

**SURVEY ON BIRDS OF PREY AND OWLS  
(FALCONIFORMES AND STRIGIFORMES) ON BAWEAN, JAVA SEA,  
WITH RECORDS OF THREE SPECIES NEW TO THE ISLAND**

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**ABSTRACT.** – Based on a survey conducted in September - October 2002 and data from surveys made previously between 1892-1969, I document 91 records of five species of raptor and two species of owl on the island of Bawean, Java Sea. I also report the distributions of observed species. It appears that there are only two resident raptors on the island, i.e. the endemic Bawean serpent-eagle *Spilornis baweanus*, confined to the main island, and the Osprey *Pandion haliaetus*, that occurs exclusively on small offshore islets. Two species that are found commonly on island archipelagos in the region, i.e. Brahminy kite *Haliaeetus indus* and White-bellied sea-eagle *Haliaeetus leucogaster*, are surprisingly but genuinely absent from Bawean. Three other raptors, Japanese sparrowhawk *Accipiter gularis*, Chinese sparrowhawk *A. soloensis*, and Oriental honey-buzzard *Pernis ptilorhyncus*, all three species newly recorded for the island, are northern migrants. Despite its geographic location, Bawean does not seem to be a prime passage site for northern migrants on their way from Borneo to Java. Of the two species of owl, i.e. Spotted wood owl *Strix seloputo* and Barn owl *Tyto alba*, only the first is widespread and abundant, as for the latter the only confirmed record dates back to 1954.

**KEY WORDS.** – Aves, avifauna, Indonesia, migration, zoogeography.

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**INTRODUCTION**

Few data are available on the raptor community of the island of Bawean situated in the Java Sea 120 km north of Java and 250 km south of Borneo. Ferguson-Lees & Christie (2000) reported the only raptor to be present on the island was the endemic Bawean serpent-eagle *Spilornis baweanus*. Few if any data are available on the owls of the island, albeit that MacKinnon et al. (1999: Appendix 3) list two species, i.e. Spotted wood owl *Strix seloputo*, and Barn owl *Tyto alba*.

On the basis of its geographical position, the island might form an important stop-over or passage site for birds migrating from Borneo south to Java and the Lesser Sunda Islands (and possibly vice versa). In the Java Sea, raptor passage in a southern and south-western direction has been observed on Pulau Laut (14 October 1996), on Pulau Marabatuan and between Pulau Matasirih and Pulau Kalambu (15-16 October 1996) (Davison, 1997), and on Pulau Masa Kambang (31 October - 15 November 1997) (F. Arga Narata, pers. comm.), all situated north-east of Bawean (Fig. 1a). In these island groups mainly Japanese sparrowhawks *Accipiter gularis* and Oriental honey-buzzards *Pernis ptilorhyncus* were observed, whereas on Java (but not Bali: Ash, 1993) the most abundant migrant raptor is the Chinese sparrowhawk *A. soloensis*

(Nijman, 2001a, b; S. van Balen, pers. comm.). Based on the ratio Chinese sparrowhawk and Japanese sparrowhawks identified on Java and Bali, it was hypothesised that an alternative migration route might follow the small islands on the eastern edge of the Java Sea, involving especially large numbers of Japanese sparrowhawks (Nijman, 2001a).

The Bawean serpent-eagle has never been studied in any detail, and the last data we have of the species dates back to 1954 when Hoogerwerf (1967) conducted an ornithological survey on the island. As the species is confined to the island, has an extreme small geographical range, and hence an expected small population size, from a conservation and management perspective, it is important to assess its distribution in detail, and to assess whether or not it is indeed the sole raptor on the island.

I conducted a 15-day raptor survey of the island in 2002. This was at the end of the dry season on Bawean, providing excellent conditions for observing raptors, and the second half of the survey coincided with the peak migration period in Central Java (Nijman, 2001b). The two main questions were (i) is the Bawean serpent-eagle indeed the only resident raptor on the island?, and (ii) is Bawean an important passage site for raptor migration? Here I provide a comprehensive

account of the birds of prey and owls that have been recorded on the island of Bawean and discuss the importance of the island for raptor migration.

## METHODS

**Study area.** – Bawean is a small island of approximately 190 km<sup>2</sup> in size (or c. 15 km across), situated in the Java Sea some 120 km north of the island of Java, Indonesia's political and industrial centre (Fig. 1a). Bawean consists of the remains of an old volcano and has a rugged landscape with several peaks >600 m asl. The interior is still largely forested, but the more fertile plains are converted into agricultural land (Whitten et al., 1996). Some 64,000 people live on the island, mostly in villages in the coastal plains. The islanders are largely dependent on fishing and farming, but a relative large proportion of the population are immigrant workers to Singapore and Malaysia. Faunistically, Bawean is best known for its endemic Bawean deer *Axis kuhli*, reputedly the rarest deer in the world. Only a small number of endemic taxa have

been described from the island, and most animal and plant species also occur on Java (Hoogerwerf, 1967; Blouch & Admosurdirdjo, 1979).

**Data acquisition.** – The survey was conducted from 27 September to 11 October 2002, and observations were made at all parts of the island. For each raptor or owl recorded, its location was geo-referenced with a handheld GPS-recorder. For searching for raptors, vantage points were selected on small hills, and on four (telegraphic) towers in the lowlands. Special attention was paid to sites where migrant raptors were expected to make a land-fall (Tanjung Mentigi) and where they would depart southwards to Java (Tanjung Alang-alang and Tanjung Lajar). Small offshore islands were sampled from the adjacent coast with binoculars with a 20x magnification.

Skins of resident raptors were studied in the collection of the Zoological Museum Bogor (ZMB), Cisarua, Indonesia, and Naturalis (RMNH), Leiden, the Netherlands, and details on collection localities given on the labels were noted.

In addition to the survey, I compiled data from a number of (ornithological) expeditions from the period 1892 - 1969: A. G. Vorderman, 9 days in (1891?)-1892, no further data on period of his survey are available: main island and Pulau Gili (Vorderman, 1892); W. L. Abbot, 19-28 November 1907: main island [and Manukan Air] (Oberholser, 1917); K. W. Dammerman, May 1928, skins in ZMB, no further details available; Ch. Dupond and co-workers, 1 May 1932, main island (Dupond, 1942); A. Hoogerwerf, 28-31 May 1939: main island, Pulau Gili, surrounding islets, 31 May 1953: surrounding islands and islets, 3-4 July 1953: surrounding islands and islets, 21 May - 3 July 1954: main island, Pulau Gili (Hoogerwerf, 1962, 1966, 1967); N. Sitwell, 14-25 June 1969, western part of main island (Sitwell, 1970).

## RESULTS

### Species account

#### Osprey *Pandion haliaetus*

During the present survey no ospreys were observed. In western Indonesia, there is a rare resident population that is augmented by small numbers of the same subspecies from austral regions (*P. h. cristatus*), and, more commonly, by migrants from boreal regions (*P. h. haliaetus*). Two mounted specimens (two adults, male RMNH 90644 and female RMNH 90645), collected on Bawean in 1841 by M. Diard, catalogued as *cristatus*, are in the collection of Naturalis (Dekker et al., 2001). Measurements and descriptions provided by Schlegel (1862, 1873) fit those of *P. h. cristatus* better than that of *P. h. haliaetus*. Chasen (1935) lists Bawean in the distribution range of the nominate subspecies, but in all likelihood, did not study any specimens from the island.

Hoogerwerf (1967) recorded an apparent pair on Pulau Gili, of Bawean's east coast, and later observed a pair with a young

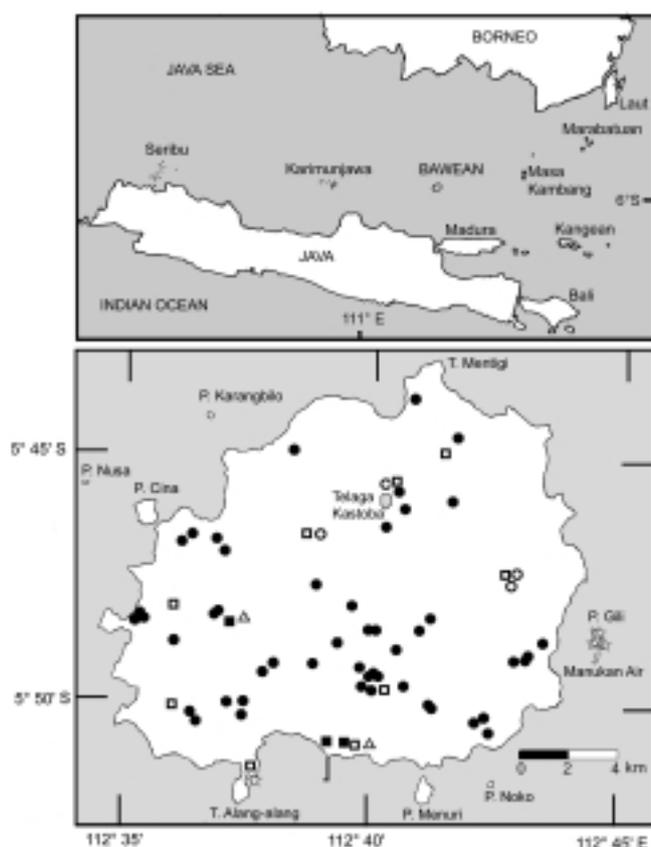


Fig. 1. (a) The western Java Sea showing the position of Bawean in relation to other islands and island archipelagos mentioned in the text. (b) 72 records of resident birds of prey (Bawean serpent-eagle *Spilornis baweanus* –circles and Osprey *Pandion haliaetus* –stars) and owls (Spotted wood owl *Strix seluputo* –squares and Barn owl *Tyto alba* –triangles). Filled and open symbols refer to recent (2002) and historic observations (1892-1954), respectively. Note that historic observations were not geo-referenced and the collection or sighting location is mapped.

individual on the same island. Once during a particular severe storm, a single individual was observed near Muara, along Bawean's south coast (Fig. 1b). It seems that the species, at least up until the 1950's, was breeding on one or more of the many smaller islets surrounding Bawean, but so far it has not been recorded on the main island.

#### **Chinese sparrowhawk *Accipiter soloensis***

A single adult was observed on the northernmost part of the island (10 October). The bird arrived from the north-east and upon making a landfall flew off in a southern direction.

#### **Japanese sparrowhawk *Accipiter gularis***

At least six individuals were observed, both in the central part of the island (2 October) and the south-western part (3, 8 October). The birds did not appear to be migrating in a particular direction, but probably used Bawean as a temporary stop-over site.

#### **Sparrowhawk / Goshawk *Accipiter* spp.**

In all five accipiters were observed that could not be identified to the species level. Three were observed in the south-western part of the island (near Tanjung Alang-alang: 3 October), one individual above the pier near the southern harbour (7 October) and one near Tanjung Mentigi (11 October). In all likelihood these were either Chinese or Japanese sparrowhawks, although the presence of Shrike *A. badius* or Eurasian sparrowhawk *A. nisus* could not be excluded.

#### **Oriental honey-buzzard *Pernis ptilorhynchus***

In the Sundaic region, the Oriental honey-buzzard is represented by both residential races on the main islands as well as migrant races from East Asia. On Java the resident race is rarely recorded (van Balen et al., 1999). Resident birds and migrants are quite distinct when perched but very difficult to separate when in flight.

Two individuals were observed in the Telaga Kastoba nature reserve in the central part of the island (2 October). The birds were seen in active flight and, briefly, soaring above the forest but did not seem to be on passage. Three individuals were observed at the south-western peninsula, near Gn. Mas, above an area partially covered in shrub and cultivated land (3 October). These three individuals were observed soaring and after gaining enough height left in a southwards direction, possible in the direction of Java. No honey-buzzards were observed by any of the other observers listed in the introduction and hence it seems likely that the individuals involved were migrants.

#### **Bawean serpent-eagle *Spilornis baweanus***

During the survey I had 49 encounters with Bawean serpent-eagle and on 13/15 days I observed the eagle. Bawean serpent-eagles were mostly observed as single birds and pairs, and more rarely in groups of three or four birds. Displaying pairs were seen regularly and in all parts of the island. The eagles are highly vocal and the majority of encounters involved one or more birds calling. Most were observed during the late morning and generally, when the weather was clear and sunny they could be seen soaring from afar. Bawean serpent-eagles were observed in all parts of the island (Fig. 2), but seemed to have a clear preference for forested areas. The species was not seen in mangrove or coastal forest, nor above the stretches of Nipa palm that fringes part of the island. Likewise the species was not recorded on any of the smaller offshore islands that could be observed from the main island (i.e. Pulau Cina, P. Karangbilo, P. Gili and Manukan air, or P. Menuri).

#### **Kestrel *Falco* spp.**

According to an official of the agricultural department kestrels (possible Spotted kestrel *Falco moluccensis*) were present on the island, but none were observed during the present survey nor did any of the other surveyors report its presence. Spotted kestrels are present on the islands of Kagean and Madura (pers. observ. 1997), and are relatively easy to observe. Hence it seems unlikely that they indeed are present, although migrant falcons (Peregrine falcon *Falco peregrinus*, Common kestrel *F. tinnunculus* or even Australian kestrel *F. cenchroides*), might land on the island occasionally.

#### **Spotted wood-owl *Strix seloputo***

Twice, west of the capital Sangapura, the vocalisations of an owl, presumed to be the spotted wood-owl were recorded, and indeed the species was reported to be still fairly common near the village of Tampo and Pudakitbarat. Vorderman (1892) observed a large owl flying near Sangkapura, but was not able to obtain a specimen. Hoogerwerf (1967) mentioned that this owl was perhaps regularly distributed over the island, and in 1954 the species was recorded on 19/40 field days and near almost all their camping sites (Fig. 1b), apart from the one on P. Gili.

#### **Barn owl *Tyto alba***

No barn owls were recorded during the present survey. Officers of the forestry department and villagers from the western part of the island (near Tampo) reliably reported the presence of two species of owl, including the barn owl. Hoogerwerf (1967) heard the typical call of this species during one evening (out of 40). Since he did not hear the species on any of the other nights he was reluctant to list the species for the island. Barn owls occur on a number of islands in the Sundaic region and it is likely that the species is indeed present on Bawean.

**Table 1.** Occurrence of birds of prey and owls on four islands or island groups in the Java Sea (see Fig. 1). Approximate size of the main island(s) is given in brackets. Data from Bartels, 1908; de Iongh et al., 1982; MacKinnon et al., 1999; V. Nijman unpubl. data.

Species	Seribu (60 km <sup>2</sup> )	Karimunjawa (110 km <sup>2</sup> )	Bawean (190 km <sup>2</sup> )	Kangean (487 km <sup>2</sup> )
Falconiformes				
<i>Pandion haliaetus</i>	√	√	√	√
<i>Haliastur indus</i>	√	√		√
<i>Haliaeetus leucogaster</i>	√	√		√
<i>Icthyophaga malayensis</i>				√
<i>Spilornis baweanus</i>			√	
<i>Falco molluccensis</i>				√
Strigiformes				
<i>Tyto alba</i>			√	√
<i>Otus lempiji</i>				√
<i>Asio flammeus</i>				√
<i>Strix seloputo</i>			√	

## DISCUSSION

During the present study, four species of raptor and one species of owl was recorded on Bawean, three of which are new to the island. All these newly recorded species were northern migrants. It is not unexpected that their presence remained unnoted given that none of the other ornithologists had visited Bawean during the migration period (i.e. end September - mid November and March - April: note that although the timing of Vorderman's (1892) survey is not known, none of the 16 species recorded were migrants). Numbers of migrants observed in the present study were, however, low, and either the island is not as an important passage site as was expected on the basis of its geographical position (Nijman, 2001a), or passage peaks later, i.e. at the end of October or early November.

The Bawean serpent-eagle was found present throughout the island, and was regularly recorded, similar to the findings of Hoogerwerf (1962, 1967) in the 1950's. Birds were observed performing display flights, and given that the reproductive organs of four birds collected in May-June (all in MZB) were all small, the species may well be breeding in the wet season (November - February: Blouch & Admosurdirdjo, 1979).

No Ospreys were observed, but certainly as a breeding resident, this species is genuinely rare in the region (MacKinnon et al., 1999). It may no longer be present on the islands and islets surrounding Bawean, or be present in small numbers only.

Interestingly, during the survey no white-bellied sea-eagles *Haliaeetus leucogaster* or Brahminy kites *Haliastur indus* were observed, and these species were not known from the island according to local fishermen (although they were familiar with the species from other islands). Hoogerwerf (1966) remarked that some families were poorly represented on Bawean and noted that: "This is demonstrated very conspicuously in the diurnal birds of prey of which to date only two species are known, viz. *Spilornis cheela* [= *S. baweanus*] and *Pandion haliaetus*. Not a single representative of the genus *Accipiter* is recorded from Bawean. And -which

may surprise use even more- also *Haliaeetus leucogaster* and *Haliastur indus* are as yet not known to occur, though it is hard to believe that these species, common in coastal regions of so many islands in the Indonesian area, do not live on this island". Hard though it may, the combined efforts of ornithologists over the last 120 years, totalling >79 days on a small island, did not reveal their presence and hence it may be assumed that these raptors are indeed absent. Both species have been recorded on other island archipelagos in the Java Sea (Table 1), are easily observed when present, and used to be among the most common raptors in the region. As such, the raptor community on Bawean is clearly depaupered.

The Spotted wood owl is probably still regularly distributed on the island, but as with most owls in the region, very little is known about their abundance and distribution. The species has not been recorded on any of the other islands in the Java Sea (Table 1), and it seems that there does not seem to be a clear distribution pattern on these islands. A detailed analysis into the patterns of abundance and distribution of owls in small and larger islands in western Indonesia may be a promising avenue for further research.

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There are 287 known species of birds of prey and experts classify them in the different ways. Here is one classification system that splits the birds of prey into two main groups; called Orders. This order includes all the species of owls. The Falconiformes are primarily diurnal (active during day light) the Strigiformes are primarily nocturnal (active at night). These two orders of birds are not closely related, but possess similar characteristics because of similarities in the way they hunt. Bird of Prey Families. Siau Scops Owl, *Otus siaoensis* - Island of Siau Malaysia - Critically Endangered - known from a single specimen collected in 1866, this population may be extinct. Surveys in 2009 did not identify any Siau Scops owls, but unidentified owl calls and interviews with locals keep hope alive. Birds typically classified as raptors, or birds of prey, have received much public and scientific attention over past decades, especially due to critical conservation issues surrounding them (e.g., Ratcliffe 1967, Prakash et al. 2003, Ogada et al. 2016). For these species, there exists discipline-specific infrastructure for research, monitoring, and conservation. Conversely, visual acuity of some Strigiformes, Cathartiformes, and Falconiformes is substantially below that of humans (Gaffney and Hodos 2003, Potier et al. 2016, Martin 2017, Mitkus et al. (2012) contrasted parasites of European owls with those of what they considered birds of prey (Accipitriformes and Falconiformes). And, Geen et al. This article presents information on raptors species recorded during the 12-day of field studies in the plains and lowlands of Assam (north-eastern India). In total, we observed 21 Bird of Prey species: 18 species of Accipitriformes and 3 species of Falconiformes, and 11 species of Strigiformes. Library Articles of the Raptors Conservation Journal Birds of Prey (Accipitriformes, Falconiformes) and Owls (Strigiformes) of Assam (India): the Results of Express Investigation of Fauna in the Low Mountains and Plains in February 2018. " Raptors Conservation 37. Birds of Prey (Accipitriformes, Falconiformes) and Owls (Strigiformes) of Assam (India): the Results of Express Investigation of Fauna in the Low Mountains and Plains in February 2018.