

Viewable Wildlife Species along Sungai Haji Kuning in Sebatik Island, Sabah

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ABSTRACT Preliminary assessment was conducted to determine wildlife species that could be sighted along Sungai Haji Kuning in Sebatik Island. Opportunistic sampling was conducted along Sungai Haji Kuning at August 6, 2018, through boat survey. Nine wildlife species were encountered within midstream and downstream regions, in which Long-tailed Macaque was encountered most frequently, followed by Brahminy Kite and the endangered Proboscis Monkey. The near-threatened Oriental Darter, vulnerable Bearded Pig and migratory Chinese Egret were viewable along this river as well. Shannon and Simpson Diversity Indices obtained in present study indicated that this riverine habitat housed rich and evenly-distributed wildlife diversity. Hence, riverine mangrove of Sungai Haji Kuning is important to the survival of both resident and migratory wildlife species, and then high viewing success of proboscis monkey for a long duration further emphasizes its potential for future river-cruising wildlife-watching opportunity.

KEYWORDS: Sebatik Island; Sungai Haji Kuning; Wildlife-Watching; Riverine Habitat; and River-Cruising

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SHORT REPORT

Wildlife-watching through river cruising is popular among international tourists, which leads to the proliferation of Lower Kinabatangan River as a renowned river-cruising-based wildlife-watching destination in Sabah (Newsome *et al.*, 2017). This is because a wide range of wildlife species that are endemic to Borneo can be sighted roaming freely when cruising along this riverine forest (Reynolds & Braithwaite, 2001; and Goossens & Ambu, 2012), especially Proboscis Monkey (*Nasalis larvatus*), Asian Elephant (*Elephas maximus*), and Orang-utan (*Pongo pygmaeus*). At the same time, this riverine habitat is inhabited by a wide range of avian, reptilian and amphibian species as well (Boonratana & Sharma, 1997; and Gillespie *et al.*, 2012), henceforth it is regarded as favourable for tourists to view free-roaming wildlife by river cruising (Newsome *et al.*, 2017). Coincidentally, Sungai Haji Kuning at the Northern part of Sebatik Island is surrounded by a thick mangrove forest, where the presences of wildlife can be detected along this riverine habitat. Reynolds and Braithwaite (2001) highlighted that a natural open habitat that allowed high viewing successes of wildlife individuals to observers were considered ideal for wildlife-watching. Nevertheless, feasibility of Sungai Haji Kuning for wildlife-watching has yet been examined by past researchers at this moment, in term of wildlife availability. Therefore, a preliminary assessment was conducted to determine wildlife species that were viewable along the riverine habitat of Sungai Haji Kuning in Sebatik Island of Tawau, Sabah.

On August 6, 2018, researchers from Small Island Research Centre (SIRC) visited to Sungai Haji Kuning in the Northern region of Sebatik Island, which was located within the Malaysia border. Oil palm trees are planted around the village and along the riverbanks at upstream region (1.0 km), and then local community mainly depend on water transportations to travel around Sebatik Island and to Tawau town, because the existing road system in Sungai Haji Kuning Village is connected to its Southern counterpart in Indonesia. From downstream to midstream (2.5 km), Sungai Haji Kuning is surrounded by thick mangrove forest, where wildlife individuals can be sighted along this riverine habitat. **Figure 1** illustrates the location of Sungai Haji Kuning in Sebatik Island of Tawau, Sabah.

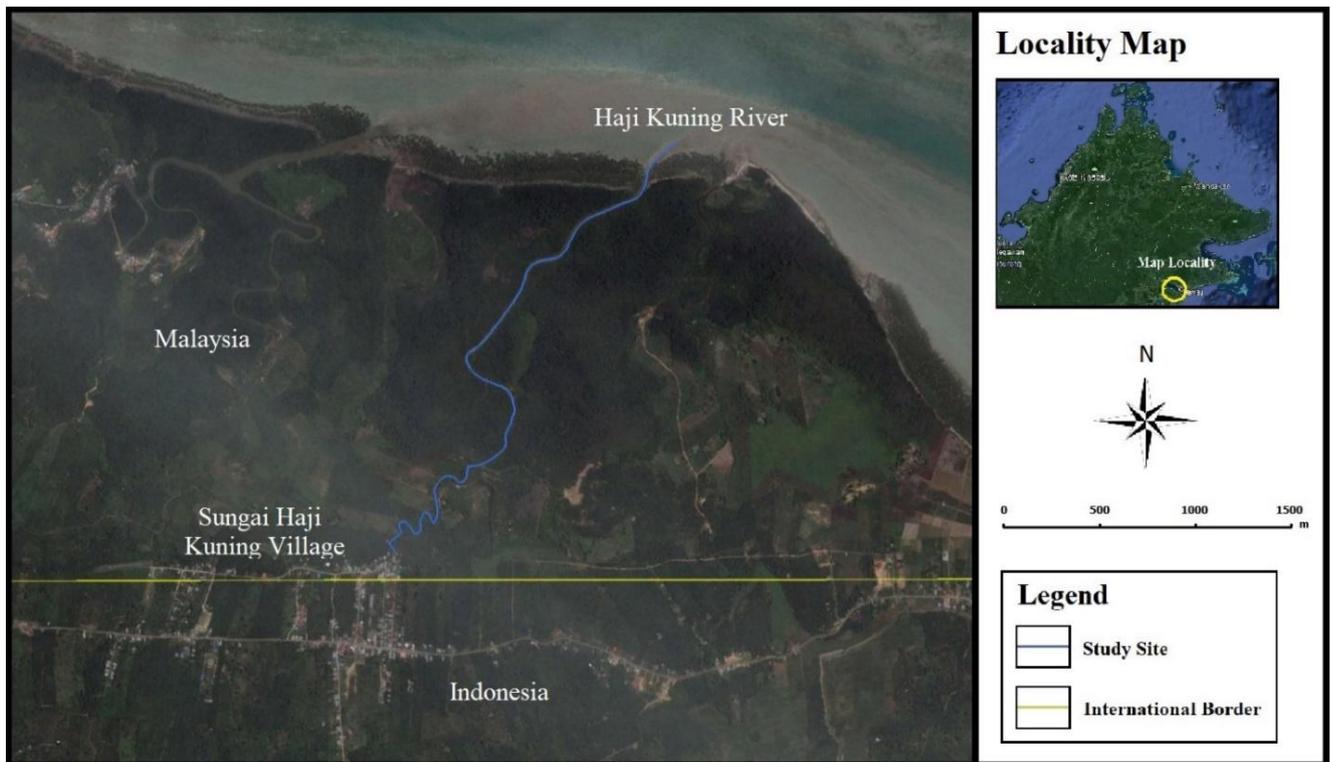


Figure 1. Location of Sungai Haji Kuning in Sebatik Island of Tawau, Sabah.

Opportunistic sampling was conducted along Sungai Haji Kuning in Sebatik Island. Round-trip boat survey was conducted at daytime along this river, with a total of 7.0 km was travelled (3.5 km per trip from river mouth to Sungai Haji Kuning Village) within a single day. Number of individual, species and sighted location of each sighted wildlife were determined and recorded directly at field. Mammal species were identified based on the field guide written by Phillipps and Phillipps (2018), while avifauna and reptilian species were identified using the field guides of Francis (2007) and Das (2010) respectively. IUCN Red List status was identified by referring to the online database of IUCN Red List of Threatened Species for the sighted wildlife species-in-interest (2019). Encounter rate (ER) was estimated, in individual per kilometer (indiv. km^{-1}), as physical availability of wildlife species for sighting along Sungai Haji Kuning (Arbieu *et al.*, 2017). Shannon (H') and Simpson (D) Diversity Indices were applied to estimate the diversity richness and evenness of sighted wildlife respectively (Magurran, 2004), and then differences in ratio of sighted wildlife individual across different IUCN status and species were determined using chi-squared test. Statistical software PAST ver. 3.25 was employed to compute above mentioned analyses (Hammer *et al.*, 2001).

Within a single day, nine wildlife species were sighted at midstream to downstream regions (2.5 km), while no sign of wildlife was detected at upstream region, especially when close to the village and riverside oil palm plantation (1.0 km). Oil palm plantation can only provide limited foods and shelters for sustaining low variation and abundance of wildlife species at a time, when compared to riverine habitat (Boonratana & Sharma, 1997; Gillespie *et al.*, 2012; Wearn *et al.*, 2017). Then, a majority of the sighted riverine species were categorized as "Least Concern" ($n = 16$; $\chi = 88.5$, $df = 8$, $p < 0.01$), such as Long-tailed Macaque (*Macaca fascicularis*), Saltwater Crocodile (*Crocodylus porosus*), Brahminy Kite (*Haliastur indus*), Great Egret (*Ardea alba*), and Dusky-grey Heron (*Ardea sumatrana*), which could be explained by their existing large and stable population sizes in this riverine habitat (Ong & Richardson, 2008; BirdLife International, 2016b, 2016c & 2016e; IUCN, 2019).

The encountering of near-threatened Oriental Darter (*Anhinga melanogaster*), vulnerable Bearded Pig (*Sus barbatus*), vulnerable migratory Chinese Egret (*Egretta eulophotes*), and endangered Proboscis Monkey (*Nasalis larvatus*) highlighted that Sungai Haji Kuning was important to the survival of these threatened wildlife species (Boonratana & Sharma, 1997; Meijaard *et al.*, 2008; BirdLife International, 2016a & 2016d; and Luskin *et al.*, 2017). Moreover, migratory bird species can be very particular in selecting their seasonal breeding sites during migration periods (Mojiol *et al.*, 2011), and then the conversion of riverine mangrove habitat to oil palm plantation can diminish the existing habitat and local population of Proboscis Monkey, which can subsequently increase its local extinction risk as well (Matsuda *et al.*, 2018). **Table 1** displays the list of wildlife species that are observed along the riverine habitat of Sungai Haji Kuning through boat survey.

Table 1. List of wildlife species observed at the riverine habitat during boat survey.

Class	Family	Scientific Name	Common Name	n	IUCN Red List	ER (indiv. km ⁻¹)
Mammalia	Cercopithecidae	<i>Nasalis larvatus</i>	Proboscis Monkey	3	EN	0.429
		<i>Macaca fascicularis</i>	Long-tailed Macaque	9	LC	1.286
	Suidae	<i>Sus barbatus</i>	Bearded Pig	1	VU	0.143
Reptilia	Crocodylidae	<i>Crocodylus porosus</i>	Saltwater Crocodile	1	LC	0.143
Aves	Ardeidae	<i>Ardea alba</i>	Great Egret	1	LC	0.143
		<i>Egretta eulophotes</i>	Chinese Egret	1	VU	0.143
		<i>Ardea sumatrana</i>	Dusky-grey Heron	1	LC	0.143
	Accipitridae	<i>Haliastur indus</i>	Brahminy Kite	4	LC	0.571
	Anhingidae	<i>Anhinga melanogaster</i>	Oriental Darter	1	NT	0.143

*Note: n = number of individual, IUCN = International Union of Conservation for Nature, ER = Encounter Rate, indiv. = individual, km = kilometre, LC = Least Concern, NT = Near Threatened, VU = Vulnerable, EN = Endangered.

Among the nine recorded species, Long-tailed Macaque was encountered most frequently (n = 9), followed by Brahminy Kite (n = 4) and Proboscis Monkey (n = 3), while the remaining six species were equally least sighted along this riverine habitat during boat survey (n = 1). Hence, Long-tailed Macaque was expected to be sighted for every 0.78 km travelled (ER = 1.286 indiv. km⁻¹), whereas Brahminy Kite and Proboscis Monkey were viewable for every 1.75 km (ER = 0.571 indiv. km⁻¹) and 2.3 km (ER = 0.429 indiv. km⁻¹) distance travelled respectively along this riverine habitat. Sightings of the remaining six wildlife species were estimated to take approximately 22.0 km travelling distance for encountering a single individual respectively (ER = 0.0455 indiv. km⁻¹). In a nutshell, individual number sighted for each recorded wildlife species were determined to be significantly different ($\chi = 23.8$, $df = 8$, $p < 0.01$), in which the Long-tailed Macaque, Brahminy Kite and Proboscis Monkey were identified as top 3 species that could be encountered frequently during river-cruising along Sungai Haji Kuning. Wildlife tourists highly preferred to visit natural open habitats that allow clear-viewing of many different unique, rare, endangered, and endemic wildlife individuals at daytime (Reynolds & Braithwaite, 2001). Since that this riverine habitat is home to various threatened species, especially the endangered Proboscis Monkey that can be easily encountered under a long duration before they escape from human sights, hence this riverine habitat should be conserved for future river-cruising-based wildlife-watching opportunity.

Present study obtained values of 1.790 and 0.1948 for Shannon and Simpson Diversity Indices respectively, which indicated the presence of rich and evenly-distributed wildlife diversity along the riverine habitat of Sungai Haji Kuning. An undisturbed natural forest was described by Magurran

(2004) to house rich wildlife diversity, with H' -value ranged from 1.5 to 3.5 using Shannon Diversity Index. By comparing the present finding with that of Magurran (2004), riverine mangrove habitat of Sungai Haji Kuning is comprised of rich and evenly-distributed wildlife diversity that resemble an undisturbed natural forest ($H' = 1.790$; $D = 0.1948$). Then, the nine recorded wildlife species in this study can be sighted at Lower Kinabatangan River as well (Boonratana & Sharma, 1997). Similarities in species composition between these two rivers indicate that there are more wildlife species waiting to be discovered along the riverine habitat of Sungai Haji Kuning. Long story short, midstream to downstream regions of Sungai Haji Kuning should be conserved to maintain physical availability of these nine recorded species for future river-cruising wildlife-watching opportunity. Not only that both riverine wildlife and habitat conservations can be sustained in long-term through this tourism activity, but also generate job opportunities and steady incomes to its surrounding local community (Newsome *et al.*, 2017).

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