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DISTRIBUTION OF HORNBILLS IN WESTERN SARAWAK AND THE WAY FORWARD FOR THEIR CONSERVATION IN SARAWAK

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ABSTRACT

There are eight species of hornbills in Borneo. However, little is known on their distribution and ecology in western Sarawak. Their large size requires habitats that consist of large forest patch with large fruiting trees for feeding and nesting. They have an important ecological niche as seed dispersers throughout the tropical rainforests of South East Asia. This study briefly describes the distribution of hornbills in Totally Protected Areas (TPA) within western Sarawak based on data collected by Sarawak Forestry Corporation from 2013–2016. We discuss the hornbill species distribution and the species area relationship within western Sarawak. The Rhinoceros Hornbill (*Buceros rhinoceros*) recorded the highest occupancy value (psi) and probability of detection (p), followed by the Black Hornbill (*Anthracoceros malayanus*) and the Bushy-crested Hornbills (*Anorrhinus galeritus*). The Helmeted Hornbills (*Rhinoplax vigil*) appears to occur in fewer TPA within western Sarawak. A long-term conservation plan is required to ensure the sustainability of the hornbill population through extending protected areas and connecting forest patches. In light of this, the research and conservation needs for these species in Sarawak are highlighted to ensure their long-term survival in the wild.

Keywords: Bucerotidae, Distribution, Ecology, Totally Protected Areas, western Sarawak

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There are eight species of hornbills in Borneo. However, little is known on their distribution and ecology in western Sarawak. Their large size requires habitats that consist of large forest patch with large fruiting trees for feeding and nesting. They have an important ecological niche as seed dispersers throughout the tropical rainforests of South East Asia. This study briefly describes the distribution of hornbills in Totally Protected Areas (TPA) within western Sarawak based on data collected by Sarawak Forestry Corporation from 2013–2016. We discuss the hornbill species distribution and the species area relationship within western Sarawak. The Rhinoceros Hornbill (*Buceros rhinoceros*) recorded the highest occupancy value (psi) and probability of detection (p), followed by the Black Hornbill (*Anthracoceros malayanus*) and the Bushy-crested Hornbills (*Anorrhinus galeritus*). The Helmeted Hornbills (*Rhinoplax vigil*) appears to occur in fewer TPA within western Sarawak. A long-term conservation plan is required to ensure the sustainability of the hornbill population through extending protected areas and connecting forest patches. In light of this, the research and conservation needs for these species in Sarawak are highlighted to ensure their long-term survival in the wild.

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INTRODUCTION

Hornbills from the family Bucerotidae are generally large in size and their habitat consists of large forest patch with large fruiting trees for feeding and nesting. There are eight species of hornbills in Borneo and they are regarded as important in socio cultural and socio politics aspect

in Sarawak (Bennett *et al.* 1997). The eight species include the Rhinoceros Hornbill (*Buceros rhinoceros*), Helmeted Hornbill (*Rhinoplax vigil*), Black Hornbill (*Anthracoceros malayanus*), Bushy-crested Hornbill (*Anorrhinus galeritus*), White-crowned Hornbill (*Berenicornis comatus*), Wrinkled Hornbill (*Aceros corrugatus*), Wreathed Hornbill (*Rhyticeros undulatus*), and the Oriental Pied Hornbill (*Anthracoceros albirostris*). Hornbills have an important ecological niche as their movement between disturbed and primary forest habitat may develop regeneration of disturbed areas if they are carrying viable seeds (Anggraini *et al.* 2000). Apart from dispersing seeds of most of the large fruiting trees in the forest, due to their large sizes, hornbills also act as useful indicators of forest condition and human disturbance as their habitat preference is of non-fragmented forest and forest with large fruiting trees for their feeding and nesting habits (Gale & Thongaree 2006).

Meijaard *et al.* (2005) stated that the effectiveness of larger area to support higher species richness is further explained by the relationship between the presence of nesting sites and the size of a habitat area. Therefore, reduction in nesting sites is a huge limiting factor in the distribution of hornbills as they require large tree holes situated in living trees, mostly the ones that are affected by heart rot or fungal species that produce wound in the tree (Meijaard *et al.* 2005). Forest size, habitat structure, and the abundance and distribution of food resources have been proven to strongly impact the density and dependency of Asian hornbills (Poonswad & Kemp 1993).

The major threats faced by hornbills are illegal hunting and habitat changes due to fragmentation caused by logging activities (Bennett *et al.* 1997; Poonswad *et al.* 2005). For the past few years, deforestations occur rapidly throughout Sarawak forests (Mohd-Azlan & Lawes 2012), where most of the areas outside of a TPA have the tendency to be logging concessions or oil palm plantations. Conversion of forest to an alternated permanent non-forested land use such as agricultural area, urban development (van Kooten & Bulte 2000) and construction of dams and planted forest is relatively common in Sarawak. Therefore, understanding the effects of such habitat change on distribution and abundance patterns of hornbills is a requirement for planning and enhancing their conservation (Raman & Mudappa 2003).

Area is an important factor affecting species richness due to its association with habitat diversity. Variety of habitats is believed to allow species that are only found in specific habitat to occur in large areas and also allows species