

The background of the cover is a vibrant landscape photograph. At the top, a blue sky is filled with large, white, fluffy clouds. Below the sky, a range of dark, forested mountains stretches across the horizon. In the middle ground, a dense, green forest covers the slopes of the mountains. On the left side, a waterfall cascades over large, grey rocks. On the right side, a small village with colorful houses and a winding road is visible, partially obscured by a layer of white mist or low clouds. The title 'BUNGO RANGE' is prominently displayed in the center. 'BUNGO' is in large, white, bold, sans-serif capital letters. 'RANGE' is in large, black, bold, sans-serif capital letters, with a detailed illustration of a toucan bird perched on a branch inside the letter 'A'.

BUNGO RANGE

BIODIVERSITY AND COMMUNITY

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BUNGO RANGE

BIODIVERSITY AND COMMUNITY

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FOREWORD

I am glad to note that this publication is another excellent milestone from Universiti Malaysia Sarawak through the Institute of Biodiversity and Environmental Conservation, in particular exploring and documenting the rich biodiversity and community in Sarawak. The biodiversity and environmental conservation is one of three niche areas of the university, which recognise the need to balance the biodiversity, habitats and human development. As such, the Research Innovation and Enterprise Centre, the university's centre responsible for research and innovation, has actively facilitated and supported research activities, and publications in various platforms available to scientific communities and the public.

I would like to thank staff of the Institute of Biodiversity and Environmental Conservation for continuously conducting good research and documenting crucial information that benefits many users including scientists across the region. It is well in line with the Institute's vision to become a leading center for research in tropical biodiversity and environmental conservation in Borneo and Southeast Asian region. I would like to congratulate the editors for their efforts in compiling and editing the data resulted from a multidisciplinary expedition in Bungo Range in December 2017 into a well indexed research book. I do believe that each article in this book serves its purpose as an important reference to academics, policy makers as well as public audiences. In particular, the findings would be a useful reference for the management plan of Bungo Range National Park that was gazetted on 26 February 2009.

To materialise the multidisciplinary expedition and the publication, the Institute had collaborated with various state agencies and local communities. Therefore, I am acknowledging their support and contribution (both financial and in-kind) to this project. They are Forest Department Sarawak, Sarawak Forestry Corporation,

Sarawak Biodiversity Centre, Sekolah Kebangsaan Tringgus, Pejabat Pendidikan Daerah Bau, Bau District Office, Bau District Council, Klinik Kesihatan Krokong, Bau District Police, Bau Fire and Rescue Station, Bau Hospital, and villagers from Tringgus settlement namely, Kg Bong, Kg Rotan and Kg Nguan. I hope similar collaborative efforts will be pursued in the near future to other protected areas in Sarawak.

To the authors, UNIMAS Publisher, and those who are involved in this publication, keep up with the good team spirit.

Finally, thank you for inviting me to pen my message in this great reading material.

Prof. Dr. Wan Hashim bin Wan Ibrahim
Deputy Vice Chancellor (Research and Innovation)
Universiti Malaysia Sarawak

PREFACE

This publication marks another significant output of the collaborative works between Universiti Malaysia Sarawak and Forest Department Sarawak on biodiversity study and conservation in the State.

In this book, the findings of multidisciplinary expedition to Bungo Range in December 2017 were compiled into 24 chapters covering biodiversity, environment and community under the theme “Bungo Range - Biodiversity and Community”. The theme signifies the importance of the pristine mountainous forest of the Bungo Range that supports rich species of flora and fauna, and the uniqueness of community and their customs as well as cultures. The involvement of academics, researchers and the villagers in the expedition has enhanced the exchange of knowledge, skill, and experience among the stakeholders, which are reflected in this book. In particular, the participation of the villagers in the expedition had indirectly conveyed the message of the Forest Department Sarawak on the importance of conserving the forest of Bungo Range and preserving local cultures. Ironically, the Bungo Range is becoming a popular tourism destination due to the outstanding sceneries such as mountains, waterfalls, reservoir, and the cultures (e. g., the last ring ladies). Indeed, this book will serve as a useful reading material for researchers, scientists and non-government organization in their research endeavour.

We would like to congratulate the editors, authors and those who contributed to the production of this book. We wish similar outputs shall be achieved from future collaborative work between Universiti Malaysia Sarawak and Forest Department Sarawak. Specifically, we would like to thank the community leaders and heads of department in Bau District for their support throughout the project. Yang Berhormat Miro Simuh for his strong supports of the expedition and launching of the event on 5th December 2017.

We hope this book serves the needs of the audiences either as academic reference or reading material in leisure time. Happy Reading!

Prof. Dr. Mohd Azlan Jayasilan Datu Hamden Haji Mohammad

Director
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INTRODUCTION

Sarawak government has voluntarily set aside more than 2.6 million hectares of lands and water bodies as conservation areas under the Heart of Borneo (HOB) Initiatives. The Sarawak's HOB area stretch from the north in Limbang Division to the south at Tanjung Datu that boundaries with Sabah, Brunei and Kalimantan, Indonesia. Of the total HOB area, approximately 441,000 hectares are totally protected area comprising national parks, wildlife sanctuaries and nature reserves. The southern part of the HOB contains 10 protected areas many of which are tourism hotspots such as Bako National Park, Kubah National Park, Gunung Gading National Park, Matang Wildlife Centre and Tanjung Datu National Park.

Bungo Range is located at 10° 16' latitude and 110° 9' longitude of the southern side of the HOB, about 500 meter above the sea level. The mountainous primary forest of the area was gazetted as Bungo Range National Park on 26th February 2009 covering 8,096 heactares (**Figure 1.1**). Bungo Range is an important water catchment area in the upstream of the Sarawak Kiri River and Sarawak Kanan River, where the Bengoh Dam is built to provide water supply for Kuching population. The southern end of the Bungo Range is the boundary of West Kalimantan, Indonesia.

In 2017, a multidisciplinary expedition to Bungo Range was conducted as one of the activities organized in conjunction with UNIMAS's Silver Jubilee Celebration. The Institute of Biodiversity and Environmental Conservation had led the expedition with the support of Forest Department Sarawak and other Institutes as well as Faculties within the university. The goal of the expedition was to increase the visibility of UNIMAS not just to the Tringgus community, but also to answer the call of the Sarawak government that wants to emphasise the implementation of Digital Biodiversity

in this state. The expedition was conducted for two weeks with the launching of the event held on 5th December 2017 at Tringgus settlement area.

Despite the earliest exploration in the area back to year 1880s, there is a lack of information pertaining to biodiversity and socio-economy, which are necessary to enhance biodiversity conservation, and boost local economic activities in the area. The expedition had produced substantial baseline data for the management of Bungo Range National Park, and highlight the area as a tourism destination, which eventually would benefit the local community in the area. The findings of the expedition are compiled herewith, comprising historical exploration in Bungo Range, water resource, aquatic biodiversity, floristics, mammals, birds, reptiles, amphibians, insects, and health and socio-economics of the locals. In summary, this book reported a total of 313 species of plants mainly orchids and zingers, and 298 species of wildlife among others are 105 birds, 39 mammals, 92 insects, 27 reptiles, 17 amphibians, and 59 aquatic lives. Additionally, the use of natural resources by local community in Tringgus is also presented in this book.

Because the expedition had only covered a small area of the southern section of the Bungo Range, gaps of information in this edition are expected, which suggest more explorations are needed in the near future. In this regard, the editors would like to acknowledge the contribution of the authors of each article in this edition. This edition may not stop here, and we wish to be working with you all again!

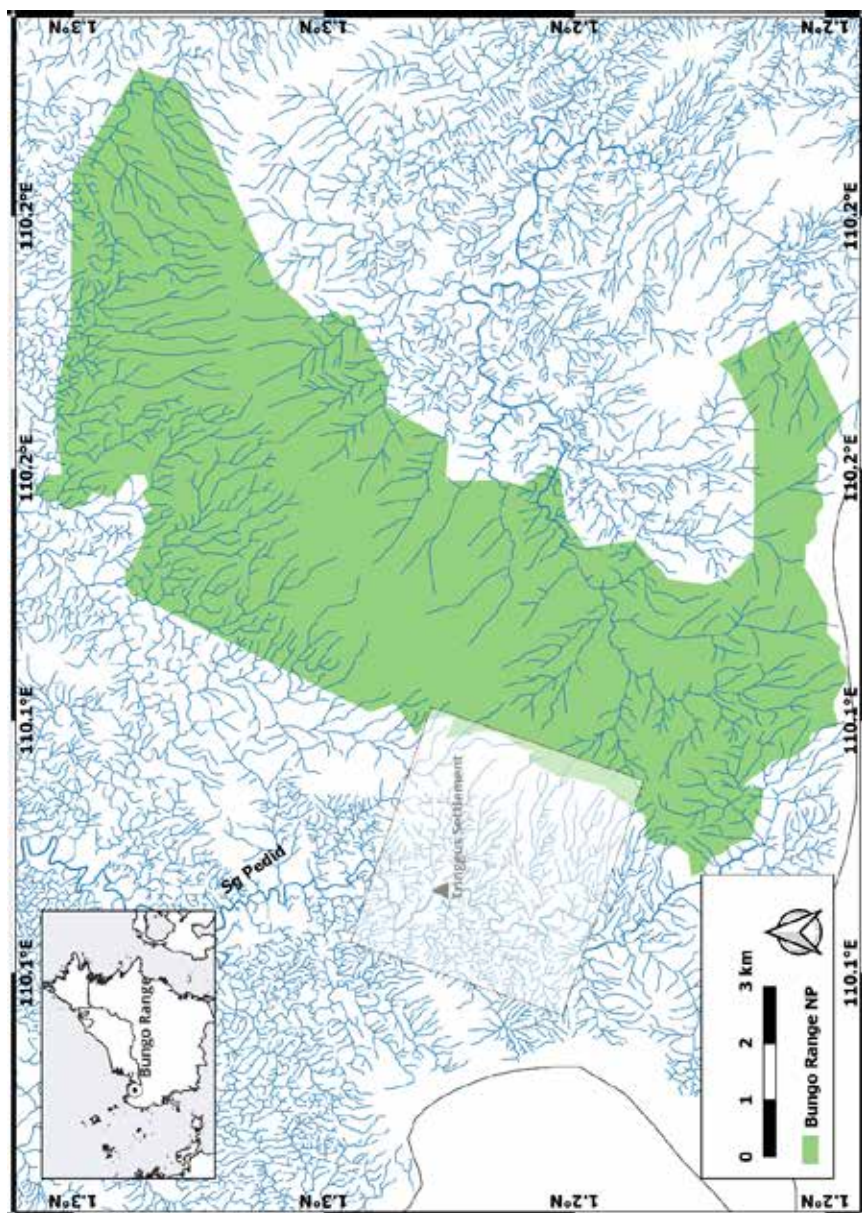


Figure 1.1. Map of Bungo Range National Park and the expedition area (shaded box).



THEME:
**GEOLOGICAL STUDY
AND ZOOLOGICAL
EXPLORATION**

THE REPTILES OF BUNGO RANGE

Indraneil Das, Izneil Nashriq and Pui Yong Min

The proposed Bungo Range National Park, in the Kuching Division of Sarawak, encompasses a total area of 8,095 ha, and comprises a rolling landscape of sandstone ridges and lowland rainforests, hemmed in by tower karst and at present, villages and agricultural land. The range of habitat types encompassed, including the presence of wetlands and several substrate types make the area of potential importance for herpetofaunas.

Nonetheless, there appears to be little published on the reptiles of the Bungo ('Bengoh' in the older literature) Range and adjacent areas. To the south of the proposed Park boundary, a number of species have been collected from Pangkalan Ampat, a jetty of importance which, before the construction of highways, permitted Sarawak Government administrators, including collectors from the Sarawak Museum, access the villages to collect tax and biological specimens, as well as to gain entry to the hinterland.

The earliest specimen to be collected is the holotype (the Natural History Museum London, BMNH 1946.1.7.38) of the extremely rare aquatic colubrid snake, *Xenelaphis ellipsifer* (Boulenger, 1900), that dates back to 1891 and was collected in a 'Dayak fish trap' (according to the Sarawak Museum [SM] ledger). Although the type locality was simply given as "Head-waters of Sarawak River, Borneo", the aforementioned ledger gives a more precise locality of "Pangkalan Ampat", to which we may restrict the type locality. Also collected from the locality were four specimens of the agamid lizard *Gonocephalus liogaster* (Günther, 1872) by "Gandiak" (catalogued as SM c.c. 2.5.2.v-y) in July 1926. All were during the period of Sarawak Museum curatorship (26 Feb 1891 - 1 March 1893) of George Darby Haviland (1857-1901), British surgeon and naturalist, specialising

on plants. Little is known of the collectors, and the second species may have been obtained by Constable Gandiak of the North Borneo Armed Constabulary, who saw action in World War II. Acquired from the Pangkalan Ampat area during the Haviland-era were at over a dozen lizard and snake species. More recent records are of the rare Lined Pipe Snake, *Cylindrophis lineatus* (catalogued as UNIMAS 9449), in our zoological collection, collected from Kampung Bengoh in January 2014 and *Eutropis rudis* (UNIMAS NM028, 036–039) from Kampung Danu in February 2012.

The vegetation in the lowlands of the Bungo Range National Park comprises mixed dipterocarp forests, that cover the peaks of the Range up to its highest point at ~800 meters. A short field expedition was held to the area, between 5–10 December 2017, when a rapid inventory was conducted, using transect walks along the lowland forests and adjacent streams.

This report compiles all records of reptiles from the Bungo Range area, which shows a total of 29 species, belonging to 10 families (**Table 15.1**), and includes 11 species of lizards and 18 species of snakes. The list must be treated as preliminary, and additional species may be expected, such as turtles (genera *Amyda*, *Cuora*, *Cyclemys* and *Dogania*), terrestrial and arboreal skinks (*Dasia*, *Sphenomorphus* and *Tyttloscincus*), agamids (*Bronchocela* and *Draco*), as well as colubrid snakes (*Ahaetulla*, *Coelognathus* and *Dendrelaphis*) that are present in adjacent areas of Gunung Penrissen and the Bau limestone region

Table 15.1. Checklist of reptiles of the proposed Bungo Range National Park and adjacent areas, Sarawak (current 12 May 2020). 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 2020–1) include: DD = Data Deficient; LC = Least Concern; NE = Not Evaluated; and VU = Vulnerable. Asterisk indicates Bornean endemics.

Sl	Species	Common Name	IUCN Listing	Habitat	Remarks
Agamidae					
1	<i>Gonocephalus grandis</i> (Gray, 1845)	Giant Angle-headed Lizard	LC	Lowland dipterocarp forests	
2	<i>Gonocephalus liogaster</i> (Günther, 1872)	Blue-eyed Angle-headed Lizard	NE	Lowland dipterocarp forests	
3	<i>Pelturagonia nigrilabris</i> (Peters, 1864)*	Black-lipped Shrub Lizard	LC	Lowland dipterocarp forests	
Gekkonidae					
4	<i>Cnemaspis kendallii</i> (Gray, 1845)*	Kendall's Day Gecko	LC	Lowland dipterocarp forests	
5	<i>Cyrtodactylus consobrinus</i> (Peters, 1871)	Peters' Bent-toed Gecko	NE	Lowland dipterocarp forests; limestone hills	
6	<i>Cyrtodactylus pubisulcus</i> Inger, 1958*	Grooved Bent-toed Gecko	LC	Lowland dipterocarp forests	
7	<i>Gekko kuhlii</i> (Stejneger, 1902)	Kuhl's Gliding Gecko	NE	Lowland dipterocarp forests	Member of a species complex

Scincidae					
8	<i>Eutropis rudis</i> (Boulenger, 1887)	Rough Skink	NE		Lowland dipterocarp forests
9	<i>Tropidophorus brookei</i> (Gray, 1845)*	Brooke's Water Skink	LC		Lowland dipterocarp forests
Varanidae					
10	<i>Varanus dumerilii</i> (Schlegel, 1839)	Duméril's Monitor Lizard	NE		Lowland dipterocarp forests and mangroves
11	<i>Varanus rudicollis</i> Gray, 1845	Rough-necked Monitor Lizard	NE		Lowland dipterocarp forests
Calamariidae					
12	<i>Calamaria everetti</i> Boulenger, 1893*	Everett's Reed Snake	LC		Lowland dipterocarp forests
Colubridae					
13	<i>Boiga cynodon</i> (Boie in: Boie, 1827)	Dog-toothed Cat Snake	LC		Lowland dipterocarp forests
14	<i>Boiga jaspidea</i> (Duméril, Bibron & Duméril, 1854)	Jasper Cat Snake	LC		Lowland dipterocarp forests

15	<i>Gonylosoma baleiodeirum</i> (Boie, 1827)	Orange-bellied Snake	LC	Lowland dipterocarp forests up to submontane forests
16	<i>Oligodon purpurascens</i> (Schlegel, 1837)	Purple Kukri Snake	LC	Lowland dipterocarp forests
17	<i>Psammodynastes pictus</i> Günther, 1858	Painted Mock Viper	NE	Lowland dipterocarp forests near streams
18	<i>Psammodynastes pulverulentus</i> (Boie in: Boie, 1827)	Mock Viper	NE	Lowland dipterocarp forests
19	<i>Xenelaphis ellipsifer</i> (Boulenger, 1900)	Ornate Brown Snake	LC	Streams within lowland dipterocarp forests Holotype
Viperidae				
20	<i>Parias sumatranus</i> (Raffles, 1822)	Sumatran Pit Viper	LC	Lowland dipterocarp forests
21	<i>Tropidolaemus subannulatus</i> (Gray, 1842)	Bornean Keeled Green Pit Viper	LC	Lowland dipterocarp forests
Cylindrophiiidae				
22	<i>Cylindrophis lineatus</i> Blanford, 1881*	Lined Pipe Snake	DD	Lowland dipterocarp forests

Elapidae						
23	<i>Bungarus flaviceps</i> Reinhardt, 1843	Red-headed Krait	LC	Lowland dipterocarp forests	Member of a species complex	
24	<i>Calliophis bivirgatus</i> (Boie, 1827)	Blue Coral Snake	LC	Lowland dipterocarp forests	Member of a species complex	
25	<i>Calliophis intestinalis</i> (Laurenti, 1768)	Malayan Striped Coral Snake	LC	Lowland dipterocarp forests	Member of a species complex	
26	<i>Naja sumatrana</i> (Müller, 1887)	Sumatran Cobra	LC	Lowland dipterocarp forests; forest edges		
27	<i>Ophiophagus hannah</i> (Cantor, 1836)	King Cobra	VU	Lowland dipterocarp and mangrove forests	Member of a species complex	
Pareidae						
28	<i>Alopeltura boa</i> (Boie, 1828)	Blunt-headed Slug Snake	LC	Lowland dipterocarp forests especially in limestone regions		
29	<i>Asthenodipsas laevis</i> (Boie, 1827)	Smooth Slug Snake	LC	Lowland dipterocarp forests		



Plate 15.1. *Boiga cynodon*



Plate 15.2. *Cylindrophis lineatus*



Plate 15.3. *Cnemaspis kendallii*



Plate 15.4. *Cyrtodactylus consobrinus*

BUNGO RANGE

BIODIVERSITY AND COMMUNITY

This book highlights the significant findings from the Multidisciplinary Expedition in Bungo Range conducted on 5-10 December 2017. The expedition was organized by the Institute of Biodiversity and Environmental Conservation, UNIMAS with support from the Forest Department Sarawak. This volume is illustrated in 24 chapters covering the historical exploration of Bungo Range, a geological feature of the mountain, water resources, aquatic biodiversity, floristics, mammals, birds, reptiles, amphibians, insects, and health and socio-economics of the Tringgus community. It is reported herewith in the book that there are a total of 313 species of plants mainly orchids and zingers, and 298 species of wildlife, among them 105 birds, 39 mammals, 92 insects, 27 reptiles, 17 amphibians, and 59 aquatic lives. Additionally, the use of natural resources by the local community in Tringgus is also presented. This book can serve as a useful reference for the development and management of Bungo Range National Park, and the communities living surrounding the area.