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Bird of Mesangat in East Kutai, East Kalimantan

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Abstract. The reduction of forest cover and wetland to plantations has a negative effect on local avifauna. A survey was conducted along the Mesangat swamp in the Muara Ancalong district to estimate bird diversity in wetland and its forest habitats. Observation and traps were set up in open-bodies of water and lowland forest dominated by *Malotus sumatranus* and *Calamus* spp. A total of 70 species were recorded belonging to 58 genera across 33 families in 14 orders. The bird species were grouped into 8 categories according to their main food preferences; nectarivorous, piscivorous, carnivorous, insectivorous, granivorous, frugivorous, herbivorous, and omnivorous. Of these avifauna groups, insectivorous are the most abundant followed by piscivorous while herbivorous and omnivorous is being the least abundant. Based on the IUCN Red List, 2 species are listed as vulnerable, 13 species as near threatened, and the remaining 55 species are of least concern. In addition, 24 species are identified as protected species and 46 species are considered unprotected according to the Government Act (88) No. 7, 1999. The presence of vulnerable species in this study highlights the potential of Mesangat swamp as an important conservation area for avifauna.

INTRODUCTION

As a part of an ecosystem, birds known to play an important role by providing numerous ecological benefits. These include birds as predators, seed dispersers, scavengers, pollinators, and pest control. Bird communities have a particular sensitivity to their habitat, thus make them perfect indicators of environmental health [1,2].

Birds occupy almost every niche on earth, spread across the continent and to the very small island. They occur almost in all habitats, including wetland [3]. The relationship between wetlands and birds was formed by many factors such as: the abundance and depth of water, water quality; the availability of food and shelter; and the presence or absence of predators [4].

Swamp is an example of a wetland with a flooded water system, shallow, ramp lined, and overgrown by plants and trees. Kalimantan has a wetland that covers more than 10 million ha, approximately 20% of its land. According to MacKinnon [5] there are 422.000 ha of lowland swamp in East Kalimantan, while Moore [6] proposed the number had shrunk to 350.700 ha in 2001.

Wetlands contribute a great deal of important habitats, especially for many bird species but are also suffering from human-caused degradation. The lack of knowledge about biological resources, in this case the unrevealed local biodiversity is really unfortunate, especially if the region is likely to be a crucial habitat for protected animals. Therefore, the purpose of this research was to determine bird species richness across the Mesangat Swamp along with observing its trophic guilds, and simultaneously nest recording.

RESEARCH METHODS

The study was conducted in Mesangat swamp in East Kutai, East Kalimantan Province Indonesia (00°31'06"N and 116°41'47"E), with one and half hour away by boat from the nearest village, Kelinjau in Muara Ancalong (FIGURE 1). The swamp is in the wetland between Kelinjau and Kedang Kepala Rivers and is fed by several small

river backflows and inflows. The vast swamp is estimated to be about 8.000 ha, with the main zone in the form of a grassy swamp habitat area of 5.000 ha and open waters covering an area of 3.000 ha. Mesangat swamp has been heavily logged since the 1970s and some of the forests around it were burnt during the forest fires in 1982 - 83 and 1997 - 98. The dry season lasts from May to August, and the rainy season from September to April. The water level in Mesangat varies throughout the year both within and between the seasons⁷.

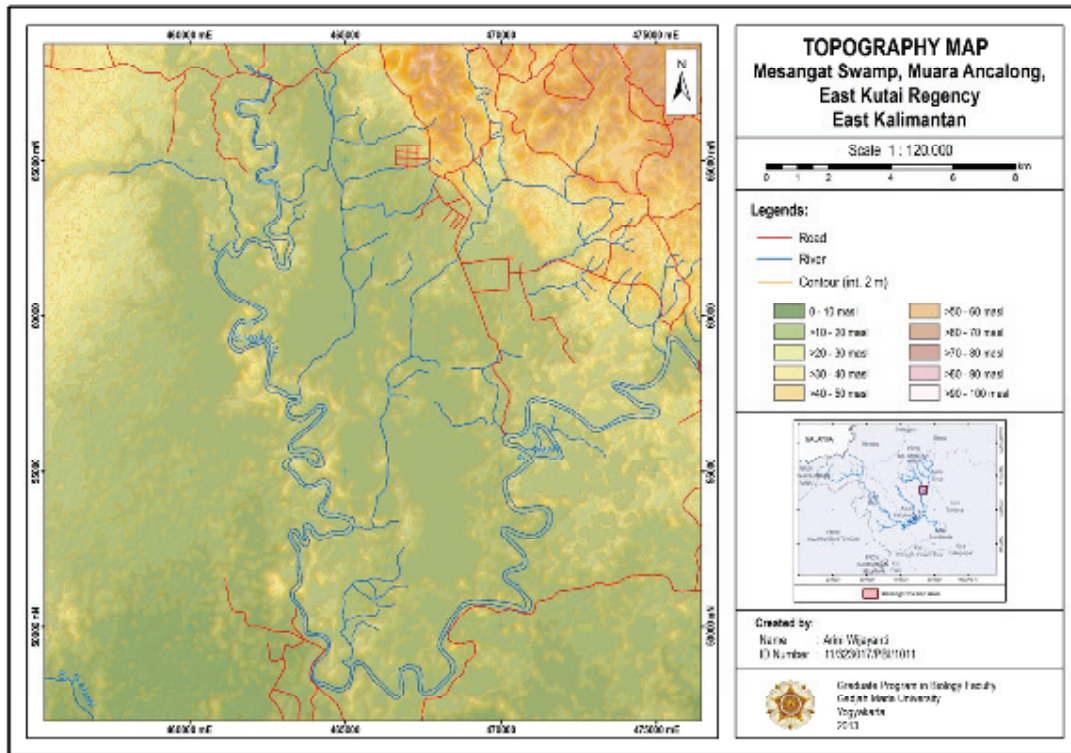


FIGURE 1. Study area

The study was conducted between July and August 2012. Birds were surveyed and observed using visual observations and calls. Data were recorded and logged in a field notebook. Observations were conducted using a pair of 7 x 50 binoculars, GPS, and several type of digital camera. In addition birds were also trapped using mist nets. Bird species were identified using field guides book by Mackinnon [8]. The popular and scientific nomenclature follows the scheme of Birds of the world by Del Hoyo.

RESULT AND DISCUSSION

The research revealed a total of 70 species of birds, belonging to 58 genera across 33 families in 14 orders (TABLE 1). The order with the largest number of species was the passeriformes with 32 species, and the fewest species represented by order were Anseriformes, Ciconiiformes, Gruiformes, Falconiformes, Suliformes, and Psittaciformes with only one species each. Passeriformes is the largest and most diverse bird group with almost 50% of total bird species world-wide.

Of the 70 species identified, only 2 species are listed as vulnerable, 13 species as near threatened, and the remaining 55 species are of least concern in the IUCN. On the other hand, 24 species are identified as protected species and 46 species are considered unprotected according to the Indonesian Government Act (88) No. 7, 1999.

TABLE 1. Bird species found on Mesangat Swamp.

No.	Birds found on Mesangat Swamp			Conservation status	
	Order	Family	Species	Indonesian Government Act	IUCN Red List category
1.	Anseriformes	Anatidae	<i>Dendrocygna arcuata</i>	NP	LC
2.	Pelecaniformes	Ardeidae	<i>Ixobrychus cinnamomeus</i>	NP	LC
3.		Ardeidae	<i>Ardeola speciosa</i>	NP	LC
4.		Ardeidae	<i>Ardea purpurea</i>	NP	LC
5.		Ardeidae	<i>Ardea lba</i>	P	LC
6.		Ardeidae	<i>Bubulcus ibis</i>	P	LC
7.	Ciconiiformes	Ciconiidae	<i>Leptoptilos javanicus</i>	P	V
8.	Columbiformes	Columbidae	<i>Ducula pickeringii</i>	P	V
9.		Columbidae	<i>Streptopelia chinensis</i>	NP	LC
10.		Columbidae	<i>Treron olax</i>	NP	LC
11.	Coraciiformes	Alcedinidae	<i>Alcedo atthis</i>	P	LC
12.		Alcedinidae	<i>Alcedo meninting</i>	P	LC
13.		Alcedinidae	<i>Ceyx erithaca</i>	P	LC
14.		Alcedinidae	<i>Pelargopsis capensis</i>	P	LC
15.		Meropidae	<i>Merops viridis</i>	P	LC
16.	Bucerotiformes	Bucerotidae	<i>Anorrhinus galeritus</i>	P	LC
17.		Bucerotidae	<i>Anthracoceros malayanus</i>	P	NT
18.		Bucerotidae	<i>Anthracoceros albirostris</i>	P	LC
19.		Bucerotidae	<i>Buceros rhinoceros</i>	P	NT
20.	Cuculiformes	Cuculidae	<i>Cacomantis merulinus</i>	NP	LC
21.		Cuculidae	<i>Centropus bengalensis</i>	NP	LC
22.		Cuculidae	<i>Centropus sinensis</i>	NP	LC
23.		Cuculidae	<i>Phaenicophaeus diardi</i>	NP	NT
24.	Accipitriformes	Accipitridae	<i>Haliastur indus</i>	P	LC
25.		Accipitridae	<i>Ictinaetus malayensis</i>	P	LC
26.		Accipitridae	<i>Ichthyophaga humilis</i>	P	NT
27.		Accipitridae	<i>Ichthyophaga ichthyaetus</i>	P	NT
28.	Falconiformes	Falconidae	<i>Microhierax fringillarius</i>	P	LC
29.	Gruiformes	Rallidae	<i>Amaurornis phoenicurus</i>	NP	LC
30.	Passeriformes	Aegithinidae	<i>Aegithina tiphia</i>	NP	LC
31.		Artamidae	<i>Artamus leucorhynchus</i>	NP	LC
32.		Corvidae	<i>Corvus enca</i>	NP	LC
33.		Dicruridae	<i>Dicrurus paradiseus</i>	NP	LC
34.		Estrildidae	<i>Lonchura fuscans</i>	NP	LC
35.		Estrildidae	<i>Lonchura Malacca</i>	NP	LC
36.		Eurylaimidae	<i>Cymbirhynchus macrorhynchus</i>	NP	LC
37.		Eurylaimidae	<i>Eurylaimus ochromalus</i>	NP	NT

TABLE 1. Continued

No.	Birds found on Mesangat Swamp			Conservation status	
	Order	Family	Species	Indonesian Government Act	IUCN Red List category
38.		Hirundinidae	<i>Hirundo tahitica</i>	NP	LC
39.		Monarchidae	<i>Hypothymis azurea</i>	NP	LC
40.		Muscicapidae	<i>Cyornis turcosus</i>	NP	NT
41.		Nectariniidae	<i>Aethopyga siparaja</i>	P	LC
42.		Nectariniidae	<i>Anthreptes singalensis</i>	P	LC
43.		Nectariniidae	<i>Anthreptes malacensis</i>	P	LC
44.		Nectariniidae	<i>Anthreptes simplex</i>	P	LC
45.		Nectariniidae	<i>Arachnothera longirostra</i>	P	LC
46.		Pittidae	<i>Pitta sordida</i>	P	LC
47.		Pycnonotidae	<i>Pycnonotus eutilotus</i>	NP	NT
48.		Pycnonotidae	<i>Pycnonotus goiavier</i>	NP	LC
49.		Pycnonotidae	<i>Pycnonotus plumosus</i>	NP	LC
50.		Rhipiduridae	<i>Rhipidura javanica</i>	P	LC
51.		Sturnidae	<i>Aplonis panayensis</i>	NP	LC
52.		Sturnidae	<i>Gracula religiosa</i>	P	LC
53.		Cysticolidae	<i>Orthotomus ruficeps</i>	NP	LC
54.		Cysticolidae	<i>Orthotomus sericeus</i>	NP	LC
55.		Cysticolidae	<i>Prinia flaviventris</i>	NP	LC
56.		Timaliidae	<i>Macronous gularis</i>	NP	LC
57.		Timaliidae	<i>Malacocincla malaccensis</i>	NP	NT
58.		Timaliidae	<i>Trichastoma rostratum</i>	NP	NT
59.		Timaliidae	<i>Trichastoma bicolor</i>	NP	LC
60.		Turdidae	<i>Copsychus saularis</i>	P	LC
61.		Zosteropidae	<i>Zosterops atricapilla</i>	NP	LC
62.	Suliformes	Anhingidae	<i>Anhinga melanogaster</i>	P	NT
63.	Piciformes	Megalaimidae	<i>Megalaima rafflesii</i>	NP	NT
64.		Picidae	<i>Celeus brachyurus</i>	NP	LC
65.		Picidae	<i>Dendrocopos canicapillus</i>	NP	LC
66.		Picidae	<i>Picoides moluccensis</i>	NP	LC
67.		Picidae	<i>Chrysophlegma miniaceum</i>	NP	LC
68.		Picidae	<i>Picus puniceus</i>	NP	LC
69.		Picidae	<i>Sasia abnormis</i>	NP	LC
70.	Psittaciformes	Psittacidae	<i>Psittacula longicauda</i>	NP	NT

Notes: NP = Not Protected; P = Protected; LC = Least Concern; V = Vulnerable; NT = Near Threatened

The birds listed and protected under the law and the IUCN Red List indicates that these species should receive more attention in order to avoid extinction and habitat degradation that increasingly threatens their survival. Based on TABLE 1, it appears that the vulnerable species according to IUCN are also protected by the government act, but there are species of birds listed as near threatened which are not protected by the government act. On the other hand, some bird species listed as least concern, are protected according to the government act.

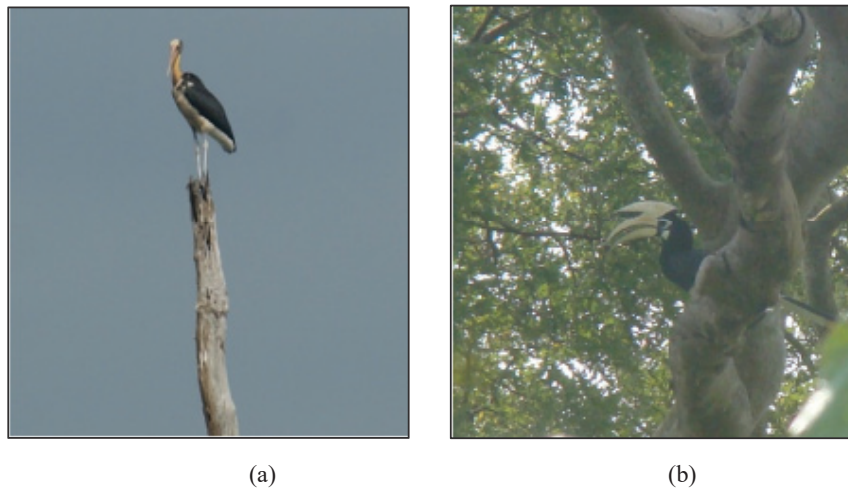


FIGURE 2. Shown bird that found in Mesangat Swamp, (a) Lesser Adjutant (*Leptoptilus javanicus*) (b) Oriental pied Hornbill (*Anthracoceros albirostris*)

Approach of IUCN is more global and tends to lead to a species, in contrast with Indonesian Government Act and Regulation. The protection of bird species under the Act and Regulation is based on family, like Falconidae or Nectarinidae. Family like Falconidae and Accipitridae were listed protected because of their role in the food chain as the highest consumers, while birds of Family Nectarinidae were protected because of their function as pollinators.

The trophic structure shows the birds position in the food chain, and its understanding - in particular the presence or absence of specific guilds – may offer important insights into the conservation status of a given area.

TABLE 2. Bird trophic group

No	Guild	Proportion of species	
		N	(%)
1	Insectivorous	34	48.57
2	Piscivorous	12	17.14
3	Frugivorous	10	14.29
4	Granivorous	4	5.71
5	Nectarivorous	5	7.14
6	Carnivorous	3	4.29
7	Herbivorous	1	1.43
8	Omnivorous	1	1.43
Total		70	100

Based on **TABLE 2**, the percentage of insectivorous species is greatest when compared to other types of birds, e.g. piscivorous or frugivorous. According to Morse [9], as a group, insectivorous birds have various specialties in foraging. This trophic category is often the most abundant and species rich in many different types of habitat, such as Malaysian Peninsular Wetland [10], Amazonian Forest [11] and Atlantic Forest [12].

Piscivorous has the largest percentage after insectivorous birds. As a quite wide freshwater swamp, Mesangat has different types of fish, which is an important diet for aquatic birds, crocodiles and also humans. According to Howes [13], waterbirds in their life cycle is very dependent on the wetland. Waterbirds make wetlands and stands of plants in it either as feeding grounds, or a place to rest. Frugivorous bird species in Mesangat swamp are represented by several species including hornbills and pigeons, where hornbills are already known to play an important role in seed dispersal [2].

Nectarivorous birds, represented by the Nectariniidae Family with five species of birds were recorded during the observation. Nectarivorous birds play an important role in the sustainability of ecosystems, and some nectarivorous bird species are exclusive pollinators for certain plant species. Kato *et al.* [14] research showed that two of the seven species of Zingiberaceae pollination was assisted by Little Spiderhunter (*Arachnothera longirostra*).

Seed eaters are an important key to the primary consumers in almost all ecosystems around the world [15]. On the other hand carnivorous birds play an important role as the highest consumer in Mesangat swamp besides crocodiles. Apart from the small size of the swamp, the number of sightings of raptor species showed that the food resources at all trophic levels are quite abundant [16]. The least diverse feeding groups are the herbivorous and omnivorous, which are represented by only one species each; Wandering Whistling Duck and Slender-billed Crow. As an omnivorous species, Slender-billed Crow believed able to adapt to prevailing conditions and resource availability.

Several nests were found during the research. Some are known to be inactive kingfisher nest, and some other weaver hanging nests of unknown species. Other nests discovered were potentially the Lesser Coucal nest and a colony of Lesser Adjutant nests. Lesser Adjutant is one of a stork species that are known to be vulnerable under the IUCN status and also listed as protected in government act. The presence of 2 vulnerable species with a potential permanent nesting site in Mesangat Swamp, implying it's important for a prospective habitat, especially for birds.

CONCLUSION

This research highlights the important of Mesangat Swamp as a habitat for local avifauna. There were 70 species of birds recorded between July and August of 2012. The discovery of vulnerable bird's nest showed that wetland and forest cover reduction should be avoided to maintain nesting and foraging site for the species and wildlife in general.

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