

*Life from Headwaters to the Coast*

# **SAMUNSAM**

**Wilderness Rediscovered**

*Edited by*

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# AMPHIBIANS AND REPTILES

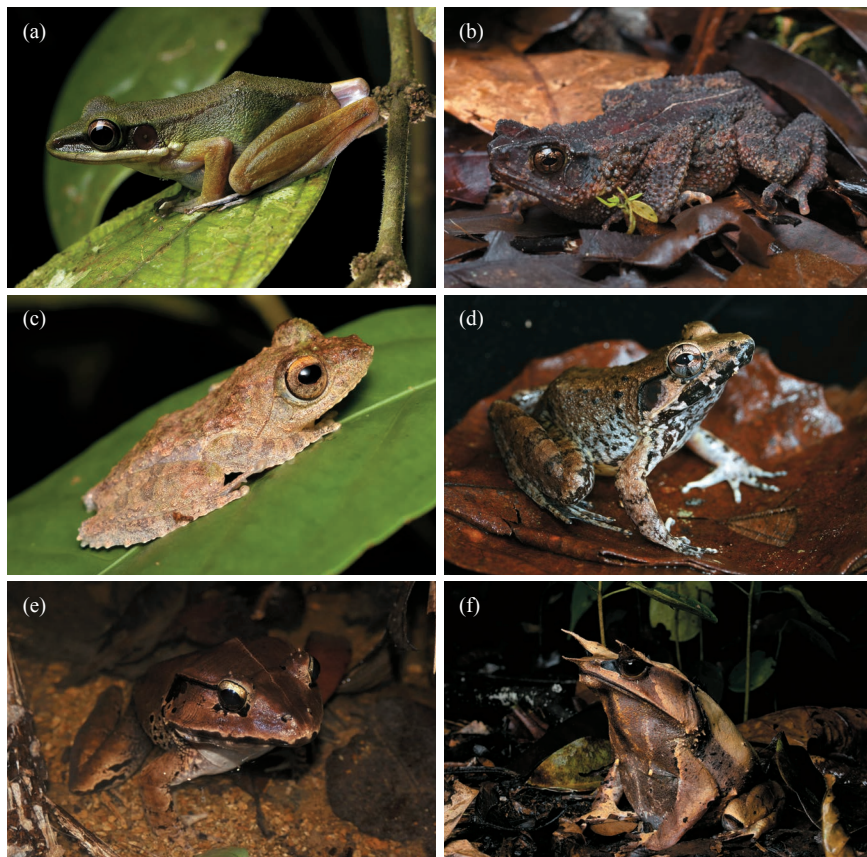
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Samunsam Wildlife Sanctuary is located in the western part of Sarawak, and is reportedly the first Sanctuary in the State, being gazetted in 1979. It encompasses an area of around 69 sq km, that stretches from the international border with Kalimantan Barat, Indonesia, to the coast. The original intention of the gazettelement was the protection of the Proboscis Monkey (*Nasalis larvatus*) and its habitat. However, significant population of the Saltwater Crocodile (*Crocodylus porosus*) and the Painted Terrapin (*Batagur borneoensis*) have been reported from the coastal portion of the region.

The original area gazetted as a Wildlife Sanctuary is located on an essentially flat, undulating terrain, comprising swamps vegetated by mangrove forests, that grade into lowland rainforest landwards, that includes representatives of riverine forest, Bornean heath (Kerangas) and some mixed dipterocarp forests. The annex to the Sanctuary, made possible by the inclusion of area across the Trans-Borneo Highway (also referred to as Pan-Borneo Highway or Asian Highway 150), comprises small swampy areas at the foothills of steep hill dipterocarp forests.

Despite its geographical proximity to Kuching, there remains a general lack of understanding of the biodiversity of Samunsam. Reasons include till recent difficulties in accessing the area, lack of freshwater to permit residence in order to conduct inventories and the nature of the habitats themselves (including mangrove swamps). Consequently, only a few groups have been studied in any detail, including the smaller mammals (Khan, 2017), hornbills (Rubis, 2001), termites (Jamil *et al.*, 2017) and dragonflies and damselflies (Dow, 2016). There appears to have been no inventories of the herpetofauna of the area, apart from several species mentioned in a general guide to the Sanctuary (Hazebroek and Kasim, 2000).

The current report describes the results of a rapid (eight-day) biodiversity assessment to collect data on the occurrence and abundance of amphibians and reptiles of Samunsam Wildlife Sanctuary and adjacent areas of western Sarawak, through field observations and collections. The primary objectives are to evaluate species richness of herpetofauna at the study site as well as understand the importance of the Sanctuary as a reservoir of the fauna vis-à-vis the IUCN Red List.



**Fig. 1.** (a) *Hylarana raniceps*. Photo: Veronica Leah; (b) *Ingerophrynus quadriporcatus*. Photo: Wong Jye Wen; (c) *Kurixalus chaseni*. Photo: Wong Jye Wen; (d) *Limnonectes paramacrodon*. Photo: Indraneil Das; (e) *Limnonectes malesianus*. Photo: Wong Jye Wen; (f) *Megophrys nasuta*. Photo: Wong Jye Wen.

The distributional and ecological data generated are expected to be of value for activities such as land-use planning, conservation of particular taxa and for the use of species in understanding ecological processes. It will also be useful for basing regional Red Lists and for understanding the conservation and management requirements of individual species, and important for management planning activities for the Wildlife Sanctuary.

Data were gathered through field work (3–7 September and 26–31 October 2019). We made observations along transects as well as via boat and road cruising, at the area centred around the Sanctuary Headquarters (in

September 2019) and in the annex of the Sanctuary, across the Trans-Borneo Highway, along the northern slopes of the Pueh massif (in October 2019). For all individual frogs and reptiles encountered, the following data were collected from the mangrove forests, lowland hill dipterocarp forests, grassy verges, and rural, built-up areas, with tarred roads: location (using a handheld Global Positioning System; Garmin GPSMap62s), species, behaviour, habitat association, and any other detail. Field technique included standard methods employed for herpetofaunal studies worldwide for similar rapid-techniques (as mentioned in McDiarmid *et al.*, 2012): observations along transects (= ‘visual encounter surveys, involving 3–5 people covering trails at all times of the day, and particularly during dusk, after evening showers), pitfall and adhesive trapping, as well as boat and road cruising.

A total of 26 reptile species and 15 amphibian species were recorded from the site (see Checklist). An overall impression of the fauna is that it represents the coastal and lowland forest south-east Asian herpetofauna, including a few mangrove species, the rest comprising human commensals that have invaded areas of disturbance in the proximity.

How important is the herpetofaunal assemblage from a conservation perspective? We apply the current (version 2021–1) of the IUCN Red List to the known fauna, to determine which species are protected in Samunsam Wildlife Sanctuary. A major caveat here is that the known fauna is primarily the result of a rapid survey (an additional species, the Bornean Green Keeled Pit Viper, *Tropidolaemus subannulatus*, not encountered by us was reported by Hazebroek and Kasim, 2000). The global conservation list too is not without limitations, as 11 of the 40 species (nine reptiles and two amphibian species) are in the ‘Not Evaluated’ list. Although these are supposedly the widespread, often common species, recent data on a few such groups suggest the existence of cryptic species (sensu Bickford *et al.*, 2007), and future systematic work- genetic, acoustic and morphological- has the potential of recognising additional species within these complexes, each with smaller ranges and habitat requirements, adding to the conservation burden.

In terms of conservation value, the most important herpetofaunal species recorded was the Painted Terrapin (*Batagur borneoensis*). The species is listed as ‘Critically Endangered’ in the IUCN Red List, and was previously a subject of an *ex-situ* conservation programme in the region. It is known to be associated with the mangrove tree of the genus *Sonneratia* (Moll, 1985; Guntoro 2012). A species known from Samunsam is the Bornean Earless Monitor (*Lanthanotus borneensis*), recorded from the Park Headquarters based on a black-and-white print photograph from the 1960s. Although not evaluated by the IUCN, the species is listed as “Totally Protected” by

the wildlife laws of Sarawak. Three amphibian species are recorded in the Near Threatened category, including the Long-fingered Stream Toad, *Ansonia longidigita*, the Malaysian River Frog, *Limnonectes malesianus* and the Masked Frog, *Limnonectes paramacrodon*. All are obligates of lowland forests, a threatened landscape from logging and other forms of habitat loss on Borneo.

A major portion of the species encountered—10 amphibians and 15 reptiles are classified as ‘Least Concern’. Several are lowland forest obligates, especially those that are restricted or have life histories centred around rocky mountain streams (including the Brooke’s Water Skink, *Tropidophorus brookei*), yet, the substantial area they occupy across Borneo (and in many species, beyond) are thought to be the rationale for not including them in a higher threat class.

As mentioned before, these inventories are necessarily preliminary, and additional species are predicted (based on availability of habitat), particularly those known from nearby areas such as Tanjung Datu and Gunung Gading (see inventories in Das *et al.*, 2015, 2017).



**Fig. 2.** *Crocodylus porosus*. Photo: Indraneil Das; (b) *Batagur borneoensis*. Photo: Indraneil Das; (c) *Aeluroscalabotes felinus*. Photo: Wong Jye Wen; (d) *Cnemaspis kendallii*. Photo: Indraneil Das.



The herpetofauna at the site is those typically encountered in mangrove and lowland hill dipterocarp forest sites of south-east Asia. Disturbance, at the edges have added to the biodiversity, with the arrival of human commensal species of geckos, such as the Common Asian Toad, *Duttaphrynus melanostictus*, the Asian House Gecko, *Hemidactylus frenatus* and the Flat-tailed Gecko, *H. platyurus*.

The Saltwater Crocodile, *Crocodylus porosus* has been recorded previously from the site (Hazebroek and Abang Kasim 2000) and several were observed during these surveys (see Checklist), comprising hatchlings and subadults.

Finally, the species recorded were based on two short-term sampling sessions using RBI techniques. Long-term sampling has the potential to increase the species inventory of herpetofauna of Samunsam significantly, taking into account the rarity of certain groups (such as snakes and caecilians) and the cryptic lifestyles of several lizard and snake groups, and the restricted breeding activities of the amphibians. It has been said before that completing a species inventory for tropical herpetofaunas may take a person's entire life (Das, 1996). Finally, life history studies need to be conducted on these species, especially those that are endemic to Borneo or in any form restricted or recognised as being under threat of extinction.

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## Checklist of Amphibians and Reptiles

Checklist of amphibians and reptiles of Samunsam Wildlife Sanctuary, Sarawak (current 6 April 2020), as recorded during a rapid assessment of the fauna in October to November 2019. The list is necessarily preliminary, and additional species are expected when long-term sampling of the herpetofauna is conducted. Abbreviations for IUCN Red List (version 2021–1) include: CR = Critically Endangered; LC = Least Concern; NE = Not Evaluated and NT = Near Threatened. Asterisk indicate Bornean endemics.

## AMPHIBIANS AND REPTILES

Sl	Species	Common Name	IUCN Listing	Habitat	Remarks
<b>AMPHIBIA</b>					
<b>Bufonidae</b>					
1.	<i>Ansonia longidigita</i> Inger, 1960*	Long-fingered Stream Toad	NT	Lowland dipterocarp forests	Hill stream obligate
2.	<i>Duttaphrynus melanostictus</i> (Schneider, 1799)	Common Asian Toad	LC	Human settlements	Human commensal
3.	<i>Ingerophrynus quadriporcatus</i> (Boulenger, 1887)	Four-ridged Toad	LC	Lowland dipterocarp forests	
<b>Dicroglossidae</b>					
4.	<i>Fejervarya cancrivora</i> (Gravenhorst, 1829)	Mangrove Frog; Crab-eating Frog	LC	Creeks, human settlements	One of few saline-resistant amphibians
5.	<i>Limnonectes conspicillatus</i> (Günther, 1872)*	Common Creek Frog	NE	Lowland dipterocarp forests	
6.	<i>Limnonectes leporinus</i> (Andersson, 1923)*	Giant River Frog	LC	Lowland dipterocarp forests	Stream and river obligate
7.	<i>Limnonectes malesianus</i> (Kiew, 1984)	Malaysian River Frog	NT	Lowland dipterocarp forests	
8.	<i>Limnonectes paramacrodon</i> (Inger, 1966)	Masked Frog	NT	Swampy portion of stream	
<b>Megophryidae</b>					
9.	<i>Megophrys nasuta</i> (Schlegel, 1858)	Horned Frog	LC	Lowland dipterocarp forests	
<b>Microhylidae</b>					
10.	<i>Kalophrynus heterochirus</i> (Boulenger, 1900)	Variable Sticky Frog	LC	Lowland dipterocarp forests	
<b>Ranidae</b>					
11.	<i>Chalcorana raniceps</i> (Peters, 1871)	White-lipped Frog	LC	Lowland dipterocarp forests	



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Sl	Species	Common Name	IUCN Listing	Habitat	Remarks
<b>Rhacophoridae</b>					
12.	<i>Kurixalus chaseni</i> (Smith, 1924)*	Bornean Frilled Tree Frog	NE	Marshes within lowland forests	
13.	<i>Polypedates colletti</i> (Boulenger, 1890)	Collett's Tree Frog	LC	Marshes within lowland forests	
14.	<i>Polypedates macrotis</i> (Boulenger, 1891)	Dark-eared Tree Frog	LC	Marshes within lowland forests and forest edges	
15.	<i>Polypedates ottilophus</i> (Boulenger, 1893)*	File-eared Tree Frog	LC	Lowland dipterocarp forests	
<b>REPTILIA</b>					
<b>Crocodylidae</b>					
16.	<i>Crocodylus porosus</i> Schneider, 1801	Saltwater Crocodile	LC	Creeks, river mouth	Juveniles and subadults sighted
<b>Geoemydidae</b>					
17.	<i>Batagur borneoensis</i> (Schlegel & Müller, 1844)	Painted Terrapin	CR	Creek at river mouth	Single individual sighted
<b>Agamidae</b>					
18.	<i>Bronchocela cristatella</i> (Kuhl, 1820)	Crested Green Lizard	NE	Trees and shrubs; forest edge	At forest edge
19.	<i>Draco quinquefasciatus</i> Hardwick & Gray, 1827	Five-banded Flying Lizard	NE	Lowland dipterocarp forests	
20.	<i>Draco sumatranus</i> Schlegel, 1844	Common Flying Lizard	NE	Trees in beach forest	

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Sl	Species	Common Name	IUCN Listing	Habitat	Remarks
21.	<i>Gonocephalus liogaster</i> (Günther, 1872)	Blue-eyed Angle-headed Lizard	NE	Lowland dipterocarp forests	
<b>Eublepharidae</b>					
22.	<i>Aeluroscalabotes felinus</i> (Günther, 1864)	Cat Gecko	LC	Lowland dipterocarp forests	Member of a species complex
<b>Gekkonidae</b>					
23.	<i>Cnemaspis kendallii</i> (Gray, 1845)*	Kendall's Day Gecko	LC	Lowland dipterocarp forests	
24.	<i>Cyrtodactylus consobrinus</i> (Peters, 1871)	Peters' Bent-toed Gecko	NE	Lowland dipterocarp forests	
25.	<i>Cyrtodactylus pubisulcus</i> Inger, 1958*	Grooved Bent-toed Gecko	LC	Lowland dipterocarp forests	
26.	<i>Gekko monarchus</i> (Duméril & Bibron, 1836)	Warty House Gecko	NE	Human settlements at Telok Melano	Edge species
27.	<i>Hemidactylus frenatus</i> Duméril & Bibron, 1836	Asian House Gecko	LC	Human settlements at Telok Melano	Human commensal
28.	<i>Hemidactylus platyurus</i> (Schneider, 1792)	Flat-tailed Gecko	NE	Human settlements at Telok Melano	Human commensal
<b>Lanthanotidae</b>					
29.	<i>Lanthanotus borneensis</i> Steindachner, 1878*	Bornean Earless Monitor	NE	Park Headquarters	Based on a black-and-white photograph taken in the 1960s
<b>Scincidae</b>					
30.	<i>Dasia vittata</i> (Edeling, 1864)*	Bornean Striped Tree Skink	LC	Mangrove tree	
31.	<i>Eutropis multifasciata</i> (Kuhl, 1820)	Common Garden Skink	LC	Lowland dipterocarp forests, also human habitations	Edge species

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32.	<i>Eutropis rudis</i> (Boulenger, 1887)	Black-banded Ground Skink	NE	Lowland dipterocarp forests	Forest species
33.	<i>Subdoliceps bowringii</i> (Gmelin, 1799)	Spotted Supple Skink	NE	Lowland dipterocarp forests; also human habitations	Edge species
34.	<i>Tropidophorus brookei</i> (Gray, 1845)*	Brooke's Water Skink	LC	Lowland dipterocarp forests	Hill stream obligate
<b>Varanidae</b>					
35.	<i>Varanus salvator</i> (Laurenti, 1768)	Water Monitor Lizard	LC	Creeks, human settlements	Often a human commensal
<b>Colubridae</b>					
36.	<i>Ahaetulla prasina</i> (Boie, 1827)	Oriental Vine Snake	LC	Forest edges	Edge species
37.	<i>Boiga nigriceps</i> (Günther, 1863)	Black-headed Cat Snake	LC	Lowland dipterocarp forests	Member of a species complex
38.	<i>Gonyosoma oxycephalum</i> (Boie, 1827)	Red-tailed Racer	LC	Edge of road	
<b>Crotalidae</b>					
39.	<i>Tropidolaemus subannulatus</i> (Gray, 1842)	Bornean Keeled Green Pit Viper	LC	Lowland dipterocarp forests	Illustrated in Hazebroek & Abang Kasim (2000)
<b>Natricidae</b>					
40.	<i>Xenochrophis trianguligerus</i> (Boie, 1827)	Triangled Keelback Water Snake	LC	Lowland dipterocarp forests	Hill stream obligate
<b>Xenopeltidae</b>					
41.	<i>Xenopeltis unicolor</i> Reinwardt, 1827	Sunbeam Snake	LC	Lowland dipterocarp forests	



**Fig. 3.** (a) *Cyrtodactylus pubisulcus*. Photo: Indraneil Das; (b) *Gekko monarchus*. Photo: Wong Jye Wen; (c) *Gonocephalus liogaster*. Photo: Indraneil Das; (d) *Lanthanotus borneensis*. Photo: Indraneil Das.