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Diversity and Threat Hunting of the Birds in the Labian-Leboyan Corridor West Kalimantan

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Abstract

Labian-Leboyan corridor is both lowland and peat swamp forested areas pointed in a strategic location between Betung Kerihun and Danau Sentarum National Park. The area is mostly managed by communities and essential areas for birds. This study is conducted to understand the diversity of birds and the threats in both peat swamp and lowland habitat using the 12 line transects method and direct observation to hunter's place. The study results are 173 bird species identified, 131 species associated with peat swamp forest, and 104 species associated with lowland forest. 108 individuals from 29 species of birds were captured for trade and meat in both habitats. Immediate conservation action is needed to support sustainable resources management of biodiversity, especially birds in the area.

Keywords: birds, labian-leboyan corridor, diversity, hunting

INTRODUCTION

Kalimantan-Indonesia is a habitat for a diversity of bird species. There are 523 species have been recorded living on this island. Most of these species live in the forest, but now their habitat is being threatened by land conversion to non-forest uses. This situation is predicted to reduce population and species diversity (Marchal and Hill, 2009; Mackinnon el al., 2010; Widjaja et al., 2014).

Furthermore, the hunting of birds for meats and as pets is the biggest threat to bird conservation in Kalimantan. The threat of poaching continues to increase, triggering various species of birds to be protected, because their populations are endangered and critically endangered. Such as helmeted hornbill (*Rhinoplax vigil*) of Bucerotidae and Greater Green Leafbird (*Chloropsis sonnerati*) of Chloropseidae (Harrison, 1995; IUCN, 2021). Based on Atlas Burung Indonesia, (2020) singing birds species are more in demand as pets to be contested and being collections due to attractive color and beautiful song. The population of singing birds has drastically decreased in nature due to over-hunting.

The Labian-Leboyan Corridor (LLC) is an imaginary area that is located between two national park areas, namely Betung Kerihun and Danau Sentarum. Habitat characteristics of Betung Kerihun are dominated by the lowland forest of Dipterocarpaceae while Danau Sentarum is dominated by the wetland ecosystem. The Labian-Leboyan Corridor area is unique because it is a mixture of both habitats. In this area, there are lowland forest habitats and peat swamp forest habitats, the resources in these two habitats are different because peat swamp forest is a forest that is always flooded and is located near a large river, while lowland forest is a dry forest and consist

of small rivers. It is interesting to study its biodiversity, especially the diversity of bird species discovered in the two habitats.

A study by Widmann et al., (2012) reported 177 species of resident birds and 16 species of migrant birds in the LLC. However, it is less known about the distribution of the species in the two habitats. Moreover, hunting for birds by communities within the surrounding area is very high and potentially has a negative impact on the bird community. Therefore, it is important to know the current situation regarding the factual threats occurring in the field.

Constructed on this background, a study was conducted that aims to determine the diversity of birds and the threat of hunting in the peat swamp forest habitat and lowland forest in the LLC. The habitat is expected to provide adequate habitat carrying capacity for the bird community and create population connectivity within the areas.

METHOD

Study Area

This research is conducted from March to April 2015, located in LLC, Batang Lupar sub-district, Kapuas Hulu District, West Kalimantan, Indonesia. There are two bird habitats in this area, they are lowland forest and peat swamp forest **Figure 1**.

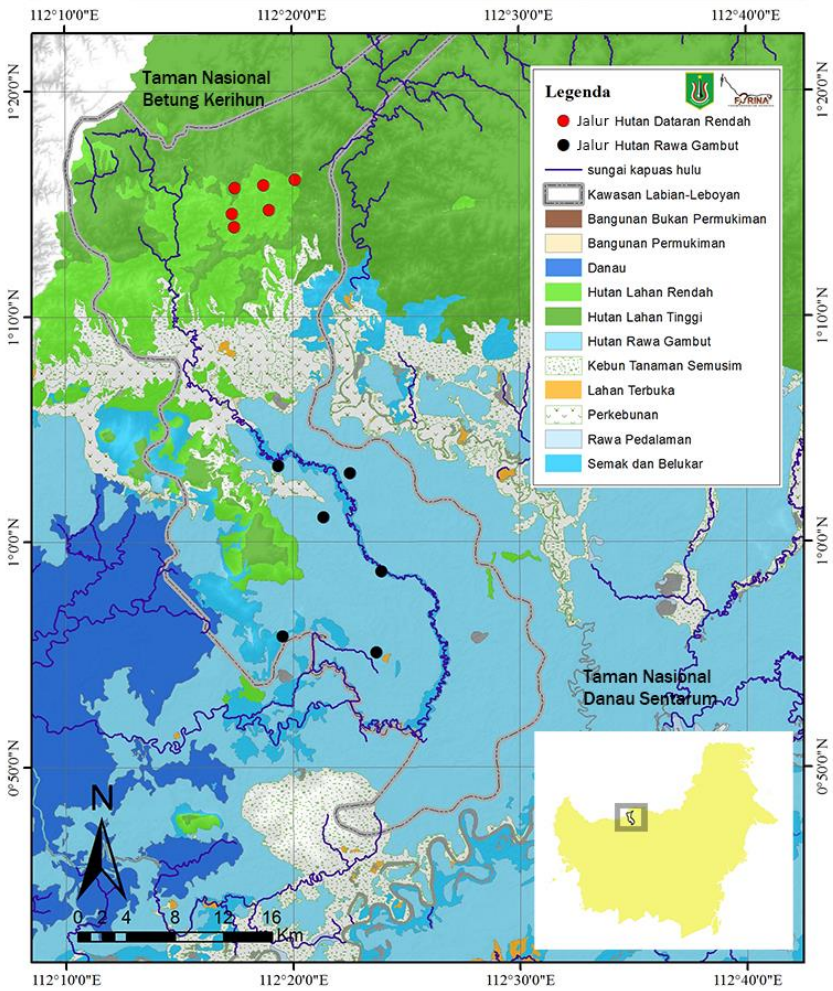

Figure 1. Location of study area ln LLC, Kapus Hulu, West Kalimantan, Indonesia

Data Collection

We use the line transects method based on Bibby et al., (2000). The observation was conducted by walking on 1 km straight lines, and record birds sighted on the left and right sides of the lines. The observation line is grouped into two habitats, they are lowland forest habitat and peat swamp forest habitat, each of them has 6 lines. Walking observation was focused on observing the spot for about 5 minutes to identify bird species using binoculars and a guidebook (Mackinnon et al., 2010). Observation time was started from 07.00 – 17.00 UTC+7. While the bird hunting data collection is conducted by direct and indirect observation to hunter's places.

Data Analysis

The data collection was analyzed and clustered by family, species, protection status, and conservation status. In addition, the status of the bird species protection was determined according to Regulation of the Minister of Environment and Forestry, Republic of Indonesia No. P.106/MENLHK/SETJEN/KUM.1/12/2018 concerning Amendment to Regulation of the Minister of Environment and Forestry No P.20.MENLHK/SETJEN/KUM.1/6/2018 on The Protected Flora and Fauna (MoEF Regulation No. P.106/2018), while the conservation status assigned according to the IUCN (2020) and CITES (2017). Diversity index was analyzed Shannon-Wiener formula to measure H' values (Magurran, 1988). Then, the values are compared between two habitats using the Hutchinson test. Inventory analysis of hunting results between habitats used a similarity index to determine the similarity of the composition of the species being hunted between habitats (Brower et al., 1990).

RESULT

3.1 Composition and Species Diversity

This study identified 173 species of birds, grouped in 47 families in LLC. There are 131 species of 33 families associated with peat swamp habitat and 104 species of 45 families associated with lowland habitat. The richness proportion of family group is variated, in peat swamp forest about 2,22% - 24,44%, while in lowland forest is about 3,03% - 33,33%. The family of Timaliidae has the highest number in both habitats, it has 11 species in each habitat type (**Figure 2**).

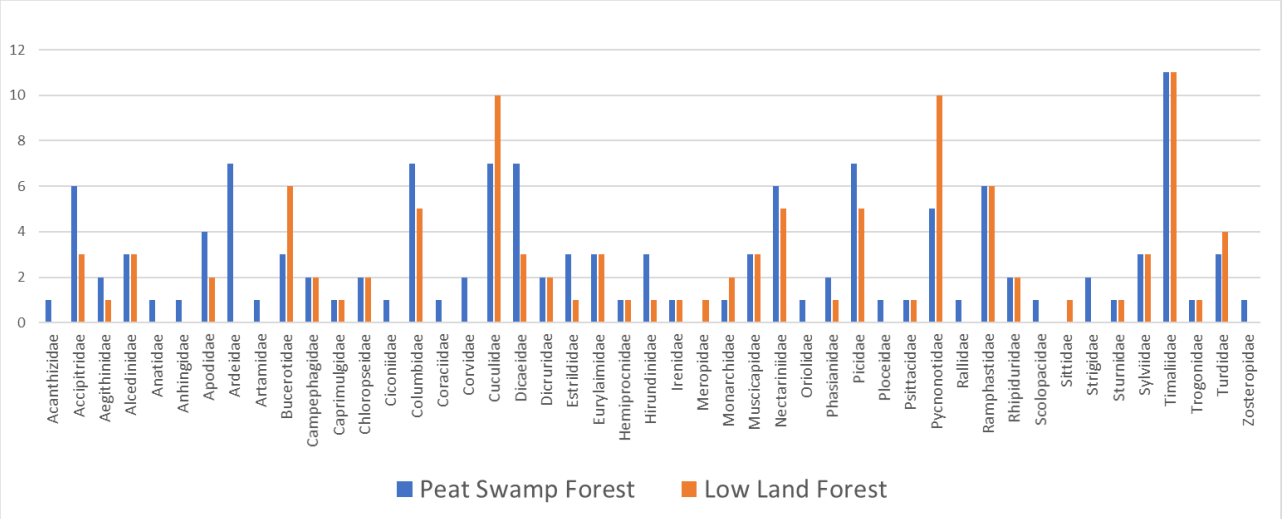

Figure 2. Number of families recorded at different habitat types

This study identified 68 species (39,30%) that were specifically discovered in peat swamp forest, such as Oriental Darter (*Anhinga melanogaster*), Grey Heron (*Ardea cinerea*), Lesser Whistling-duck
(*Dendrocygna javanica*), and Lesser Adjutant (*Leptoptilos javanicus*). Meanwhile, 42 species (24,27%) were only found in lowland forests, for instance, Helmeted Hornbill (*Rhinoplax vigil*), Green Broadbill (*Calyptomena viridis*), Red-bearded Bee-eater (*Nyctyornis amictus*), and Great Argus (*Argusianus argus*).

In terms of threats and protection status, 125 species classified as least concern, 34 species near threatened, 9 species vulnerable, 4 species endangered, and 1 species critically endangered based on International Union for Conservation of Nature (IUCN) red list. There are 28 species listed as protected species based on MoEF Regulation No. P.106/2018. Furthermore, the Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora appendixes, listed Helmeted Hornbill (*Rhinoplax vigil*) in Appendix I, then Great Argus (*Argusianus argus*) and Common Hill Myna (*Gracula religiosa*) at Appendix II.

The diversity of species in the habitat is determined by related factors. It has components that produce vary of feedback for physical and geographical factors (Odum, 1993). Peat swamp habitat habitats have an H' value of 3.81 and lowland forest habitats have H' value of 3.56. The species diversity index in both habitats shows that the species diversity is relatively high (Magurran, 1988). The Hutchinson test shows that $t_{hit} > t_{tabel}$ (2,11>1,64).

3.2 Threat of Hunting

This research listed 29 species of 12 families (108 individuals) that were captured by hunters in LLC area. There are 7 species of 14 individuals captured in peat swamp forest, and 26 species of 94 individuals captured in lowland forest.

The similarity index of captured bird species between both peat swamp and lowland forest that has IS value less than 50%, is about 24,24 %. It is shown that bird species captured in the two habitats are relatively different species. The family of Pycnonotidae members is the most frequently captured, it consists of 8 species listed (31%). Moreover, 43% of the listed species of Ardeidae is captured in peat swamp forest (**Figure 3**)

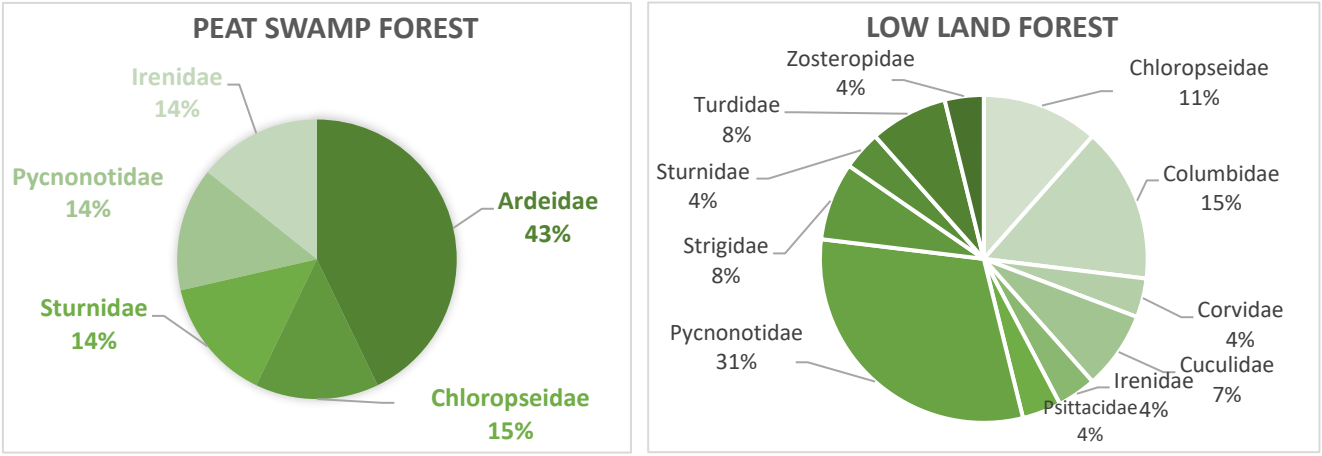

Figure 3. Percentage of families recorded at different habitat types

Of the captured bird species in LLC, Greater Green Leafbird (*Chloropsis sonnerati*) is the highest number of individually captured. There were 26 individuals were captured from lowland habitats during the study conducted. While in the peat swamp forest is 4 individuals of Little Egret (*Egretta garzetta*) were captured.

DISCUSSION

The LLC area has both connected and remaining peat swamp forest and lowland forest in West Kalimantan by high bird species diversity. It is proven by the high diversity index value in both habitats.

This area is a habitat for protected and threatened bird species. For example, seven species of birds from the Bucerotidae family were found, from eight species that ever lived in Borneo. Include Critically endangered Helmeted hornbill (*Rhinoplax vigil)* and endangered species of White-crowned hornbill (*Berenicornis comatus*). Hadiprakarsa (2020) despite nearly 100 years of protected status, the condition of the hornbill population and habitat in Indonesia continues to be under pressure. In addition to forest loss that continues to threaten the habitat of hornbills in Indonesia, the threat of hunting also has a fatal impact on their populations in nature. Casque hornbill is often used as a decorative ornament and the meat is an alternative source of protein.

Hutchinson's test shows that there is a difference between peat swamp forest habitat and lowland forest habitat. The H' value in the peat swamp forest habitat was higher than in the lowland forest. This fact shows that the peat swamp forest habitat in LLC provides better habitat carrying capacity for more bird species. Tropical peat swamp forest is a unique wetland ecosystem and one of the richest biodiversity values. Peat swamp forest habitat is a combination of peat swamps, rivers, and lakes that have abundant potential sources of food for birds with fruit trees and various species of aquatic biota such as fish, shrimp, crabs, mollusks, and other invertebrates (Anderson, 1983; Barchia, 2006). Bird diversity is influenced by variations in plant species, flower diversity, feed types, and supporting habitats. The availability of food sources is a key factor that directly affects the structure of the bird community (Oktiana & Antono, 2015; Praptiwi, 2019)

According to Mackinnon K (2000), Flooded swamp forests and open swamps are breeding grounds for various types of freshwater fish that move between swamp, lake, and river habitats. This area is a feeding ground for waterbird species and is an important breeding ground for waterbirds such as herons, herons, and pecuk. Rivers and lakes also form transitional areas (ecotones). This habitat, therefore, supports maintaining the rich diversity of bird species (Hernowo *et al*., 1991). Peat swamp forest is an essential habitat of Lesser Adjutant (*Leptoptilos javanicus*), Greater Green Leafbird (*Chloropsis sonnerati*), and Black Partridge (*Melanoperdix nigra*), that classified as vulnerable and endangered (IUCN, 2021)

The bird community in LLC is under pressure from poaching. Communities around the peat swamp forest habitat do hunting to be consumed and meeting alternative protein. Almost half of the members of the Ardeidae tribe are hunted. The Ardeidae are a group of waterbird species that have large bodies and live in groups, so they are easy to hunt and have quite a lot of meat.

Meanwhile, the community around the lowland forest is hunting for trade. Bird families that are hunted are more varied, and mostly targeted at singing birds such as

Pycnonotidae, Chloropseidae, and Turdidae. The Pycnonotidae is a bird family that has a loud and melodious voice, so it is in demand by the market. Greater Green Leafbird (*Chloropsis sonnerati*) from the Chloropseidae, Oriental Magpie Robin (*Copsychus saularis*), and White-rumped Shama (*Copsychus malabaricus*) from the Turdidae which are also targeted by hunters in this area. Rentschlar (2018) reported that there was a very high increase in trading value in the bird market in all provinces in Kalimantan. The types of birds that have decreased are the singing birds or birds with beautiful color patterns. According to (Haryanta et al, 2011) the facts show that more than 80% of the animals traded in the Indonesian bird market come from capture in the wild. This condition can trigger the phenomenon of empty forest syndrome, which is a term in which a forest is devoid of content because the animals have been hunted out.

This study proves that LLC is an important bird habitat on Kalimantan that must be sustainably managed. The threat of hunting for a bird in this area could reduce bird populations. Thus, multi-stakeholder conservation efforts are needed as well as efforts to fulfill alternative income for the communities and hunters. The development of avitourism in tourism activity packages could be one of the solutions. According to Dalem et al., (2014) birds are one component of the ecosystem that can be used as a source of ecotourism attraction. This is related to several factors, such as beautiful appearance, voice, or attractive behavior. Through the development of ecotourism, birds could be preserved in nature, provide alternative economic benefits to the communities, and can provide education about their role in the ecosystem.

CONCLUSION

Birds at LLC have listed 173 species, 131 species associated with peat swamp forest, and 104 species associated with lowland forest. There is a threat of hunting birds in the Labian-Leboyan Corridor area as many as 108 individuals from 29 species of birds captured. Communities around the peat swamp forest habitat do hunting to be consumed, while people living around lowland forests hunt for trade. Conservation efforts are needed in the Labian-Leboyan Corridor area to minimize the threat of hunting and find alternative livelihoods for hunters such as developing avitourism in the area.

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