemic island races are found: *pallidus* (Borneo), *naturensis* (Belitung), *sipora* (Mentawai), *batu* (south Sumatra, Batu), *asturinus* (Nias), *abbottii* (Simeulue), *bido* (Java, Bali) and *baweanus* (Bawean). Despite habitat destruction and heavy hunting pressure in Java it is still rather commonly seen; the status of most of the other endemics is uncertain.

Spilornis rufipectus - Sulawesi Serpent-eagle

No immediate danger

Endemic to Sulawesi (*rufipectus*) and Sula islands (*sulaensis*), widespread and common in forests and open woodland. Numerous recent records throughout Sulawesi: at eight localities between 1-7 Aug 1987 throughout S and C Sulawesi (Meyburg & van Balen, this volume), five records in Jul-Aug 1979 at Soroako in C (Holmes & Wood 1979), common in Dumoga Bone (Rozendaal & Dekker 1989), Beteleme (C Sulawesi), Lore Lindu (Watling 1983; Gibbs 1990), Tangkoko (Andrews 1988), etc.; frequently encountered on Taliabu (Sula Islands; UEA 1991). The population is not in direct danger as the species is still widely distributed.

Circus assimilis - Spotted Harrier

No immediate danger

Local and uncommon resident in open country in Sulawesi, but there are no breeding data (Kukila 1990); recent records from Timor (W&B; Andrews 1988) of presumable migrants from Australia, where it is widespread. In northern winter harriers in small numbers visit Sumatra and Kalimantan, and recently harriers have been recorded in Java as well (D. Watling 1990, pers. comm.). Hitherto the following species have been recorded: *C. aeruginosus*, *C. cyaneus* (N Borneo only), *C. spilonotus* and *C. melanoleucos*.

Accipiter trivirgatus - Crested Goshawk

No immediate danger

Widespread in lowland and hill forests in the Greater Sundas; four endemic races: *trivirgatus* (Sumatra), *niasensis* (Nias), *javanicus* (Java) and *microstictus* (Borneo). The species is common throughout its range in suitable habitat; recently its occurrence on Bali was confirmed (van Balen 1991a).

Accipiter griseiceps - Sulawesi Goshawk

Interminate

Endemic to Sulawesi, where it is widespread in most types of woodland. However, only few recent records are available: one in Jul 1979 at Soroako (Holmes & Wood 1979), two confirmed sightings in Lore Lindu (Watling 1983; Hornbuckle 1988) and two sightings in Aug 1987 (Meyburg & van Balen, this volume) in C Sulawesi, one mistnetted in Dumoga-Bone in Jan 1983 (Rozendaal & Dekker 1989), a pair in July 1985 near Mt Dua Saudara (Kukila 1990) and Tangkoko (Andrews 1988; Entwistle 1988) in N Sulawesi. Considered to be of indeterminate status (Meyburg 1986), but perhaps not in immediate danger, despite the few scattered records.

Accipiter trinotatus - Spot-tailed Goshawk

No immediate danger

Endemic to Sulawesi, moderately common in suitable habitat in lowland forest and mangroves. Recent records throughout Sulawesi: commonest of four endemic Accipiters in Dumoga-Bone, frequently heard and seen, mistnetted on four occasions (Rozendaal & Dekker 1989): commoner than other Accipiters in Lore Lindu (Watling 1983), observed twice (van den Berg & Bosman 1986). Mentioned as being of indeterminate status (Meyburg 1986), but seems to be out of immediate danger.

Accipiter fasciatus - Brown Goshawk

No immediate danger

Widespread in woodland and cultivation with scattered trees (W&B) throughout the Lesser Sundas and Moluccas; occurring in seven (Wallacean and single island) endemic races: *tjendanae* (Sumba), *wallacei* (Lombok to Flores), *stresemanni* (small islands south of Sulawesi), *hellmayri* (Alor, Roti, Timor), *savu* (Savu), *didimus* (Buru) and *fasciatus* (Timor). Recent records from Komodo (Madsen 1983), Sumba and Timor (Gibbs 1990), and Buru (P. Jepson pers. comm.).

Accipiter novaehollandiae - Variable Goshawk

No immediate danger

Occurring in eight races, of which seven endemic to Wallacea: 1. *sylvestris* (Lesser Sundas), 2. *polionotus* (Banda, Tanimbar), 3. *albiventris* (Kai), 4. *obiensis* (Obi), 5. *griseogularis* (Bacan, Halmahera), 6. *mortyi* (Morotai), 7. *hiogaster* (Seram, Ambon), 8. *pallidiceps* (Buru). The species can be placed in three well-marked groups in Wallacea (W&B), sometimes lumped into two species (e.g. Weick 1980): *A. griseogularis* (group 4/5/6) and *A. novaehollandiae* (groups 1/2/3 and 7/8). Scattered records of the species throughout: Seram, occasional in the lowlands (Bowler & Taylor 1989; Andrews 1988), Komodo (pers. obs., 1992), Flores (Gibbs 1990); *griseogularis* as species was considered of indeterminate status, and recent records are available from Halmahera, where a number were collected by Taylor in 1980-1983 (W&B), and where it was not uncommon at Kali Batu Putih in Mar 1989 (Gibbs 1990), and Obi where four were collected by Taylor in 1982-1983 (W&B).

Accipiter henicogrammus - Moluccan (Gray's) Goshawk

Rare

Wallacean endemic restricted to Halmahera, Bacan and Morotai, where it inhabits forests and forest edges. Uncommon and infrequently seen. Declining in areas of human disturbance (K.D. Bishop, pers. comm.) Recent records from Halmahera, where Taylor (in W&B) collected a number of birds and Gibbs (1990) and Bucket *et al.* (1987) observed it in Sep 1990.

Accipiter virgatus - Besra

No immediate danger

Widespread in the submontane forests of the Greater Sundas, where it occurs in four endemic races: *rufotibialis* (only found N Borneo), *vanbemmeli* (Sumatra), *virgatus* (Java, Bali) and *quinquefasciatus* (Flores). Widespread in Sumatra (M&V) and Java (M; own obs.), but no recent records in Wallacea, known from only one old specimen in Flores.

Accipiter nanus - Small Sparrowhawk

Endangered

Endemic to Sulawesi in mountain forest. Records from Lore Lindu (Watling 1983; K.D. Bishop, pers. comm.) and two probable records of two birds in Dumoga-Bone in Apr 1985 (Rozendaal & Dekker 1989) are the only recent records. In the field the species is extremely difficult to tell with certainty from *A. rhodogaster*, from which it seems to be segregated by altitude. Of indeterminate status according to Meyburg (1986), and considered threatened by Collar & Andrew (1988), which seems to be appropriate in view of the scarcity of recent records, and possible confusion with the other hawk.

Accipiter erythrauchen - Rufous-necked Sparrowhawk

Rare

Wallacean endemic in lowland forest, occurring in two races: *erythrauchen* (N. Moluccas) and *ceramensis* (Seram, Ambon, Buru). Recent records from Obi, where one specimen was collected by Taylor in 1980-1983 (W&B), Seram, where it is uncommon in submontane forest (Bowler & Taylor 1989), and Halmahera (Buck *et al.* 1987)

Accipiter rhodogaster - Vinous-breasted Sparrowhawk

Insufficiently known

Endemic to Sulawesi and the neighbouring islands in the east, where it is uncommon and sparsely distributed in forest, forest edges, mangroves, etc.; occurs in two races: *rhodogaster* in Sulawesi, and *sulaensis* on Peleng, Banggai and Sula. Only few recent records: probable record of a pair in Lore Lindu (Watling 1983), probable record of a pair in Dumoga-Bone in Jan 1983 (Rozendaal & Dekker 1989) and observed in Sept 1990 (Gibbs 1990); not uncommon in Tangkoko (Gibbs 1990); two definite records for Taliabu in Sep 1991 (UEA). This species is notoriously difficult to distinguish with certainty from the previous species in the field, therefore sight-records of both species should be treated with caution.

Accipiter meyerianus - Meyer's Goshawk

Indeterminate

Occurring in lowland and hill forest. Only recent records from Seram, where it was uncommon in lowland forest (Bowler & Taylor 1989), but the species is widely but very sparsely distributed through New Guinea and eastward.

In northern winter large numbers of migrant Accipiters are found wintering or on passage in the archipelago. West of Wallace's Line *A. gularis* is dominant, *A. soloensis* is the most common migrant goshawk in the east (W&B), whereas *A. badius* and *A. nisus* seem to have their farthest winter quarters in Sumatra and N Borneo respectively (M & V; S).

Butastur liventer - Rufous-winged Buzzard

No immediate danger

Only found in Java and Sulawesi in open wooded country. No recent records from Java, where it has always been scarce, but more widespread in small numbers throughout Sulawesi (W&B), with recent records from Dumoga-Bone (Escott & Holmes 1980), in N Lore Lindu (Watling 1983) in C, Rantepao-Palopo (A&H) and Enrekang (Meyburg & van Balen, this volume) in S. In the northern winter *Butastur indicus* and *Buteo buteo* visit the Greater Sundas in small numbers, and the first mentioned is also a common winter visitor to N Wallacea (W&B).

Ichneutes malayensis - Black Eagle

No immediate danger

Widespread and moderately common in the hill forests throughout the Greater Sundas, Sulawesi and N Moluccas. A fair number of records from Kalimantan, Sumatra, Java and Sulawesi; few records from the Moluccas, where it was found quite common in Seram (Bowler & Taylor 1989) and on Halmahera (Andrews 1988; Gibbs 1990.). Despite its size, sometimes naive behaviour and habit of roaming the forest edges in search of bird nests, hunting has not decreased

numbers notably, even in the overpopulated island of Java.

Aquila gurneyi - Gurney's Eagle

Rare

Little-known forest dweller, found on Halmahera and neighbouring islands. Only recent certain records are of two individuals seen in Manusela National Park, Seram, in Sep 1987 (Bowler & Taylor 1989), which is a new locality for the species; regularly observed on Halmahera (KD Bishop, pers.comm.; Buck *et al.* 1987; Gibbs 1990).

Hieraaetus fasciatus - Bonelli's Eagle

No immediate danger

The Wallacean endemic race *renschii* is found in forests up to 2000m in the Lesser Sundas. Recent records from Timor (M&B) and Flores (Gibbs 1990; Verhoeve & King 1990). Vagrants of *H. morphnoides* from Australia and N Guinea are since recently known to visit Wallacea (King 1990).

Hieraaetus kienerii - Rufous-bellied Eagle

No immediate danger

Scarce but widespread in the area. Reportedly rare in Sumatra (M&V), Borneo (S), Java (M) and Wallacea (W&B), which does not agree with the relatively high number of recent records throughout its range, and perhaps the species is much more common than previously thought. Probably migrant birds from the west increase the local resident populations, as they appear to do in Malaysia (Medway & Wells 1976), and as suggested by some birds in migrant raptor flocks above Bali Straits in Oct 1982 and 1990 (Ash 1984; pers. comm.). Migratory *H. pennatus* have been found on Bali in the northern winter (Ash 1984).

Spizaetus cirrhatus - Changeable Hawk-eagle

No immediate danger

Widespread in the Greater Sundas, where *limnaeetus* occurs; endemic races *vanheurni* (Simeulue) and *floris* (Sumbawa, Flores). Occurs in two different morphs, widespread throughout forest edges, riverine forest and wooded cultivated areas, apparently not in the forest interior; in Java the species became very scarce outside protected areas.

Spizaetus bartelsi - Javan Hawk-eagle

Endangered

Javan endemic in primary lowland and hill forest considered globally endangered (Collar & Andrew 1988). Recent surveys pointed out a wider distribution than was previously presumed (Thiollay & Meyburg 1987; Meyburg *et al.* 1989; van Balen 1991b), but the continuing destruction of lowland and hill forest, aggravated by hunting pressure, still puts the species' survival in jeopardy. The present situation of the species is discussed in Van Balen & Meyburg (this volume).

Spizaetus lanceolatus - Sulawesi Hawk

No immediate danger

Endemic to Sulawesi and Sula Islands, occurring in lowland and mountain forests. A fair number of records throughout Sulawesi: Dumoga-Bone, common (Rozendaal & Dekker 1989); Lore Lindu, probably quite common (Watling 1983; van den Berg & Bosman 1986; Andrews 1988; Gibbs 1990); Tangkoko (Andrews 1988; Gibbs 1990); eleven sightings of adults and immatures during 31 Jul-18 Aug 1987 through S to N Sulawesi (Meyburg & van Balen, this volume); some probable sightings of juvenile birds from Taliabu (UEA). See *Pernis celebensis*. Globally near-threatened (Collar & Andrew 1988) which cannot hold with regard to the number of recent records.

Spizaetus alboniger - Blyth's Hawk-eagle

Indeterminate

Sondaic endemic occurring mainly in the submontane areas; in Java it is replaced by the allospecies *S. bartelsi*. Recent records of single adults from Riam Kanan? in Aug 1984 (H&B) and Barito Ulu (Wilkinson *et al.* 1991) in S Kalimantan; one bird at the Kutai National Park in Aug 1990 and heard near Long Alango in Feb 1992 (own obs.) in E Kalimantan. No certain recent records from Sumatra, but adults seen in 1974-1985 near Ketambe, Tapanuli, Mt Sibayak, Mt Kerinci and Siberut most likely refer to this species (M&V). Listed as of indeterminate status, but perhaps relatively secure in its (sub) montane forest habitat.

Spizaetus nanus - Wallace's Hawk-eagle

Vulnerable

Sondaic endemic, occurring in Borneo and Sumatra, where it replaces the previous species in the lowlands; *stresemanni* endemic to Nias Island. Only very few recent records: sight records from Alas Valley, Mt Kerinci, Way Kambas and Siberut need to be confirmed with regard to its resemblance to *S. alboniger* in certain plumage stages (M&V); a subadult seen in Oct 1989 near

Ipuh (Bengkulu) at ca. 200m (own obs.) Only recent Kalimantan records from the Kutai National Park, where a pair was regularly seen in Jul/Aug 1990, and two birds in trees along the Samarinda-Bontang road on 27 Jul 1990 (H. Kalisch, J. Meiss & SvB). Because of the ongoing deterioration of its lowland forest habitat and low population densities listed as threatened by Collar & Andrew (1988), but here considered vulnerable, which seems most appropriate with regard to the confusion with other species and in anticipation of more accurate data becoming available on its distribution and status.

Microhierax fringillarius - Black-thighed Falconet

No immediate danger

Widespread and not uncommon in Sumatra, Kalimantan, Java and Bali in forest edge and open country. The species is absent from many apparently suitable habitats, such as the Kayan Mentarang nature reserve in E Kalimantan, where none was seen during three weeks in Feb 1992 (own obs.) and Tanjung Puting, where only one single bird was observed (Nash & Nash 1988).

Falco moluccensis - Spotted Kestrel

No immediate danger

Indonesian endemic, widespread in the mid- and eastern half of the archipelago; up to five races described: *moluccensis* (Moluccas), *timorensis* (Timor, Tanimbar), *microbalia* (Lesser Sundas, Sulawesi), *renschii* (Sumba) and *javensis* (Java, Bali), but often only the first and third recognised. Recent records of all races are available. In southern and northern winter the migrant allospecies *F. cenchroides* and *F. tinnunculus* are occasional visitors to the eastern half of the archipelago and N Borneo respectively.

Falco severus - Oriental Hobby

No immediate danger

Extremely rare in Borneo, still to be confirmed in Sumatra, but more common in Java, Sulawesi and part of the Moluccas. Perhaps more widespread than the scarce records suggest, especially in Sulawesi. The following recent records are available: Baluran, Gede/Pangrango (SvB), Krakatau (Zann *et al.* 1990) and Ujung Kulon (Smiet, van Strien & Rijksen, pers. comm.) in Java; Mangkutana, Taripa, Lore Lindu and Malino (Andrews 1988; van den Berg & Bosman 1986; Meyburg & van Balen, this volume) in Sulawesi; Seram (Bowler & Taylor 1989), which confirms an old doubtful record, in the Moluccas. In southern and northern winter the migrant allospecies *F. longipennis* and *F. subbuteo* are rare visitors in Wallacea and Java respectively.

Falco peregrinus - Peregrine Falcon

No immediate danger

The race *ernesti* is a scarce resident throughout Indonesia, nesting on volcanos and steep cliffs. The N Asian races *calidus* and *japonicus* are winter visitors in small numbers, the latter only found hitherto on Kalimantan, the former more widespread.

DISCUSSION

In the previous sections it was shown that, whilst for a few species the status appears to be less a matter of concern than was thought (e.g., *Spilornis rufipectus* *Spizaetus lanceolatus*), others, especially in Java, seem to have declined at least locally. These, interestingly, belong to species of open country and cultivation, which is far from threatened habitat. Whether pesticides, excessive hunting or habitat destruction through the removal of nest trees are the cause for the local decline of *Milvus migrans*, *Elanus caeruleus*, *Haliastur indus* and *Spizaetus cirrshatus* remains to be studied. It offers a haunting prospect of the future for the other islands where development proceeds at an increasing rate. The local persecution of bat predating raptors may in particular affect Bat Hawks and to a less extent Peregrine Falcons and sparrowhawks, often found in the neighbourhood of caves (Mees 1950; own obs.). In this respect it is encouraging that since December 1991 the Indonesian Government announced a country-wide ban on air rifles. More surveys are needed in remote areas, especially in the eastern part of the archipelago, where many little known hawks occur, perhaps widespread and secure as species but with threatened local races, whose taxonomic status is often still to be studied. A good example is the Variable Goshawk, not threatened as a species, but with a local race *griseogularis*, Grey-throated Goshawk, with a very restricted distribution. Examples of former races, now considered to be full species, threatened with extinction are *Spizaetis bartelsi* and *Spilornis kinabaluensis*. In recent years a considerable number of surveys have been carried out to little-visited areas. Many of these were or are being organised by English universities (University of E Anglia; Manchester Polytechnic; Southampton,

etc.), local universities (outstanding are the National University, University of Indonesia, Gajahmada and Padjadjaran University). Furthermore a survey is currently being carried out under supervision of the WWGBP by the author on the Javan Hawk Eagle, and the ICBP is planning and coordinating surveys to the Moluccas, which will provide valuable new information. In addition to these surveys, field studies are needed in order to assess the adaptability of the forest raptors to the changing conditions of their habitat and to identify which species are exclusively dependent on virgin forest. The identification of a number of raptors causes serious problems. However, no regional field guides handling this adequately as yet exist, despite a major increase of books on Indonesian birds published during the past few years. It is therefore hoped that the forthcoming raptor identification guide by Ferguson-Lees *et al.* will serve serious ornithologists as well as the guide for shorebirds in the same series did and will be an impetus for collecting reliable data on the little-known birds of prey.

CONCLUDING REMARKS

Eleven species of raptor discussed in this paper deserve special attention, as their status causes more or less concern. The availability of more recent data allows a re-assessment of the conservation status of species treated by Meyburg (1986) and Collar & Andrew (1988). The number insufficiently known to determine to which category they belong has decreased considerably. Birds of endangered, vulnerable, rare and indeterminate (i.e. uncertain which of the former three categories) status include eight species. Only *Spizaetus bartelsi* is considered to be in immediate danger, having regard to the serious situation on Java. All eleven species badly need detailed field studies.

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