

A Review of Recent Knowledge on Raptor Species in Sumatra, Indonesia

Hilda Zulkifli¹, Muhammad Iqbal², Adam A. Supriatna³ and Agus Nurza⁴

1. Department of Biology, Sriwijaya University, Indralaya 30662, Indonesia

2. Kelompok Pengamat Burung Spirit of South Sumatra, Palembang 30152, Indonesia

3. Indonesian Ornithologists' Union (IdOU), Bogor 16001, Indonesia

4. Cicem Nangroe, Banda Aceh 23111, Indonesia

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Abstract: A review of recent knowledge on raptor species in Sumatra (Indonesia) is discussed here. It summarized 34 raptor species recently known from Sumatra, updating previous 32 species. A total of 19 species was recorded resident in Sumatra, eight endemic subspecies, and 18 migratory species. The resident raptors in Sumatra have different breeding seasons. There are three raptors breeding in dry season, three between dry to rainy season, two raptors in rainy season and five raptors breeding between rainy to dry season. Most raptors in Sumatra breeds between rainy to dry season, consistent with major period of breeding season of bird in Sumatra. Four species have been listed as vulnerable and near threatened by IUCN. All Indonesian raptors have been protected by the Indonesian law. Therefore, this information will provide more significant recent knowledge of the raptor species in Sumatra to be used for updating the conservation status and preparing long term monitoring activities to support the conservation of Sumatran tropical forests.

Key words: Review, recent, raptor, Sumatra, Indonesia.

1. Introduction

Sumatra is the westernmost and the second largest island in Indonesia. It is known to be rich in biodiversity. This great wealth is due to the large size of Sumatra, its diversity of habitats, and also its past links with the Asian mainland [1]. With such varied geography and vegetation zones, it is not surprising that the region holds nearly 11% of the world's raptor species [2] as well as a mind-boggling list of endemic raptor subspecies of many region's forested islands [2-4]. Furthermore, it is also worth nothing that the region falls along a number of major fly-ways for raptors migrating between Northeast Asia and Southeast Asia in the boreal winter. For example, every autumn, thousands of honey-buzzards would

pass through a number of sites along Rupert Island as they migrate south into Java [5-7].

Indonesia has 70 species of raptors, and from that number 32 species occur in Sumatra [8]. This paper has summarised 34 raptors species recently known from Sumatra and added two new species for the island, Himalayan Griffon and Common Buzzard [9-11]. The purpose of this paper is twofold. Firstly, the authors will present the more significant recent records of raptor species compiled from available references in Sumatra. Second, we explore recent knowledge raptor species in Sumatra that we can use to prepare long term monitoring activities to support the conservation of Sumatran tropical forests.

2. Materials and Methods

This paper presents recent references related to raptors in Sumatra (Fig 1). Few unconfirmed sight

Corresponding author: Hilda Zulkifli., Ph.D., research field: ecology. E-mail: hilda.zulkifli@yahoo.com.

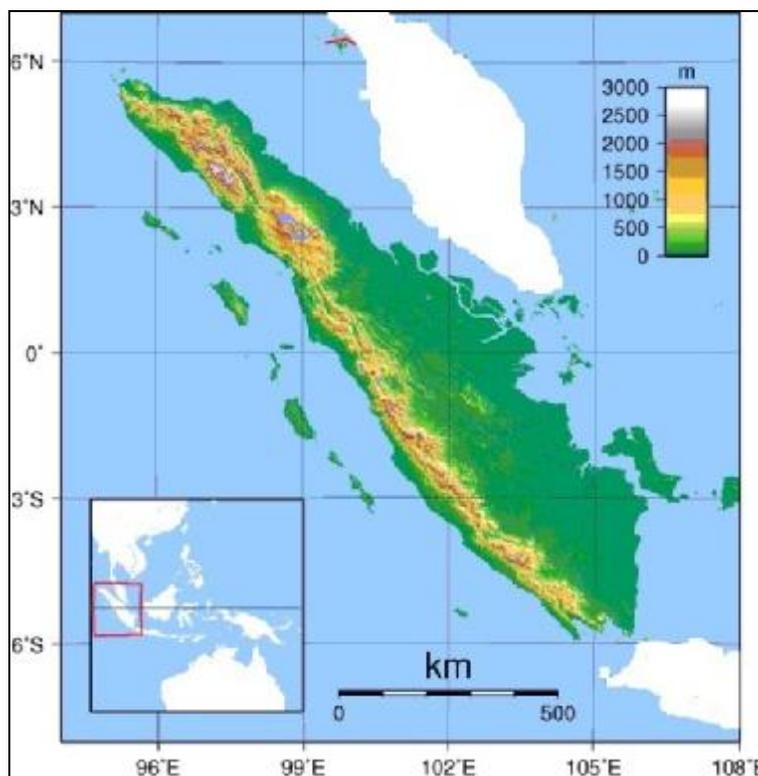


Fig. 1 Map of Sumatra Island.

records were reported to Sumatra. However, we put only valid species in **Table 1**. A total of 34 raptor species recorded in Sumatra. This is a significant references for Sumatran raptor after two previously reports on Sumatra raptor in “Birds of Sumatra” [4] and “Sumatra bird report” [12], with additional recent breeding records [13-16].

Bird taxonomy is currently undergoing a molecular overhaul, as advance molecular methods become more easily available for phylogeny-based studies. Many species of raptors Sumatra have not escaped the taxonomic revolution that has overtaken classical morphology-based taxonomy. The formerly pantropical genus *Spizaetus*, with its seven to 15 members species, is found to be not closely related, and had its Asian members reassigned to their original genus *Nisaetus*, after these were found to be distantly related to the neotropical hawk eagles, as was previously thought [17]. Recent studies of the Asian hawk eagles have found considerable intraspecific variation and polyphyly that it may be more

meaningful to raise some subspecies to species level [18]. For taxonomic reason, we still follow recent Indonesian Bird Checklist No. 2 for English and scientific names [8]. Conservation status covering global threatened species follows recent International Union for Conservation of Nature (IUCN) Redlist 2011 [19], Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) [20], and national protection is under the law of Indonesian [21].

3. Results and Discussion

3.1 Raptors Diversity

Table 1 shows that 34 species of raptors occur in Sumatra. Two species have been added for Sumatran raptor list: Himalayan Griffon and Common Buzard. Himalayan Griffon was reported in December 2007 on Bintan Island, Sumatra. The bird was caught by local people when attempting to feed on carcasses at a local pig farm [9]. Common Buzard is accidental visitor

Table 1 List of raptor species, subspecies, status, conservation status and remarks on its breeding records in Sumatra.

No	Common & scientific name	Subspecies	Status	Conservation status	Remarks on breeding records
01	Osprey <i>Pandion haliaetus</i>	<i>P. h. cristatus</i>	M	PI, Ap II	Migrant
02	Himalayan Griffon <i>Gyps himalayensis</i>	-	M	PI, Ap II	Migrant
03	Jerdon's Baza <i>Aviceda jerdoni</i>	<i>A. j. jerdoni</i>	R	PI, Ap II	Possible breeding activity recorded in August. Nesting cycle assuming between August to November.
04	Black Baza <i>Aviceda leuphotes</i>	<i>A. l. syama</i>	M	PI, Ap II	Migrant
05	Crested Honey Buzzard <i>Pernis ptilorhynchus</i>	Resident <i>P. p. torquatus</i> and Migrant <i>P. p. orientalis</i> .	R+M	PI, Ap II	No breeding record available for resident subspecies <i>P. p. torquatus</i> .
06	Bat Hawk <i>Macheiramphus alcinus</i>	<i>M. a. alcinus</i> .	R	PI, Ap II	Breedings were recorded between April to September (attended nest, eggs collected and incubating female). Breedings were observed twice in August at two different locations (pair copulating, carrying nesting material and attending nest). Nesting cycle assumed to occur between August to November.
07	Black-winged Kite <i>Elanus caeruleus</i>	<i>E. c. hypoleucos</i> .	R	PI, Ap II	Breedings were recorded between January to May (egg collected & fledglings). Breedings were recorded in September to March (eggs collected and nearly full-grown immature on nest).
08	Black Kite <i>Milvus migrans</i>	<i>M. m. lineatus</i>	M	PI, Ap II	Migrant
09	Brahminy Kite <i>Haliastur Indus</i>	<i>H. i. intermedius</i> .	R	PI, Ap II	Breedings were recorded between January to May (egg collected & fledglings). Breedings were recorded in September to March (eggs collected and nearly full-grown immature on nest).
10	White-bellied Sea-eagle <i>Haliaeetus leucogaster</i>	-	R	PI, Ap II	Breedings were recorded in September to March (eggs collected and nearly full-grown immature on nest).
11	Lesser Fish Eagle <i>Ichthyophaga humilis</i>	<i>I. h. Humilis</i>	R	NT, PI, Ap II	Breeding was recorded but without detail date of record.
12	Grey-headed Fish Eagle <i>Ichthyophaga ichthyhaetus</i>	-	R	NT, PI, Ap II	Two breeding records, nest building in April and bird on nest in September.
13	Crested Serpent Eagle <i>Spilornis cheela</i>	Six subspecies occur and four endemic <i>S. c. abboti</i> (endemic on Simeuleu), <i>S. c. asturinus</i> (endemic on Nias), <i>S. c. batu</i> (endemic on Batu Island) and <i>S. c. sipora</i> (endemic on Mentawai Island). Two other subspecies <i>S. c. malayensis</i> and <i>S. c. natunensis</i> .	R	PI, Ap II	Breedings were recorded between February to April (incubated egg). Nesting cycle assumed to occur between January to May.
14	Pied Harrier <i>Circus melanoleucos</i>	-	M	PI, Ap II	Migrant
15	Western Marsh Harrier <i>Circus aeruginosus</i>	<i>C. a. aeruginosus</i>	M	PI, Ap II	Migrant
16	Eastern Marsh Harrier <i>Circus spilonotus</i>	-	M	PI, Ap II	Migrant
17	Crested Goshawk <i>Accipiter trivirgatus</i>	Resident <i>A. t. trivirgatus</i> (endemic on the mainland) and <i>A. t. niasensis</i> (endemic on Nias).	R	PI, Ap II	Breeding was recorded where nest built in January. Nesting cycle assumed to occur between January to May.
18	Shikra <i>Accipiter badius</i>	<i>A. b. poliopsis</i>	R	PI, Ap II	Only single breeding record from Aceh between January to May (building nest until success fledgling).

(Table 1 continued)

No	Common & scientific name	Subspecies	Status	Conservati on status	Remarks on breeding records
19	Chinese Sparrowhawk <i>Accipiter soloensis</i>	-	M	PI, Ap II	Migrant
20	Japanese Sparrowhawk <i>Accipiter gularis</i>	possible both of <i>A. g. gularis</i> and <i>A. g. sibiricus</i> .	M	PI, Ap II	Migrant
21	Besra <i>Accipiter virgatus</i>	<i>A. v. vanbemmeli</i> .	R	PI, Ap II	Only one breeding record of almost full-grown young in April. Nesting cycle assumed to occur between January to May.
22	Grey-faced Buzzard <i>Butastur indicus</i>	-	M	PI, Ap II	Migrant
23	Common Buzzard <i>Buteo buteo</i>	<i>B. b. vulpinus</i>	M	PI, Ap II	Migrant
24	Black Eagle <i>Ictinaetus malayensis</i>	-	R	PI, Ap II	Resident but no breeding record.
25	Greater Spotted Eagle <i>Aquila clanga</i>	-	M	VU, PI, Ap II	Migrant
26	Booted Eagle <i>Hieraetus pennatus</i>	-	M	PI, Ap II	Migrant
27	Rufous-bellied <i>Hieraaetus kienerii</i>	Eagle <i>H. k. formosus</i>	R	PI, Ap II	Breedings were recently fledged and young juvenile between July to November.
28	Crested <i>Spizaetus cirrhatus</i>	Hawk-eagle Resident <i>S. c. limmaetus</i> throughout the mainland, and <i>S. c. vanheurni</i> endemic on Simeuleu.	R	PI, Ap II	Breedings were recorded on October to January (eggs and downy young collected).
29	Blyth's <i>Spizaetus alboniger</i>	Hawk-Eagle -	R	PI, Ap II	No breeding record
30	Wallace's <i>Spizaetus nanus</i>	Hawk-Eagle <i>S. n. nanus</i> throughout the mainland, and <i>S. n. stresemanni</i> endemic on Nias.	R	VU, PI, Ap II	No breeding record
31	Black-thighed <i>Microhierax fringillarius</i>	Falconet -	R	PI, Ap II	Breeding recorded between March to May (Nesting and egg collected). Family with fledged young, without date record. Nesting cycle assumed to occur between February to June.
32	Common Kestrel <i>tinnunculus</i>	<i>Falco F. t. interstinctus</i>	M	PI, Ap II	Migrant
33	Oriental Hobby <i>severus</i>	<i>Falco F. s. severus</i>	M	PI, Ap II	Migrant
34	Peregrine Falcon <i>peregrinus</i>	<i>Falco</i> Resident <i>F. p. ernesti</i> and migrant <i>F. p. calidus</i> .	R + M	PI, Ap I	Two young fledged from nest between June to July. Nesting cycle assumed to occur between March to July.

Note : R = Resident, M = Migran, R + M = there is resident subspecies and migrant subspecies, NT = Near Threatened, VU = Vulnerable, PI = Protected by Indonesian Law, Ap = listed in CITES Appendix I or II.

(possibly *Buteo buteo vulpinus*). One unconfirmed sight records from Gunung Leuser National Park Aceh but the species has been observed in and on the coast of Negri Sembilan Malaysia after crossing the Malacca Straits coming from Sumatra together with migrating Crested Honey Buzzard on March [10]. Single bird on migration over Tanjung Said, Bintan was found in November 8 1995. There are presently no

confirmed records for the Sumatra realm, but it passes through Singapore every year in small numbers [10].

A total of 19 species was recorded resident in Sumatra. The birds are Jerdon's Baza, Bat Hawk, Black-winged Kite, Brahminy Kite, White-bellied Sea-eagle, Lesser Fish Eagle, Grey-headed Fish Eagle, Crested Serpent Eagle, Shikra, Besra, Black Eagle, Rufous-bellied Eagle, Crested Hawk-eagle, Blyth's

Hawk-eagle, Wallace's Hawk-eagle, Black-thighed Falconet, Crested Honey Buzzard, Crested Goshawk and Peregrine Falcon. Eight subspecies recorded as endemic subspecies in Sumatra, and possible split as fully species in the future. The subspecies including four endemic of Crested Serpent-eagle *S. c. abboti* (endemic on Simeuleu), *S. c. asturinus* (endemic on Nias), *S. c. batu* (endemic on Batu Island) and *S. c. sipora* (endemic on Mentawai Island); one subspecies of Crested Hawk-eagle *S. c. vanheurni* endemic on Simeuleu; two subspecies of Crested Goshawk *A. t. trivirgatus* (endemic on the mainland) and *A. t. niasensis* (endemic on Nias); and one subspecies of Wallace's Hawk-eagle *S. n. stresemanni* endemic on Nias.

It has been reported that some possibilities of vagrant raptors from lowland in southern Sumatra, White-tailed Eagle *Haliaeetus albicilla*, Lesser Spotted Eagle *Aquila pomarina*, possible Steppe Eagle *Aquila nipalensis* or Imperial Eagle *Aquila heliaca* [22]. Therefore, future observers should be more aware and paying more attention on possibilities to observe these raptors in Sumatra, to review their migrant status whether vagrant or regular visitor.

There are migratory raptors in Sumatra which need further fieldwork for clarification. These species are Himalayan Griffon, Common Buzzard, Greater Spotted Eagle, Booted Eagle, Common Kestrel, and Oriental Hobby. The occurrence of these rare migrants is important to be further confirmed to clarify its status whether they are vagrant or only regular visitor. The future observers should also be more aware of possibilities that they observe these species in Sumatra.

Sumatra is one of important migration flyways for raptor in Indonesia. There are 18 species of raptor recorded passing Sumatra as its migration flyway. The species are Osprey, Himalayan Griffon, Black Baza, Black Kite, Pied Harrier, Western Marsh Harrier, Eastern Marsh Harrier, Chinese Sparrowhawk, Japanese Sparrowhawk, Grey-faced Buzzard,

Common Buzzard, Greater Spotted Eagle, Booted Eagle, Common Kestrel, Oriental Hobby, Crested Honey Buzzard, Crested Goshawk and Peregrine Falcon. Unlike Java where raptor migration sites have held more regular monitoring and the migratory data have been relatively well documented, Sumatran raptor migratory flyway is still lacking information. Searching important sites for migratory raptor in Sumatra is then becoming priority for conducting key monitoring sites, and its relation to population trend.

3.2 Breeding Season

Much work is still needed to clarify the seasonality of breeding among Sumatran birds [23], especially raptors. It has been reported that incubation period of raptors varies considerably between different groups: 28-38 (one month) days in Harriers and 48-56 days (1.5-2 moths) in the largest tropical forest eagles [2]. Hatching period of raptor also varies a great deal especially with size, lasting: 24-30 days (one month) in small Sparrowhawks and 105/115-148 days (3-5 months) in the largest tropical forest eagles [2]. In Sumatra, the length of nesting cycle of Rufous-bellied Eagle and Shikra between 3.5-4 months [15, 16]. Table 2 shows assumption on nesting cycle of each resident raptor in Sumatra. Here, the nesting cycle is defined as covering of laying egg to fledgling or young first flight.

Based on Table 2, there are three raptors (Bat Hawk, Grey-headed Fish Eagle and Peregrine Falcon) breed in dry season, three raptors between dry to rainy season (Jerdon's Baza, Black-winged Kite and Rufous-bellied Eagle), two raptors in rainy season (White-bellied Sea-eagle and Crested Hawk-eagle). Five raptors (Brahminy Kite, Crested Serpent Eagle, Crested Goshawk, Shikra, Besra, Black-thighed Falconet and Peregrine Falcon) breed between rain to dry season. It is still no breeding record for five resident raptors (Crested Honey Buzzard, Lesser Fish Eagle, Black Eagle, Blyth's Hawk-Eagle, Wallace's Hawk-Eagle) in Sumatra.

Table 2 Assuming nesting cycle of resident raptors in Sumatra.

No	Common & scientific name	Months											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
01	Jerdon's Baza (DR)								x	x	x	x	
02	Crested Honey Buzzard*												
03	Bat Hawk (D)				x	x	x	x	x	x			
04	Black-winged Kite (DR)								x	x	x	x	
05	Brahminy Kite (RD)	x	x	x	x	x							
06	White-bellied Sea-eagle (R)	x	x	x						x	x	x	x
07	Lesser Fish Eagle*												
08	Grey-headed Fish Eagle (D)				x	x	x	x	x	x			
09	Crested Serpent Eagle (RD)	x	x	x	x	x							
10	Crested Goshawk (RD)	x	x	x	x	x							
11	Shikra (RD)	x	x	x	x	x							
12	Besra (RD)	x	x	x	x	x							
13	Black Eagle*												
14	Rufous-bellied Eagle (DR)							x	x	x	x	x	
15	Crested Hawk-eagle (R)	x	x								x	x	x
16	Blyth's Hawk-eagle*												
17	Wallace's Hawk-eagle*												
18	Black-thighed Falconet (RD)		x	x	x	x	x						
19	Peregrine Falcon (D)			x	x	x	x	x					

*Resident but no breeding record. x = recorded breeding or assuming nesting cycle, D = dry season (most assuming nesting cycle between April to September), DR = dry to rainy season (most assuming nesting cycle between July to December), R = rainy season (most assuming nesting cycle between October to March), RD = rainy to dry season (most assuming nesting cycle between January to June).

In tropical areas, where the seasons are based on the rainfall regime, raptors tend to breed during the dry season. The large specific begins early in the dry season, the smaller ones in the second half, both timed in order that the young may fledge early in the wet season, when their a plentiful flush of new food, but before the vegetation cover reaches its full development, and also before the rains for too troublesome [2]. However, **Table 2** shows that most raptors in Sumatra breed between rainy to dry season (January to June). Although, it is not consistent with most breeding raptor period in tropical area, it is consistent with major period of breeding bird season in Sumatra [4]. It has also been reported that breeding period of few birds in Sumatra is from July to September [23]. The occurrence of three raptors recorded breed in dry season, and other three raptors breed between dry to rainy season, supporting that the breeding season of raptors depends on species. In

tropical areas, where the seasons are based on the rainfall regime, raptors tend to breed during the dry season [2]. In Sumatra, during rainy season two raptors still found to breed. It is suspected that timing to ensure food availability for few raptors is priority compared to the rainfall.

Further study on the breeding of raptor in Sumatra is required to learn periods of comprehensive breeding season on raptor in Sumatra. Mapping key sites of breeding raptor is also important to help conserve tropical resident raptors in Sumatra. Protecting key breeding sites is needed to ensure survivorship of raptor population in Sumatra.

3.3 Conservation Status

Four raptors have been listed in IUCN Redlist [19]. Two birds, Wallace's Hawk-eagle and Greater Spotted-eagle listed as Vulnerable. Other two species, Lesser Fish Eagle and Grey-headed Fish Eagle, listed

as Near Threatened. Although Indonesian raptors were protected by Indonesian law [21], there is no guarantee that each raptor species in Sumatra will be saved in the wild from poaching or hunting. Considering land-use planning is another important thing to conserve resident and migratory raptors in unique habitat within an administration region [24]. For example, ornithological survey in 1989 at floodplains near Palembang (South Sumatra) recorded both of resident and migratory raptors [23], but a recent monitoring bird survey in 2011 at Pulokerto (Palembang floodplains) only found resident without migratory raptors [24]. Therefore, the followings are conservation priorities to save Sumatran raptors: particular survey and monitoring of declining populations for updating its threatened status, preventions of disturbance breeding site of raptors, conducting wide environmental education to public, activation of all administrative and non-governmental wildlife organizations to stop poaching and smuggling of large falcons.

4. Conclusions

It is concluded that there are 34 raptors species recorded in Sumatra. Among these species, there are 19 resident species, eight endemic subspecies and 18 migrant raptor listed from Sumatra. The resident raptors in Sumatra have different breeding seasons. Three species breed in dry season, three between dry to rainy season, two raptors in rainy season and five raptors breed between rainy to dry season. Most raptors in Sumatra breed between rainy to dry season, consistent with major period of breeding season of birds in Sumatra. Further study on the breeding raptor in Sumatra is required to learn periods of comprehensive breeding season and protecting key breeding sites is needed to ensure the survival of raptor population in Sumatra. Four species have been listed in IUCN Redlist as vulnerable and near threatened, and all Indonesian raptors have been protected by Indonesian law. Recent knowledge of

raptor species in Sumatra can be used to prepare long term monitoring activities in support of conservation of Sumatran tropical forests.

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