

PAPER • OPEN ACCESS

Key Biodiversity Areas (KBA): An Important Approach in Mainstreaming Biodiversity Conservation in Malaysia

To cite this article: N H Ahmad Ruzman *et al* 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **842** 012054

View the [article online](#) for updates and enhancements.

You may also like

- [Preface](#)
- [Agriculture is the primary driver of tree cover loss across the Forestière region of the Republic of Guinea, Africa](#)
Maegan Fitzgerald, Janet Nackoney, Peter Potapov et al.
- [Challenges and Opportunities in Establishing China Infrastructure for Big Biodiversity Data](#)
Li Zhu and Keping Ma

A promotional banner for 'Free the Science Week 2023' featuring a hand interacting with a futuristic digital interface. The interface includes a central padlock icon, suggesting open access. The background is dark with glowing blue lines and patterns.

Free the Science Week 2023 April 2–9

Accelerating discovery through
open access!

 www.ecsdl.org [Discover more!](#)

Key Biodiversity Areas (KBA): An Important Approach in Mainstreaming Biodiversity Conservation in Malaysia

N H Ahmad Ruzman^{1,*}, M A Shahfiz^{1,2}, K Munian^{1,3}, N F M Fauzi¹, M A Azahar¹, A Z Zam Beri¹, M Appanan¹, M S Baharudin¹ and N A A Mahyudin¹

¹Zoology Branch, Forest Biodiversity Division, Forest Research Institute Malaysia (FRIM) 52109 Kepong, Selangor

²Faculty of Science and Technology, The National University of Malaysia, 43600 Bangi, Selangor, Malaysia

³Faculty of Applied Sciences and Technology, University Tun Hussein Onn Malaysia (Pagoh Campus), 84000 Muar, Johor Darul Ta'zim, Malaysia

*Corresponding author: norhazwani@frim.gov.my

Abstract. Malaysia has adopted two ways of conserving its biodiversity; species-based and landscape-based approaches. However, there are limitations of these approaches that can be addressed via Key Biodiversity Areas (KBA). Hence, the aim of the study is to review and compare several current conservation approaches in Malaysia with KBA. Systematic literature search was done using a set of keywords in search engine and visited official government websites to obtain relevant documentations on conservation and biodiversity in Malaysia. Based on the findings, KBA is a holistic approach consisting of several biodiversity elements, criteria and themes that can be put in place, including Important Plant Areas (IPA), Important Bird and Biodiversity Areas (IBA), Important Fungus Areas and Prime Butterfly Areas. This approach has successfully helped many countries such as the Philippines, Indo-Burma hotspot, Uganda, and Canada identify and prioritize important sites for biodiversity conservation. Thus, KBA approach is an alternative approach to support stakeholders in mainstreaming biodiversity conservation approaches in Malaysia for more effective conservation planning in the future. This approach also offers geographic targets for the expansion of protected area coverage and identifies the site for urgent conservation action.

1. Introduction

Malaysia is one of the megadiverse countries in the world [1]. There are 307 mammal species, 785 birds, 567 reptiles, 242 amphibians, 2 068 freshwater and marine fishes, about 150 000 invertebrates and over 15 000 plant species recorded in Malaysia [1,2]. Besides that, Malaysia also has at least 14 major forest ecosystems, including tropical evergreen lowland rainforest, tropical upper montane rainforest, mangrove forest, peat swamp forest and many more [3,4]. However, the biodiversity in Malaysia is threatened by land developments, pollutions, poaching, encroachments, invasive alien species (IAS), and climate change [1,5]. For instance, habitat loss due to forest conversion for agriculture and silviculture, commercial logging, and human settlements threatens to push the Malayan tiger (*Panthera tigris jacksoni*) towards extinction [6]. At the same time, high hunting pressure due to illegal trade had also led to the reduction of Malayan tiger populations [6].

As a State Party to the Convention on Biological Diversity (CBD), Malaysia has developed strategies to conserve biodiversity mainly based on two approaches, namely species-based and landscape-based approaches. However, the existing species-based and landscape-based approaches



Content from this work may be used under the terms of the [Creative Commons Attribution 3.0 licence](https://creativecommons.org/licenses/by/3.0/). Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

have their limitations that can be supported through other biodiversity conservation approach like Key Biodiversity Areas (KBA). Key Biodiversity Areas (KBA) are defined as sites that contribute significantly to the global persistence of biodiversity [7,8]. It is a global initiative first announced in 2016 by IUCN World Commission on Protected Areas (WPCA) and Species Survival Commission (SSC). The vision of the KBA approach is "a comprehensive network of sites that contribute significantly to the global persistence of biodiversity is appropriately identified, correctly documented, effectively managed, sufficiently resourced and adequately safeguarded" [9].

Therefore, this study aims to review and compare several current conservation approaches in Malaysia with KBA. This information is important to support stakeholders in mainstreaming biodiversity conservation into national development planning and sectoral policies and plans to provide more effective conservation planning in the future.

2. Materials and Methods

The literature gathering was done using the search engine Google, and we visited the official ministry website to gain the authentic documents related to this study. The search of published documents related to species-based conservation approaches was conducted using keywords "species, conservation and Malaysia". Besides that, the search for published documents associated with landscape-based conservation approaches was carried out using keywords such as "landscape, conservation and Malaysia" associated with management plans and guidelines adopted in Malaysia.

Moreover, data mining on Key Biodiversity Areas (KBA) approach was conducted by searching and screening the published documents related to the identification of KBA. In addition, the search for information on Malaysia's global commitments and national biodiversity policy was done to gather information on the need for the KBA approach in Malaysia. Data interpretation was conducted by identifying the strength among adopted species-based and landscape-based conservation approaches and their limitations in Malaysia. The potential of the KBA approach as an alternatives initiative in mainstreaming biodiversity was also identified.

3. Results and Discussion

3.1. Species-Based Conservation Approaches

Active initiatives to conserve endangered species, especially large mammals, are implemented by the government and the Department of Wildlife and National Parks (DWNP) is given the task to foresee the implementations. For instance, the critically endangered Malayan tiger (*Panthera tigris jacksoni*) and its two main prey species are sambar deer (*Rusa unicolor*) and barking deer (*Muntiacus muntjac*) [10]. The survival of the Malayan tiger greatly depends on the main prey species. However, especially Sambar deer, the tiger prey species populations have declined due to high hunting pressure for meat consumption [11]. On the other hand, high access into forests due to fragmentation and degradation caused the sambar deer to be easily hunted by poachers [11]. Therefore, Malaysia delicately formulated the National Tiger Conservation Action Plan (NTCAP) to further protect the apex species and prey species, including their habitats [10].

Moreover, Malaysia also formulated the National Elephant Conservation Action Plan (NECAP) to safeguard the Asian elephant (*Elephas maximus*) and its habitat. The elephant is often threatened by habitat loss, forest fragmentation and poaching, and the illegal trade of body parts such as ivory [12]. However, less attention is given to the conservation of other species of vertebrates. According to the Red List of Mammals for Peninsular Malaysia, a total of 14 mammal species are listed as Vulnerable (VU) [13]. These species have the potential to become endangered if no conservation measures are taken.

3.2. Landscapes-Based Conservation Approaches

Conservation by habitat protection in Malaysia was done through the establishment of Protected Areas (PAs). PAs received protection due to their natural, ecological and cultural values [14]. Based on the Master List of Protected Areas in Malaysia, there are 527 protected areas in Malaysia: 275 for Peninsular Malaysia, 195 for Sabah, and 57 for Sarawak [15]. These consist of land areas (4 346 249.4 ha) and sea areas (1 510 037.3 ha) [15]. Besides that, Malaysia has adopted the High Conservation Value (HCV) approach to facilitate forest management and certification activities via the identification of High Conservation Value Forest (HCVF) [16]. The HCVF is classified into six types of HCV as listed by the Global HCVF Toolkit, which are HCV1-6 [17]. The HCV1 focuses on the forest areas containing globally, regionally, or nationally significant biodiversity values, including protected areas, threatened and endangered species, endemic species, and critical temporal use [16].

Another site-level conservation in Malaysia is through the Environmentally Sensitive Areas (ESAs) approach. This approach is seeking balanced development within and around such areas based on sustainable development. According to the Environmentally Sensitive Area Conservation and Development Planning Guidelines, ESAs are divided into three conservation priorities: ESA Rank 1, ESA Rank 2 and ESA Rank 3 which is arranged from no development to controlled development activities [18]. According to the 3rd National Physical Plan (NPP3), 4 491 145.13 ha of ESA Rank 1, 4 440 453.29 ha of ESA Rank 2 and 2 857 393.51 ha of ESA Rank 3 in Peninsular Malaysia [19].

Nevertheless, there are limitations in the existing landscape conservations. For instance, conservation, management, and enforcement of habitat are only focused within the PAs gazetted. Thus, important habitats that exist outside the PAs and buffers might not be well protected. Apart from that, the HCVF approach favouring large forested areas and does not consider the critically endangered species dwelling in fragmented areas as well as in smaller forest patches [20]. As for the ESAs approach, the current classification are mostly based on physical orientated attributes such as high altitudes, slopes and degree of risks [21]. Therefore, the important biological elements in an ecosystem might be neglected.

3.3. Key Biodiversity Areas (KBA) as Alternative Approach

The KBA is a holistic approach to biodiversity conservation. It can be applied across species, ecosystem and genetics levels and applicable to terrestrial, inland water, and marine environments [7,8]. The identification of KBA was conducted using the globally standardized species and ecosystem-based criteria with quantitative thresholds [8]. Based on the Guidelines "A Global Standard for Identifying Key Biodiversity Areas", 11 KBA criteria are grouped into five high-level criteria (A-E) [8]. These criteria cover biodiversity elements like species, ecosystem and genetic diversity. The KBA criteria and its biodiversity elements are stated in Table 1. In addition, the information derived from the IUCN Red List of Threatened Species and the IUCN Red List of Ecosystem uses criteria and quantitative thresholds to identify threatened species and ecosystem types.

In addition, KBA also encompasses other important sites for biodiversity, namely Important Plant Areas (IPAs), Important Bird and Biodiversity Areas (IBAs), Important Fungus Areas, Prime Butterfly Areas, Alliance for Zero Extinction (AZE), Ramsar sites, Special Protection Areas and Ecologically and Biologically Significant Areas (EBSAs) [8].

To date, more than 15, 000 KBA have been identified globally [7]. This approach has successfully helped many countries such as the Philippines, Indo-Burma hotspot, Uganda, and Canada identify and prioritize important sites for biodiversity conservation [22,23,24,25]. For example, based on the case study in the Philippines, the KBA approach has successfully identified 288 KBA in the Philippines, resulting from the integration of the terrestrial, freshwater and marine KBA [22]. These KBA represent the known habitat of 855 globally important species of plants, mammals, birds, amphibians, reptiles, fishes, corals, molluscs and elasmobranchs in the country, including sites identified under the Important Bird Areas (IBAs) [22]. Besides that, the KBA approach had also identified a total of 438 KBA, covering 258 085km² in the Indo-Burma Biodiversity Hotspot: Cambodia, Lao PDR, Myanmar (Burma), Thailand and Vietnam, plus parts of southern China and northeastern India [23]. These KBA

include the important habitat of globally threatened mammals, reptiles, amphibians, freshwater fish and plants, as well as the sites identified under the Important Bird Areas (IBAs) [23]. Therefore, the KBA can be an important approach for biodiversity conservation in Malaysia.

Table 1. KBA criteria and biodiversity elements [8].

Criterion	Species	Ecosystems	Genetic diversity
A. Threatened biodiversity			
A1. Threatened species	/		/
A2. Threatened ecosystem type		/	
B. Geographically restricted biodiversity			
B1. Individual geographically restricted species	/		/
B2. Co-occurring geographically restricted species	/		/
B3. Geographically restricted assemblages	/		
B4. Geographically restricted ecosystem type		/	
C. Ecological integrity			
C. Ecological integrity	/	/	
D. Biological processes			
D1. Demographic aggregations	/		
D2. Ecological refugia	/		
D3. Recruitment sources	/		
E. Irreplaceability through quantitative analysis			
E. Irreplaceability through quantitative analysis	/		

3.4. Adoption of KBA in Malaysia's Conservation

Malaysia is committed in achieving the global commitment under the 2030 Agenda for Sustainable Development (2030 Agenda). According to the 3rd National Physical Plan (NPP3), there are 17 Sustainable Development Goals (SDGs) that cover five dimensions, namely People, Planet, Prosperity, Peace and Partnership [19]. Therefore, the KBA approach can support Malaysia in achieving this global commitment as it contributes significantly to the SDG15 – Goal 15 Life on Land: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. Apart from that, the KBA approach also contributes to Nature 2030 IUCN Programme under section 4.2 Land to achieve the Impact Target 1 – Ecosystems are retained and restored, species are conserved and recovered, and key biodiversity areas are safeguarded [26].

According to the National Policy on Biological Diversity 2016-2025, at least three goals and four targets will be supported by the KBA approach, namely (1) Goal 2-Target 3: By 2025, biodiversity conservation has been mainstreamed into national development planning and sectoral policies and plans; (2) Goal 3 - Target 6: By 2025, at least 20% of terrestrial areas and inland waters, and 10% of coastal and marine areas, are conserved through a representative system of protected areas and other effective area-based conservation measures and Target 9: By 2025, the extinction of known threatened species has been prevented, and their conservation status has been improved and sustained, as well as (3) Goal 5 - Target 15: By 2025, capacity for the implementation of the national and subnational biodiversity strategies, the CBD and other related multilateral environmental agreements (MEAs) has significantly increased [1].

Implementing the KBA approach will provide a comprehensive framework that complements existing approaches to identify important sites for biodiversity [7]. In line with that, KBA can also help to guide the strategic expansion of PA networks, supporting national and regional conservation planning and priority-setting, and site designation under international conventions. Moreover, it also informs the private sector to enhance safeguarding biodiversity-related policies and environmental standards and at the same time provide increased recognition and investment in site conservation efforts by local and indigenous communities [7].

4. Conclusion

In conclusion, the KBA initiative is an alternative approach to mainstream biodiversity conservation approaches in Malaysia. However, more research needs to be done on the implementation of the KBA approach in Malaysia. Nevertheless, the KBA approach is expected to offers geographic targets for the expansion of protected area coverage and identifies the site for urgent conservation action in Malaysia. At the same time, the KBA information is also expected to support stakeholders in mainstreaming biodiversity conservation into national development planning and sectoral policies and plans to provide more effective conservation planning in the future.

Acknowledgement

This study is funded under the 12th Malaysia Plan (RMK-12) entitled "Development of Key Biodiversity Areas (KBA) Directory in Perak (Phase 1)" (Vot no.: 24011401001). We would like to dedicate our greatest gratitude to Forest Research Institute Malaysia (FRIM) for providing support. We also thank all staffs of the Zoology Branch for data collection for this study.

References

- [1] NRE 2016 *National Policy on Biological Diversity 2016-2025* (Malaysia: Ministry of Natural Resources and Environment) 112.
- [2] Latiff A 2019 Biodiversity in Malaysia *Global Biodiversity Volume 1 Selected Countries in Asia* ed T Pullaiah (Canada: Apple Academic Press Inc.) 307–49.
- [3] Wyatt-Smith J, Panton W P and Mitchell B A 1963 *Manual of Malayan Silviculture for Inland Forest* (Vol 2) Malayan Forest Records No. 23 (Kuala Lumpur: Forestry Department Peninsular Malaysia).
- [4] Whitmore T C 1984 *Tropical Rain Forest of the Far East* 2nd edn (Oxford: Oxford University Press) 352.
- [5] PLANMalaysia 2016 *National Physical Plan 3 2040* (Kuala Lumpur: Federal Department of Town and Country Planning).
- [6] Kawanishi K 2015 *Panthera tigris ssp. jacksoni* The IUCN Red List of Threatened Species. Retrieved from <https://www.iucnredlist.org/species/136893/50665029>.
- [7] Langhammer P F, Butchart S H M and Brooks T M 2018 Key Biodiversity Areas *Encyclopedia of the Anthropocene* (Vol 3) eds D A DellaSala and M I Goldstein (Oxford, UK: Elsevier) 341–5.
- [8] KBA Standards and Appeals Committee 2020 *Guidelines for using A Global Standard for the Identification of Key Biodiversity Areas* v. 1.1 (Gland, Switzerland: KBA Standards and Appeals Committee of the IUCN Species Survival Commission and IUCN World Commission on Protected Areas) 206.
- [9] Key Biodiversity Areas 2020 *KBA programme*. Retrieved from <http://www.keybiodiversityareas.org/working-with-kbas/programme>.
- [10] KATS 2019 *Malaysia 6th national report for the convention on biological diversity* (Malaysia: Ministry of Water, Land and Natural Resources) 210. Retrieved from <https://www.cbd.int/doc/nr/nr-06/my-nr-06-en.pdf>.
- [11] Kawanishi K, Rayan D M, Gumal M T and Shepherd C R 2014 Extinction process of the sambar in Peninsular Malaysia *DSG Newsletter*. **26** 48–59.

- [12] Williams C, Tiwari S K, Goswami V R, de Silva S, Kumar A, Baskaran N, Yoganand K and Menon V 2020 *Elephas maximus* The IUCN Red List of Threatened Species. Retrieved from <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T7140A45818198.en>.
- [13] DWNP 2017 *Red List of Mammals for Peninsular Malaysia* (Malaysia: Department of Wildlife and National Parks Peninsular Malaysia) 207.
- [14] Hashim Z, Abdullah S A and Md Nor S 2017 Stakeholders analysis on criteria for protected areas management categories in Peninsular Malaysia *IOP Conf. Ser.: Earth Environ. Sci.* **91**(1) 012014 DOI: 10.1088/1755-1315/91/1/012014.
- [15] KATS 2019 *Master List of Protected Areas in Malaysia* (Putrajaya, Malaysia: Ministry of Water, Land and Natural Resources) 142.
- [16] WWF-Malaysia 2009 *High Conservation Value Forest (HCVF) toolkit for Malaysia* (Selangor, Malaysia: World Wide Fund for Nature-Malaysia). Retrieved from https://hcvnetwork.org/wp-content/uploads/2018/05/2009HCVF-Toolkit-Malaysia_english.pdf.
- [17] Jennings S, Nussbaum R, Judd N and Evans T 2003 *The high conservation value forest toolkit* 1st edn (Oxford: ProForest) OX 12 1–62.
- [18] PLANMalaysia 2017 *Environmentally Sensitive Area Conservation Planning and Development Guidelines* (Malaysia: Federal Department of Town and Country Planning) 211.
- [19] JPBD 2016 *3rd National Physical Plan* (Kuala Lumpur: Federal Department of Town and Country Planning).
- [20] Gullison R E 2003 Does forest certification conserve biodiversity? *Oryx*. **37**(2) 153–165.
- [21] Shahfiz M A, Munian K, Ruzman N H A, Zakaria N A and Fauzi N F M 2021 Introduction of biological parameters for Environmentally Sensitive Area (ESA) classification for permanent forest reserve: a case study based on small vertebrates' assessments in Selangor *IOP Conf. Ser.: Earth Environ. Sci.* **736** 012066.
- [22] Ambal R G R, Duya M V, Cruz M A, Coroza O G, Vergara S G, de Silva N, Molinyawe N and Tabaranza B 2012 Key Biodiversity Areas in the Philippines: priorities for conservation *J. Threat. Taxa*. **4**(8) 2788–96.
- [23] Tordoff A W, Baltzer M C, Fellowes J R, Pilgrim J D and Langhammer P F 2012 Key Biodiversity Areas in the IndoBurma Hotspot: process, progress and future directions *J. Threat. Taxa*. **4**(8) 2779–87.
- [24] Plumptre A J, Ayebare S, Behangana M, Forrest T G, Hatanga P, Kabuye C, Kirunda B, Kityo R, Mugabe H, Namaganda M, Nampindo S, Nangendo G, Nkuutu D N, Pomeroy D, Tushabe H and Prinsloo S 2019 Conservation of vertebrates and plants in Uganda: identifying Key Biodiversity Areas and other sites of national importance *Conserv. Sci. Pract.* **1**(2) e7 DOI: 10.1002/csp2.7.
- [25] KBA Canada Coalition 2021 *A National Standard for the Identification of Key Biodiversity Areas in Canada* v. 1.0. (Toronto, ON Canada: Wildlife Conservation Society Canada and Key Biodiversity Area Canada Coalition) 39.
- [26] IUCN 2021 *IUCN Nature 2030 One Nature, One Future* (Gland Switzerland: IUCN, World Conservation Congress) 23.