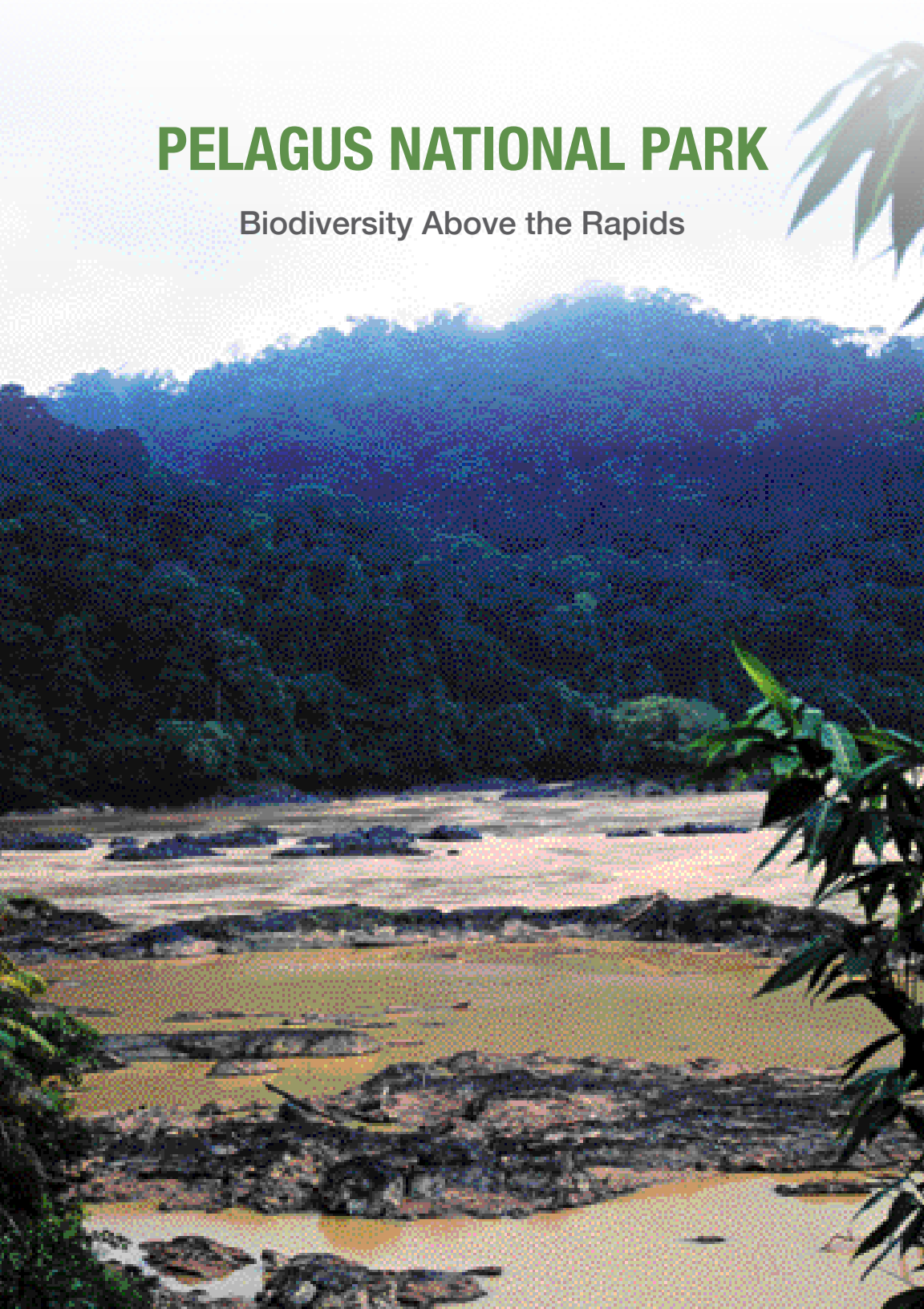
PELAGUS NATIONAL PARK

Biodiversity Above the Rapids



Life from Headwaters to the Coast

PELAGUS NATIONAL PARK

Biodiversity Above the Rapids

Edited by

Andrew Alek Tuen, Indraneil Das
Karen Lee Suan Ping and Jayasilan Mohd-Azlan

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Half-title page: The Rapids of Pelagus, as seen in August 2003. Photo: I. Das
Frontispiece: *Megophrys nasuta*, the Bornean Horned Frog. Photo: Pui Yong Min
Foreword page and across: Aerial view of Pelagus Kaki Wong. Photo: Tonny Ganyai.

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FOREWORD

Prof. Datuk Dr. Mohamad Kadim Suaidi
Vice Chancellor, Universiti Malaysia Sarawak

Since its humble beginnings in 1992, Sarawak's first public university, Universiti Malaysia Sarawak (UNIMAS), has put natural resource management and biodiversity conservation at the forefront of its research agenda. This includes the setting up of the Faculty of Resource Science and Technology and the Institute of Biodiversity and Environmental Conservation. The location of UNIMAS on the island of Borneo has given us a unique opportunity to study its biodiversity, one of the most diverse in the world. Over the years, university researchers have discovered new species and uncovered new facets of the biology of numerous threatened species and landscapes, contributing to the conservation of species and habitats in Sarawak and beyond.

To be globally relevant and forward looking, UNIMAS has established linkages and collaborated with like-minded individuals and institutions within Malaysia and overseas. On 24 September 2013, we formalised a research collaboration with Sarawak Energy, to embark on the first in-depth study of the 2,041-hectare Pelagus National Park. As a result of this collaboration, significant new findings have come to light and have been featured in this book.

I would like to congratulate the authors, editors and publishers for their hard work and perseverance, to help unravel the wonders of biodiversity of Pelagus, and make this place of magic and mystery accessible to the world.

MESSAGE

Datu Haji Sharbini Suhaili
Group Chief Executive Officer, Sarawak Energy Berhad

Congratulations to all those who are part of this important publication. Your contribution will enhance knowledge and understanding of Sarawak's biodiversity areas in general and the Pelagus National Park in particular.

In mid-2020, it was announced by the Sarawak government that Sarawak will become a high-income economy by 2030 through the two core principles of a digital economy and environmental sustainability, and Sarawak Energy is fully aligned to this vision.

We are developing our energy resources sustainably to deliver greater access to affordable, reliable and sustainable energy for Sarawak and its people, in alignment with Goal #7 of the United Nations Sustainable Development Goals (SDG) 2030.

Just over a decade ago, Sarawak made a strategic decision to reduce our dependence on thermal resources of coal, gas and diesel through the Sarawak Corridor of Renewable Energy.

As a result, Sarawak Energy is now the largest renewable energy developer and provider in Malaysia through our investments in large renewable hydropower as well as solar and micro-hydro for remote areas.

As a member of the International Hydropower Association, we are a strong advocate of sustainable hydropower and are working to integrate a robust sustainability agenda into our business. It is estimated that less than 2% of our land area will be affected when we fully harness our hydropower potential to ensure a sustainable energy future for our state and beyond.

To conserve biodiversity in line with SDG #15, we are working with various state agencies, higher learning institutions, local communities and stakeholder groups on efforts to mitigate any negative impact and maximise the positive impact of our projects and operations.

Initiatives include the implementation of sustainable management of forest types which are important water catchments. We also contribute to

the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services. Our partnerships so far have yielded encouraging successes.

1. The Batang Ai National Park and catchment area, located within the area of the 35-year-old Batang Ai Hydroelectric Plant (HEP), serve as a buffer zone that supports the regeneration of the surrounding environment. The area is now home to a sustainable population of the Bornean orangutan in Sarawak and forms part of the transboundary conservation area with Indonesia's Betung Kerihun National Park.
2. For the Murum HEP project, the Wildlife Monitoring and Rescue (WiMoR) operation with the Sarawak Forestry Corporation rescued and relocated wildlife in significant numbers to safer areas before impoundment.

To ensure we understand the effectiveness of our efforts, research and development is an important part of our business. This creates greater understanding of the impact of our projects by enhancing the body of knowledge and enables us to make informed decisions in environmental management and conservation.

In 2013, we partnered with Universiti Malaysia Sarawak (UNIMAS) and rolled out the Hydropower Environmental Sustainability Programme with a focus on three objectives:

i. To identify critical local environmental issues that warrant closer attention;
ii. Collect necessary data in forming baseline knowledge particularly in the areas of aquatic and terrestrial ecology and biodiversity; and
iii. Support the development of local research capability and capacity within Sarawak on related environmental topics.

The 2,041-hectare Pelagus National Park was identified as one of the study locations under this programme given its importance as a protected area. Significant findings have been established and are featured in this book.

We are pleased to support this book publication together with Universiti Malaysia Sarawak (UNIMAS) in line with SDG #17 which calls for multi-stakeholder partnerships that mobilise shared knowledge, expertise, technology and financial resources.

On behalf of Sarawak Energy, I would like to thank UNIMAS for this research collaboration and for sharing your expertise and resources.

We are also fortunate to have collaborated with and gauged the support from like-minded organisations such as our higher learning institutions, Forest Department Sarawak and Sarawak Forestry Corporation in enabling Sarawak Energy to play a greater role in local environmental conservation efforts.

I would also like to congratulate Sarawak Energy's Research and Development team. I am confident that you have gained valuable experience and further exposure through this research as part of Sarawak Energy's hydropower development journey.

PREFACE

Andrew Alek Tuen, Indraneil Das,
Karen Lee Suan Ping* and *Jayasilan Mohd-Azlan

Sarawak's vast protected areas network, including its National Parks, are home to many of the State's natural wonders- floral, faunal, geological and at the level of landscapes. Central Sarawak, in particular, is an important area for biodiversity conservation, being home to uncountable Bornean endemics.

Its thriving National Parks vindicate the commitment of the State Government as a responsible caretaker of Sarawak's biodiversity. Halting biodiversity loss is one of the top State agendas, whereby Sarawak is determined to conserve and protect its wildlife and natural ecosystem. This project sits in line with the University's niche area of biodiversity and environmental conservation. This book, based on extensive field research by the staff of our two organisations, brings together new information on species, their habitats and other aspects of natural history.

Little has been written about Pelagus National Park. Scientific understanding of biodiversity intended for conservation is crucial for our advancement to preserve the State's natural heritage. Identifying the distribution, richness and habitat use of animals in tropical rainforest are essential for understanding their ecology, and in facilitating management of such biodiversity-rich areas. This book attempts to enumerate selected zoological groups, many of which had hitherto remained undetected in these dense tropical rainforests. The faunal studies reported here include inventories of mammals, birds, reptiles, amphibians, fishes and macroinvertebrates, a critical first step towards understanding the biodiversity of Pelagus National Park.

The work targets local stakeholders, management authorities, naturalists, researchers and the general public. Most enthusiasts continue to see protected areas as a parade of natural wonders, to be appreciated and protected for future generations. An understanding of our biodiversity may thus support complex needs of conservation. It is hoped that nature enthusiasts and those who are interested in tropical biodiversity will find this book beneficial. Acknowledgement is here made to the authors who have gathered these data, substantially increasing our knowledge and awareness of an important part of our national heritage.

Foremost, we thank Sarawak Energy Hydropower Environmental Sustainability Program for a research grant to conduct the activities mentioned in this work. We are grateful to the Resident of Kapit Division for welcoming us to the area under his jurisdiction, and to the longhouse folks from Rumah John at Nanga Benin (John anak Asun and family), Rumah Bujah at Nanga Pelagus (Bujah anak Ijau and family) and Rumah Laja at Nanga Peraran (Laja anak Sandak and family), for assisting with the research.

Prof. Dr. Wan Hashim bin Wan Ibrahim, the Deputy Vice Chancellor for Research and Innovation, Prof. Dr. Lo May Chiun and her staff at the Research Innovation and Enterprise Centre facilitated the research on the UNIMAS side. We also thank the staff of the Institute of Biodiversity and Environmental Conservation, and the Faculty of Resource Science and Technology, UNIMAS, for logistic and field assistance: Isa Sait, Rahah Mohd. Yakup, Mohd. Hasri Al-Hafiz Haba, Ketty Daun, Pasey Lisus, Mohsin bin Zainalabidin, Siti Maimunah binti Ibrahim and Felicia Reyap, besides our many research assistants and graduate research students.

The Sarawak Forest Department provided research permits for the individual projects reported here. Entry to Pelagus Resort area was provided by Pelita Holdings Sdn. Bhd, and we thank its manager, Netty Haji Narawi. We thank Mohd. Tajuddin Abdullah, Qammil Muzzammil Abdullah, Amirruddin Ahmed, Faisal Ali Anwar Ali, Aaron M. Bauer, Henry Bernard, Chan Kin Onn, Stuart James Davies, Ulmar Grafe, Suhaila binti Abdul Hamid, Kelvin Lim, Lo May Chiun, Suhaili Mokhtar, Mustafa Abdul Rahman, Abdullah Samat and Tan Heok Hui for reviews of the chapters, and Genevieve V. A. Gee for copy editing. We are thankful to Chien C. Lee for images of birds, Faisal Ali Anwar Ali for the images of bats and to the family of the late Brian Houldershaw for the images of the Rapids from the 1960s, made possible through the kindness of Albert Field.

We dedicate this book to the kind-hearted folks of the Rajang Basin, who offered us their homes and carried the burden and joy of discovery.

AMPHIBIANS

Pui Yong Min, Mohamad Paisal, Adi Shabrani* and *Indraneil Das

A total of 8,151 species of amphibians have been described globally, with 6,794 (84%) assessed under the IUCN Red List of 2020, of which 2,200 (41%) have been classified as 'Threatened'. Of the approximately 190 species now known from Borneo, 130 (68%) are endemic to the island and 83 species are 'Threatened', representing nearly half of the known amphibian fauna. These figures are, of course, conservative estimates, as many species have yet to be evaluated due to lack of information on threats, and limited knowledge on species distributions, which are often biased towards accessible areas. The insufficiency in the current knowledge on Bornean frogs highlights the need for species inventories, especially in less accessible areas.

Limited literature exists on the herpetofauna of the Pelagus region. This chapter provides an updated inventory of the amphibians found in the Pelagus National Park, based on results of multiple surveys conducted between 2014 to 2015, and those recorded previously. Standardised visual and encounter surveys were conducted between 1900 to 2200 hours along streams and adjacent areas, extending from the bank of the river which demarcates the Park's western boundary, up to the ridge-top along the Bidai Trail, north-west of the site of the former resort within the Park. In addition, an automated sound recording device (Song Meter™ Model SM2+; Wildlife Acoustics Inc.) was established circa 2 m from the stream bank, to remotely record frog vocalization patterns. The sampling regime of 5 min (recording time frame) every 15 min (recording time gap) resulted in 2,700 sampling intervals and 13,500 total minutes of recording time.

The current species inventory for Pelagus National Park documents 39 species, representing 22 genera and seven families. These constitute 21% of the amphibian species recorded on Borneo, 21 of which are endemic to the island. Two of these – the Wallace's Flying Frog (*Rhacophorus nigropalmatus*) and Crested Toad (*Ingerophrynus divergens*) – were solely detected on the automated sound recorder. A species of conservation importance, the Lesser Rock Skipper (*Staurois parvus*), listed as 'Vulnerable' in the IUCN Red List, was found on a sapling along the stream bank. Three 'Near Threatened' species, including the Peat Swamp Frog (*Limnonectes malesianus*), the Serasin Dwarf Litter Frog (*Leptobrachella serasanae*) and Cinnamon Frog (*Nytixalus pictus*) were also recorded from the site.

BUFONIDAE

Fig. 1. Representative species of bufonids found in Pelagus National Park. (a) *Ansonia leptopus*; (b) *Ansonia longidigita*; (c) *Rentapia hosii*; (d) *Ingerophrynus divergens*; (e) *Phrynoides asper*; (f) *Ansonia minuta*.

DICROGLOSSIDAE

Fig. 2. Representative species of *Limnonectes* found in Pelagus National Park. (a) *Limnonectes ibanorum*; (b) *Limnonectes leporinus*; (c) male *Limnonectes kuhlii*.

The amphibian fauna of the Park is rich and includes a number of globally-threatened species. The automated recording device deployed was shown to be effective in detecting species not recorded during transect walks, especially species that are visually cryptic and whose detection may often rely on advertisement calls. Our surveys covered a small part of the Park. More studies are needed in other significant areas of the Park. The current inventory provides baseline information for future, more intensive studies that are focussed on surveys to compile species lists, life history and conservation needs of the Park's interesting frog fauna, all of which are relevant to their management.

A Checklist of Amphibians

IUCN Status (IUCN, 2020): NE – Not Evaluated, LC – Least Concern, NT – Near Threatened, VU – Vulnerable. *Detected by automated recording device.

Species	Common Name	IUCN Status	Endemism
BUFONIDAE			
Ansonia leptopus (Günther, 1872)	Brown Slender Toad	LC	Endemic
Ansonia longidigita Inger, 1960	Long-fingered Slender Toad	LC	Endemic
Ansonia minuta Inger, 1960	Dwarf Slender Toad	LC	Endemic
Ingerophrynus divergens (Peters, 1871) *	Forest Toad	LC	-
Pelophryne sp.	Dwarf Toad	NE	Endemic
Phrynoidis asper (Gravenhorst, 1829)	River Toad	LC	-
Rentapia hosii (Boulenger, 1892)	Brown Tree Toad	LC	-
CERATOBATRACHIDAE			
Alcalus cf. *baluensis* (Boulenger, 1896)	Kinabalu Dwarf Mountain Frog	LC	Endemic
DICROGLOSSIDAE			
Limnonectes ibanorum (Inger, 1964)	Rough-backed River Frog	LC	Endemic
Limnonectes kuhlii (Tschudi, 1838)	Kuhl's Creek Frogs	LC	-
Limnonectes leporinus (Andersson, 1923)	Giant River Frog	LC	Endemic
Limnonectes malesianus (Kiew, 1984)	Peat Swamp Frog	NT	-
Limnonectes sp.	Creek Frog	NE	Endemic
Megophryidae			
Leptobrachella mjobergi Smith, 1925	Mjoberg's Dwarf Litter Frog	LC	Endemic
Leptobrachella juliandringi Eto, Matsui & Nishikawa, 2015	Dring's Dwarf Litter Frog	NE	Endemic
Leptobrachella parva Dring, 1984	Rough-sided Dwarf Litter Frog	LC	Endemic
Leptobrachella serasanae Dring, 1983	Serasin Dwarf Litter Frog	NT	-
Leptobrachium abbotti (Cochran, 1926)	Lowland Litter Frog	LC	Endemic

Species	Common Name	IUCN Status	Endemism
Leptolalax gracilis (Günther, 1872)	Sarawak Slender Litter Frog	LC	Endemic
Megophrys edwardinae Inger, 1989	Edwardine's Horned Frog	LC	Endemic
Megophrys nasuta (Schlegel, 1858)	Bornean Horned Frog	LC	-
MICROHYLIDAE			
Chaperina fusca Mocquard, 1892	Saffron-bellied Frog	LC	-
Nanohyla petrigena (Inger & Frogner, 1979)	Kapit Rice Frog	LC	Endemic
RANIDAE			
Chalcorana raniceps (Peters, 1871)	White-lipped Frog	LC	-
Meristogenys phaeomerus (Inger and Gritis, 1983)	Kapit Torrent Frog	LC	Endemic
Pulchrana picturata (Boulenger, 1920)	Spotted Stream Frog	LC	-
Pulchrana signata (Günther, 1872)	Striped Stream Frog	LC	-
Staurois guttatus (Günther, 1858)	Black-spotted Rock Frog	LC	Endemic
Staurois parvus Inger and Haile, 1959	Lesser Rock Skipper	VU	Endemic
Staurois tuberilinguis Boulenger, 1918	Green Spotted Rock Skipper	LC	Endemic
RHACOPHORIDAE			
Kurixalus chaseni (Smith, 1924)	Frilled Tree Frog	LC	-
Leptomantis gauni (Inger, 1966)	Short-nosed Tree Frog	LC	Endemic
Nyctixalus pictus (Peters, 1871)	Cinnamon Frog	NT	-
Philautus hosii (Boulenger, 1895)	Hose's Bush Frog	LC	Endemic
Philautus tectus (Boulenger, 1895)	Obscure Bush Frog	LC	Endemic
Polypedates leucomystax (Gravenhorst, 1829)	Four-lined Tree Frog	LC	-
Polypedates otilophus (Boulenger, 1893)	File-eared Tree Frog	LC	-
Rhacophorus nigropalmatus Boulenger, 1895*	Wallace's Flying Frog	LC	-
Rhacophorus pardalis Günther, 1858	Harlequin Flying Frog	LC	-

MEGOPHRYIDAE

Fig. 3. Representative species of Megophryidae found in Pelagus National Park. (a) *Leptolalax gracilis*; (b) *Leptobrachium abbotti*; (c) *Megophrys nasuta*; (d) *Megophrys edwardinae*; (e) Near Threatened *Leptobrachella serasanae*; (f) *Leptobrachella mjobergi*.

RANIDAE

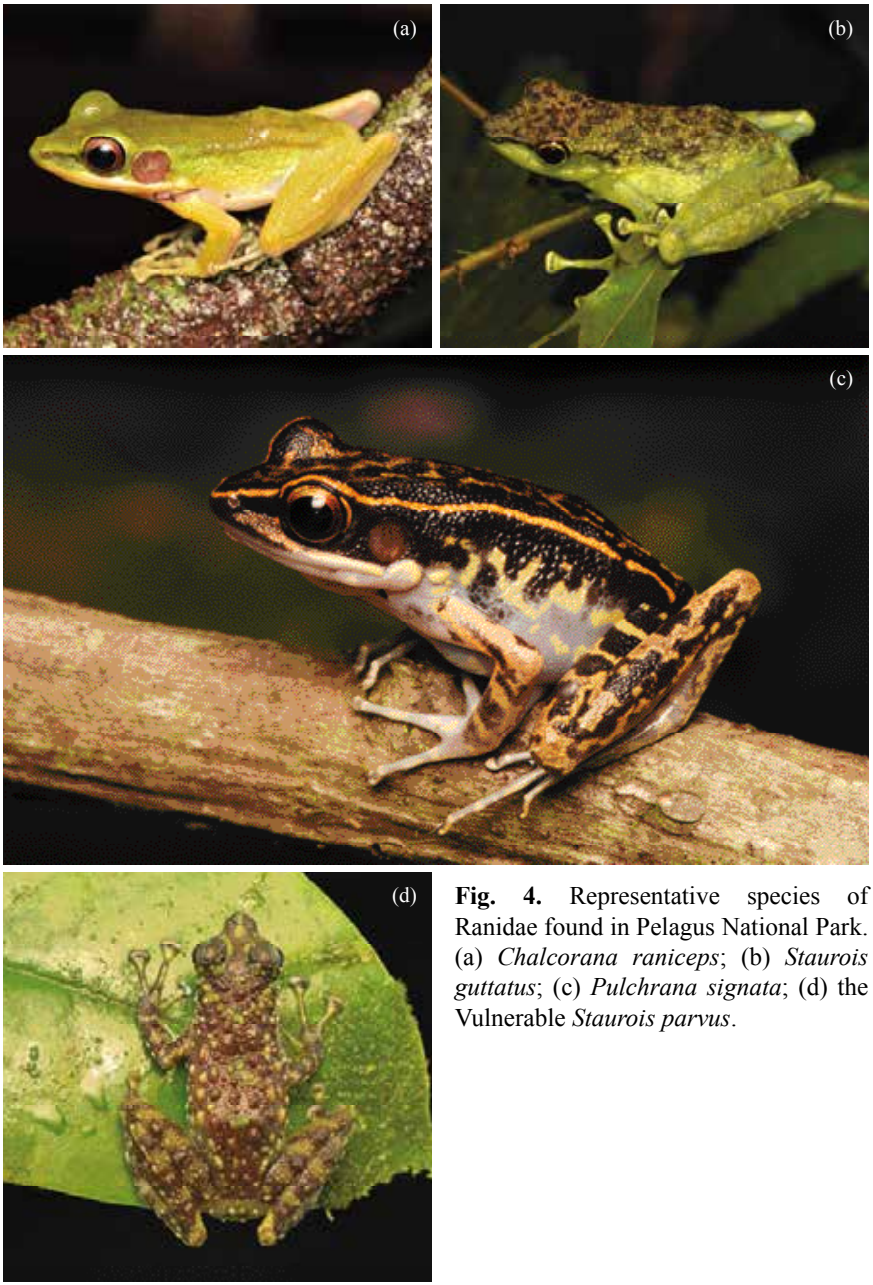

Fig. 4. Representative species of Ranidae found in Pelagus National Park. (a) *Chalcorana raniceps*; (b) *Staurois guttatus*; (c) *Pulchrana signata*; (d) the Vulnerable *Staurois parvus*.

RHACOPHORIDAE

Fig. 5. Representative species of Rhacophoridae found in Pelagus National Park. (a) *Kurixalus chaseni*; (b) *Nyctixalus pictus*; (c) *Polypedates leucomystax*; (d) *Polypedates otilophus*; (e) *Philautus hosii*; (f) *Leptomantis gauni*; (g) *Rhacophorus pardalis*; (h) *Rhacophorus nigropalmatus*.