



The Potential of Flora and Fauna as Tourist Attractions in Biodiversity Park of Pelawan Forest, Central Bangka

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Abstract

Indonesia has a high potential for the diversity of flora and fauna species together with their ecosystem. Preservation of natural resources can be done through conservation using the concept of ecotourism. The purpose of this research is to identify the potential of the flora and fauna in Biodiversity Park of Pelawan Forest for tourist attraction. The study was conducted from October 2016 to January 2017 through inventory and in-depth interview. The analysis on the results of this study indicate that there are 41 species of 27 families of plants and 135 species of animals consisting of amphibians (6 species), reptiles (16 species), birds (99 species) and mammals (14 species). This indicates that Biodiversity Park of Pelawan Forest is very competitive for tourism attractions, which is supported by the presence of key species (*Tristaniopsis merguensis*), flagship species (*Cephalopachus bancanus*), and abundance of birds for bird watching. Based on the IUCN red list, several species of flora, such as *Gonystylus bancanus*, and fauna, such as *Setornis criniger*, *Chloropsis sonnerati*, *Macaca nemestrina*, *Nycticebus menagensis*, and *Cephalopachus bancanus*, are vulnerable to extinction. This study on flora and fauna results in the initial data that can be used to support conservation efforts. Moreover, the result of this study can provide an opportunity for visitors to enjoy these tourist attractions, which can benefit the local community.

How to Cite

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INTRODUCTION

Indonesia is a mega-biodiversity country which has a very high diversity of species and their ecosystems. At this time, it estimated that there are 42,584 species of plants (39% endemic) in Indonesia. For vertebrates, there are 720 species of mammals (53% endemic), 1,605 species of birds (20% endemic), 385 species of amphibians (41% endemic), and 723 species of reptiles (31% endemic) (Widjaja et al., 2014). However, the threat of its biodiversity extinction is one of the highest in the world due to the loss of the primary habitat, such as forests (Sutarno & Setyawan, 2015). It is caused by illegal logging, forest fires, and forest conversion or deforestation (Cleary & DeVantier, 2011).

Aside from being a habitat for plants and animals, forests act as lungs of the world. Therefore, conservation to maintain and preserve them is needed. This is stipulated in the Regulation of the Minister of Environment No. 03 of 2012 on Biodiversity Park, which serves as a backup area for local biological resources outside the region which has the function of *in situ* and *ex situ* conservation (BAPPENAS, 2016). Biodiversity Park of Pelawan Forest in Central Bangka, as one of the few biodiversity parks in Indonesia, has a key species of Pelawan trees (*Tristaniopsis merguensis*), which are significant for animals and other plants for their survival in this ecosystem (Akbarini, 2016).

The conservation activity that can be applied to sustainably preserve the diversity of the biological resources is through the concept of ecotourism because it is a clean and environmentally friendly tourism business with economic impacts for communities since it can increase the number of visits without exploiting the natural resources (Kirkby et al., 2011; Hakim et al., 2012).

Exploration of the potential of plant and animal species is necessary for the use of making basic data concerning the condition of the natural environment. The goal is to obtain data about uniqueness, excellence, and benefits that can be used to develop ecotourism, so that in turn, it can be used to formulate a sustainable ecotourism management for environmental changes (Scott, 2011). Therefore, data collection on the diversity potential of the Biodiversity Park of Pelawan Forest should be done to measure its competitiveness for it is development into a tourist attraction.

METHODS

This research was conducted at the Bio-

diversity Park of Pelawan Forest located in 106°11'00,19 E and 2°22'03,25 S in the Regency of Central Bangka in Bangka Belitung from October 2016 to January 2017. The observation was carried out along the corridor of Pelawan Forest (Figure 1). Biodiversity Park of Pelawan Forest is included in category IV in the list of the United Nations (UN), in which the main purpose of this inclusion is to protect, conserve, and restore its species and habitats (Dudley, 2008).

The data of this study are primary and secondary data. The primary data were obtained directly through observation and recording, especially in plant species, and in-depth interview about the benefits received by the public. The secondary data were obtained from results and reports from previous studies. The identification was done by cross-checking references that support this research.

The data from the analysis on the potential of forestry resources in forms of plant species that can be processed by the community into products of ecotourism attraction will be presented in tables that display family name, species name, local name, and benefits. Animal species will be represented by family name, species name, local name, and state of conservation. The criteria for determining the quality of flora and fauna is very important in identifying the competitiveness of certain species for tourist attractions. The criteria for the quality of flora and fauna diversity are presented in Table 1.

RESULTS AND DISCUSSION

Potential of Flora

Based on the results of inventory and interviews about plant species of Biodiversity Park of Pelawan Forest, there are 41 species of plants from 27 families dominated by the family of *Myrtaceae*, as presented in Table 2.

The family of *Myrtaceae* dominates plant species since this family, in general, is capable and successful to survive in acidic soil conditions and under stressful conditions. Family of *Myrtaceae* is immune to acidic soil because it can produce secondary metabolites such as phenol, one of which is tannin (Henri et al., 2016). It is also associated with the members of *Myrtaceae* family who are able to survive in nutrient-poor ecosystem habitat (Oktavia et al., 2015). Some plant species from the family of *Myrtaceae* can also be used as local plants for post-mining tin revegetation (Nurtjahya et al., 2008).

The results of this study identify 41 species of plants, which means that the species is more

than 31 in the criteria of diversity quality of flora. Thus, it can be interpreted that Biodiversity Park of Pelawan Forest is very good to be developed into ecotourism attractions (Latupapua, 2013). The species in Biodiversity Park of Pelawan Forest has a high degree of diversity. In general, the species in this list are used by the community on the island of Bangka as a climbing pole for pepper tree (37 species), firewood (13 species), building materials (12 species), pharmaceuticals (4 species), and food (4 species).

Based on data from the 41 species of plants, the outline of plant species in Pelawan Forest is still classified as many in its nature, although there are three types of plants whose conservation status are included into the category of Least Concern; i.e. jelutung (*Dyera costulata*), idat (*Cratogeomum arborescens*), and resak (*Vatica rassak*), which means that their extinction risks are still low. In addition, there is a type of plant whose conservation status is included in Vulnerable category; i.e. namang or ramin tree (*Gonystylus bancanus*), which means that the species is facing the risk of extinction in the wild in the future.

According to the people on the island of

Bangka, several species of plants, such as a leting tree (*Elaeocarpus nitidus*), rempudong tree (*Symplocos cochinchinensis*), and pelawan tree (*Tristanopsis merguensis*), are useful as a source of nectar for wild honeybee (*Apis dorsata*). *T. merguensis*, which is considered as a key species with a very large impact on the environment, is able to affect ecosystem. In addition *T. merguensis* (Figure 2), can be used as a host for edible fungus like Pelawan mushrooms (*Heimoporus* sp.) (Akbarini, 2016). This high species diversity has become an attraction for local and foreign tourist because this diversity has a uniqueness that does not exist in other areas.

Potential of Fauna

Bangka Belitung is flanked by large islands, such as Sumatra, Kalimantan, and Java, which makes its biodiversity a combination of the three islands. This is because during the Pleistocene interpluvial time, when most sea levels were very low, the islands became a “bridge” between the larger islands. Therefore, the diversity of its fauna is very diverse ranging from amphibians, reptiles, birds, and mammals.

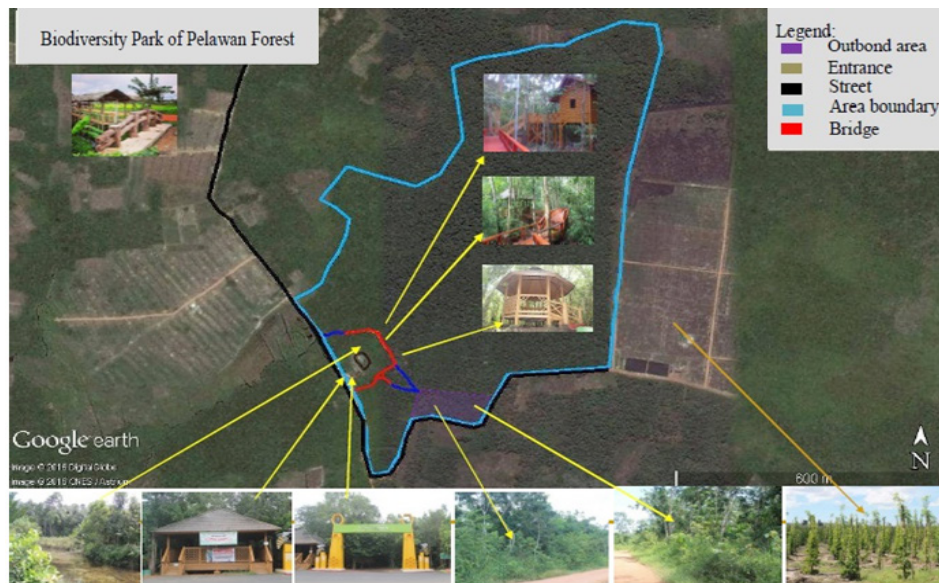


Figure 1. Map of Biodiversity Park of Pelawan Forest and site location

Table 1. Quality criteria of flora and fauna diversity

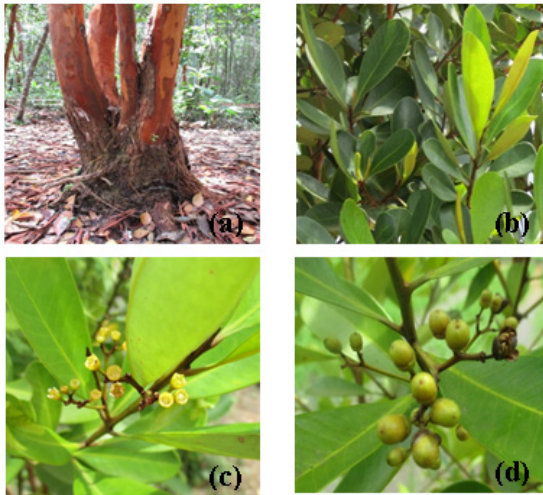
Scale	Numbers flora species	Numbers fauna species	Quality
1	< 5 species	1-2 species	Very poor
2	6-10 species	3-5 species	Poor
3	11-20 species	6-10 species	Fair
4	21-31 species	11-15 species	Good
5	> 31 species	> 15 species	Very good

Source: (Latupapua, 2013).

Table 2. Flora in Biodiversity Park of Pelawan Forest

Family	Scientific Name	Local Name	Other Potential Benefits*)				
			I	II	III	IV	V
<i>Anacardiaceae</i>	<i>Camponosperma auriculatum</i>	Terentang	√				√
	<i>Gluta velutina</i>	Mengkikir	√				
<i>Apocynaceae</i>	<i>Dyera costulata</i>	Jelutung	√		√		√
<i>Aquifoliaceae</i>	<i>Ilex cymosa</i>	Mensirak	√				
<i>Araliaceae</i>	<i>Polyscias biformis</i>	Juluk Antu	√				
<i>Bonnetiaceae</i>	<i>Ploiarium alternifolium</i>	Riang-riang	√				
<i>Calophyllaceae</i>	<i>Calophyllum lanigerum</i>	Mentangor belulang	√				√
	<i>Calophyllum pulcherrimum</i>	Mentangor prit	√		√		√
<i>Clusiaceae</i>	<i>Garcinia parvifolia</i>	Asam kandis					√
<i>Dilleniaceae</i>	<i>Dillenia suffruticosa</i>	Simpur	√				
<i>Dipterocarpaceae</i>	<i>Vatica rassak</i>	Resak	√				
<i>Elaeocarpaceae</i>	<i>Elaeocarpus nitidus</i>	Leting	√				
<i>Euphorbiaceae</i>	<i>Hevea brasiliensis</i>	Karet			√		
<i>Fagaceae</i>	<i>Lithocarpus blumeanus</i>	Kabal putih	√		√		
<i>Guttiferae</i>	<i>Cratoxylum arborescens</i>	Idat	√		√		√
<i>Lamiaceae</i>	<i>Vitex pinnata</i>	Leban	√	√	√		
<i>Lauraceae</i>	<i>Litsea firma</i>	Medang	√				
<i>Melastomataceae</i>	<i>Pternandra rostrata</i>	Mengketan	√		√		
<i>Myrtaceae</i>	<i>Eugenia lepidocarpa</i>	Samak	√	√			
	<i>Melaleuca leucadendra</i>	Gelam merah	√		√		√
	<i>Rhodamnia cinerea</i>	Merapin	√	√	√		√
	<i>Syzygium attenuatum</i>	Sisel	√		√		
	<i>Syzygium bisulea</i>	Jambu utan	√				√
	<i>Syzygium decipiens</i>	Isot-isot	√				√
	<i>Syzygium lineatum</i>	Kebecir	√				
	<i>Syzygium muelleri</i>	Uber	√				
	<i>Syzygium pachyphyllum</i>	Sabar bubu	√				
	<i>Syzygium perforatum</i>	Mengkalai	√		√		
<i>Syzygium racemosum</i>	Bantui	√					
	<i>Tristaniopsis merguensis</i>	Pelawan	√	√	√		√
<i>Pentaphylacaceae</i>	<i>Adinandra dumosa</i>	Pelempang hitam	√		√		√
<i>Phyllanthaceae</i>	<i>Aporosa microcalyx</i>	Pelangas	√				√
<i>Proteaceae</i>	<i>Helicia serrata</i>	Keratong	√				
<i>Rhizophoraceae</i>	<i>Gynotroches axillaris</i>	Mengkelik	√				
<i>Rubiaceae</i>	<i>Gaertnera vaginans</i>	Kayu abu	√				
	<i>Timonius flavescens</i>	Kayu ruan	√				
<i>Sapindaceae</i>	<i>Guioa pubescens</i>	Pulas	√				
<i>Sapotaceae</i>	<i>Palaquium rostratum</i>	Nyatoh					√
<i>Symplocaceae</i>	<i>Symplocos cochinchinensis</i>	Rempudong	√				
<i>Theaceae</i>	<i>Schima wallichii</i>	Seruk	√		√		√
<i>Thymelaeaceae</i>	<i>Gonystylus bancanus</i>	Namang/ramin	√				√

*) : I: climbing pole for pepper tree; II: pharmaceuticals; III: firewood; IV: food; and V: building materials



Photograph: personal document/by Henri, 2016
Figure 2. Key species (*Tristaniopsis merguensis*). a) stem; b) leaf; c) flower; and d) fruit

Composition diversity of various plant species is the carrying capacity of suitable habitat for various species of animals, such as vertebrates. The composition of this biodiversity can lead to the mutualistic relation in the interaction in the habitat. The results of data processing supported by the secondary data show that various species of vertebrate inhabit Biodiversity Park of Pelawan Forest; they are 3 families of amphibians (6 species), 8 families of reptiles (16 species), 35 families of birds (99 species), and 8 families of mammals (14 species), as shown in Table 3.

Table 3. Fauna in Biodiversity Park of Pelawan Forest

Fauna	Family	Species	(%)
Amphibians	<i>Bufo</i>	2	33.33
	<i>Rana</i>	2	33.33
	Rhacophoridae	2	33.33
	Total	6	100
Reptile	<i>Agamidae</i>	2	12.5
	<i>Colubridae</i>	4	25
	<i>Gekkonidae</i>	1	6.25
	Geoemydidae	1	6.25
	<i>Natricidae</i>	1	6.25
	<i>Pythonidae</i>	1	6.25
	<i>Scincidae</i>	4	25
	<i>Varanidae</i>	2	12.5
	Total	16	100
Bird	<i>Acanthizidae</i>	1	1.01
	<i>Accipitridae</i>	1	1.01

<i>Aegithinidae</i>	2	2.02	
<i>Alcedinidae</i>	8	8.08	
Ardeidae	2	2.02	
<i>Campephagidae</i>	3	3.03	
<i>Caprimulgidae</i>	2	2.02	
<i>Chloropseidae</i>	3	3.03	
<i>Columbidae</i>	4	4.04	
Corvidae	1	1.01	
<i>Cuculidae</i>	9	9.09	
<i>Dicaeidae</i>	4	4.04	
<i>Dicruridae</i>	1	1.01	
<i>Eurylaimidae</i>	2	2.02	
Hemiprocnidae	1	1.01	
Laniidae	2	2.02	
Megalaimidae	2	2.02	
<i>Meropidae</i>	2	2.02	
<i>Monarchidae</i>	2	2.02	
Muscicapidae	6	6.06	
<i>Nectariniidae</i>	8	8.08	
<i>Pachycephalidae</i>	1	1.01	
<i>Pellorneidae</i>	1	1.01	
<i>Phasianidae</i>	3	3.03	
Phylloscopidae	1	1.01	
<i>Picidae</i>	5	5.05	
<i>Pittidae</i>	2	2.02	
<i>Pycnonotidae</i>	6	6.06	
<i>Rallidae</i>	2	2.02	
Strigidae	2	2.02	
<i>Sylviidae</i>	2	2.02	
<i>Tephrodornithidae</i>	1	1.01	
<i>Timaliidae</i>	4	4.04	
<i>Trogonidae</i>	2	2.02	
Turnicidae	1	1.01	
Total	99	100	
Mammals	<i>Cercopithecidae</i>	3	21.43
	<i>Cynocephalidae</i>	1	7.14
	<i>Lorisidae</i>	1	7.14
	Pteropodidae	1	7.14
	<i>Rhinolophidae</i>	2	14.29
	<i>Sciuridae</i>	4	28.57
	<i>Tarsiidae</i>	1	7.14
	<i>Tupaiidae</i>	1	7.14
	Total	14	100

Based on the data of the composition abundance of various species, the number of fauna species in Biodiversity Park of Pelawan Forest is very abundant (>15 species), so that the element of becoming a tourist attraction is in the category of very good and competitive for development (Latupapua, 2013).

The most abundant fauna is bird species, such as the family of *Alcedinidae* (8 species), *Cuculidae* (9 species), *Muscicapidae* (6 species), *Nectariniidae* (8 species) and *Pycnonotidae* (6 species). One species of bird that is endemic to Bangka Island is the green paok (*Pitta sordida*) (Figure 4b). This indicates that some species of birds in the families can live together in one habitat and can form a community so that interaction with other species in the habitat appears. This diversity of birds also indicates that Biodiversity Park of Pelawan Forest can be used as an indicator of ecosystem stability (Susanto et al., 2016). The high abundance of bird species becomes a special priority to determine its conservation indicators, such as endemism, populations status, and endangered species (Hadiprayitno et al., 2016).

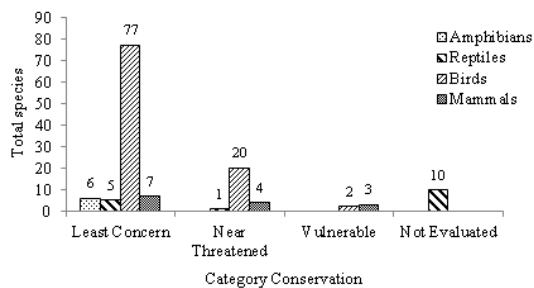


Figure 3. Conservation status of fauna in Biodiversity Park of Pelawan Forest

Based on Figure 3, the status of fauna conservation specified under IUCN (International Union for Conservation of Nature) proves that, in general, the types of fauna in the Pelawan Forest are still included in the Least Concern category, which means that their extinction risks are still low. Several other fauna species are included in the category of Vulnerable, where these species are facing the risk of extinction in the wild in the future. The species are empuloh paruh kait (*Setornis criniger*) (Figure 4a), cica daun besar (*Chloropsis sonnerati*), beruk (*Macaca nemestrina*), kukang bukung (*Nycticebus menagensis*), and krabuku ingkat or mentilin (*Cephalopachus bancanus*) (Figure 4c).



Photograph: by Syahputra.

Figure 4. Fauna Biodiversity Park of Pelawan Forest. a) *Setornis criniger*; b) *Pitta sordida*; and c) *Cephalopachus bancanus*

Fauna on Pelawan forest has a uniqueness in terms of its flagship species. They are krabuku ingkat, or mentilin in local language, with the scientific name of *Cephalopachus bancanus*. This species the identity of Bangka-Belitung. In contrast to its relatives in Sulawesi (krabuku tangkasi), this nocturnal primate is solitary, or lone-living, animal. The conservation status of this species is vulnerable, which means that this species is facing the risk of extinction in the wild life of the future. *Cephalopachus bancanus* can have up to 2-3 hectares territorial area, except during the mating season, where males and females live together for some times. Females usually give birth to the pups after 6 months of pregnancy (Syahputra, 2016).

Biodiversity Park of Pelawan Forest has a high and unique flora and fauna diversity potential such as Pelawan tree a key species (*Tristaniaopsis merguensis*) (Akbarini, 2016), as well as flagship species of Bangka Island, i.e. the mentilin (*Cephalopachus bancanus*) (Syahputra, 2016). In addition to key species and flagship species, the high bird abundance of Biodiversity Park of Pelawan Forest can be used as bird watching attraction. Bird watching is one of tourism activities directly related to the nature (Connell, 2009).

This potential has an important contribution to the community through ecotourism development that has a direct role in improving the economy (Adamu et al., 2015). Ecotourism development is not limited to visits from tourists, in terms of improving economic returns. It also reaches preservation of local culture and natural environment (Ahmad, 2014).

The development Biodiversity Park of Pelawan Forest with the involvement of community is the most significant thing in maintaining the nature. Resources and environment are the most important factors in ensuring sustainable tourism development. Tsaur et al., (2006), proposed three tourism management strategy as follows: The primary concern for the development of ecotourism is an urgency to pay attention to the negative impact on the environment, degradati-

on, and destruction. Here does the government have a role to overcome the problem that does not correspond to the use of biological resources by making regulations to support resource protection and conservation strategy; For community and citizens, the primary concern is to protect the livelihood of citizens so as to maintain the attractiveness of the environment. Sustainable tourism needs to add values in involving the community in a fair process; For tourists, let alone making visitors enjoy high-quality tourism activities, managers must provide them with interpretive services by providing environmental education.

This study on flora and fauna results in initial data that support the conservation efforts in Biodiversity Park of Pelawan Forest. Moreover, this potential of flora and fauna can provide an opportunity for visitors to enjoy these tourist attractions, which can benefit the local community. According to Kiper (2013), tourism development can become a sustainable tourism if it focuses on three things: a) quality, improvement on the environmental quality so that the tourist attraction will attract more tourists to revisit; b) sustainability, the development of tourism areas must be accompanied by preservation and regeneration of natural resources; and c) balancing between the needs of tourists and environmental protection by carrying capacity on the tourist attraction. The role of local communities and stakeholders can be mutually beneficial, which is seen as an economic concept of sustainability in increasing long-term economic objectives and environmental stewardship.

CONCLUSIONS

Based on the data of potential, there are 24 plant families (41 species) and 135 species of vertebrates, with the composition of amphibians (6 species), reptiles (16 species), birds (99 species) and mammals (14 species), living in Biodiversity Park of Pelawan Forest. Thus, it can be said that this park is very suitable for ecotourism attraction. This is supported by an identity or a characteristic in a form of the presence of key species, flagship species, and abundance of birds for bird watching that can become a sustainable tourist attraction and destination in Central Bangka. The role of communities and governments should be optimized to preserve this diversity without neglecting environmental sustainability factors.

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