RESEARCH ARTICLE

MEDIA KONSERVASI
SCIENTIFIC JOURNAL IN CONSERVATION OF NATURAL RESOURCES AND ENVIRONMENT

Development of Nature Based Tourism in Sultan Syarif Hasyim Grand Forest Park, Riau Province

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Article Info:
Received 5 November 2023
Revised 16 May 2024
Accepted 24 May 2024

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Abstract

The Nature Conservation Area of the Forest Park in Riau Province is Tahura (Forest Park) Sultan Syarif Hasyim (SSH). SSH Forest Park is a natural tourist destination located near urban areas, offering great potential for development. However, the management of Forest Park and natural tourism in SSH Forest Park is currently considered not optimal. Indonesia's biodiversity and ecosystems play a crucial role in human life, and therefore, they must be managed sustainably. One way to conserve Indonesia's biodiversity is through the sustainable use of the area, achieved through the assessment and analysis of Objects and Natural Tourism Attractions (ONTA). This research aims to conduct an assessment and analysis of SSH Forest Park Objects and natural tourism attractions, and compile the development of natural tourism and ecotourism in SSH Forest Park. The methods employed include a literature review, field observations, assessments of the nature reserve, and interviews. The tourist attraction in Sultan Syarif Hasyim Forest Park consists of both physical and biotic aspects, with a high assessment classification (feasible) developed. The proposed natural tourism development includes wildlife tourism (primarily primate tourism) and thematic plant collection parks, featuring typical plant collections of Riau Province, plant collections of the Dipterocarpaceae family, collections of medicinal plants, and collections of fruit-producing plants.

Keywords: objects and natural tourism attraction, thematic plant collection, wildlife tourism

1. Introduction

The SSH conservation area is surrounded by 6,747 villages, with approximately 16 million dependents relying on natural resources and land to meet their needs. Land cover change occurred in 1.8 million ha (7% of the total area of the conservation area) to open land, indicating damage or degradation to the ecosystem. Damage occurs due to encroachment, illegal logging, animal hunting, and damage caused by both natural and human factors [1]. Based on Law No. 5 of 1990, Indonesia's biodiversity and ecosystems play a crucial role in human life, and therefore, they must be managed sustainably. One way to conserve Indonesia's biodiversity is through the sustainable use of the area through the development of objects and natural tourism attractions (ONTA). Tourist attractions and objects are crucial elements in the tourism industry [2]. Tourism activities have the potential to develop in various forest areas in Indonesia [3]. Tourism development can be a solution to the pressure on forests as a new source of livelihood for communities [4].

The Sultan Syarif Hasyim Forest Park is a natural tourist destination located near urban areas and has potential for further development. Nature tourism is an activity based on the natural environment, with a focus on physical, biotic, and cultural objects [5]. Nature tourism is an activity chosen by urban communities [6]. The hustle and bustle of the city have made people want to return to nature. A beautiful environment can provide visitors with tranquility and comfort. Nature recreation and tourism activities are also basic human needs, serving as a means for people to escape boredom. Nature tourism enables visitors to immerse themselves in nature in a way that many people cannot experience in the routine of urban life. Based on the potential of natural resources in the forest park, nature tourism in SSH forest parks can be developed based on the principle of developing natural tourism, including

that related to nature, which is beneficial for oneself and socially, not mass tourism, and undergoing programs that challenge tourists physically and mentally [7].

The management of natural resources and ecosystems is crucial for the conservation of tourism planning and development at tourist destinations [8]. Sustainable forest management can be achieved through sustainable tourism management [9]. The application of sustainability principles is the best way to protect tourist destinations from social, cultural, and environmental degradation [10]. This study aims to conduct an assessment and analysis of the Objects and Natural Tourism Attractions (OBTA) of SSH Forest Park and compile the development of natural tourism in SSH Forest Park.

2. Materials and Methods

2.1. Time and Location of Research

This research was conducted from September to October 2023 at Sultan Syarif Hasyim Grand Forest Park (SSH Forest Park), which falls under the jurisdiction of the Riau Provincial Forestry Office and is part of Pekanbaru City, Kampar Regency, and Siak Regency areas. Data collection was carried out in the utilization block of the Sultan Syarif Hasyim Forest Park. A map of the research locations is shown in Figure 1.

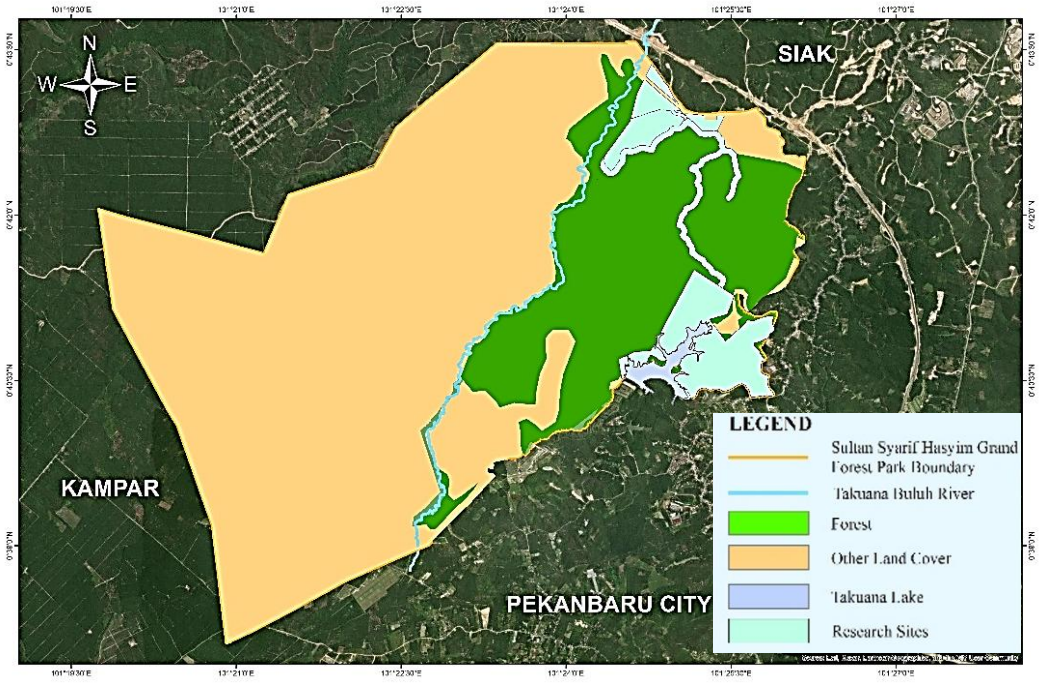

Figure 1. Map of the research location.

2.2. Tools and Instruments

The tools used in this study were stationery, cameras, Avenza Maps, binoculars, and field guides. The instruments used are the assessment instrument of the Analysis of Operational Area Analysis - Objects and Natural Tourism Attraction (OAA-ONTA)[11], an interview guide, and a map of Sultan Syarif Hasyim Forest Park. The interview guidelines used include interview guidelines for stakeholders related to the development of natural tourism in Forest Parks and field officers. The maps used include the Tahura Administrative Boundary Map, Tahura Land Cover Map, and Tahura Block Map.

2.3. Data Collection Methods

The methods used for data collection included literature studies, field observations, and interviews. The data collected consisted of information on the potential of natural resources in SSH Forest Park and potential natural tourism attractions in SSH Forest Park. The types and methods used for the data retrieval are listed in Table 1.

Table 1. Types and methods of data collection.

No.	Data type	Method	Collected Data
1	Forest Park Natural Potential	Literature review, interviews, and field verification OAA-ONTA	a. Physical potential b. Biotic potential c. Socio-cultural potential of the community
2	Natural Tourism Attraction Potential		a. Attraction b. Accessibility c. Supporting facilities d. Security

2.3.1 Interview

The interviews were conducted using a complete and systematic intervention guide to collect data [12]. Respondents who will be interviewed include stakeholders related to the development of natural tourism in Forest Parks and field officers. Interviews were conducted to obtain data and information on the current condition of Forest Park, the potential of Forest Park's natural resources, and the development of natural tourism in Sultan Syarif Hasyim Forest Park, Riau Province.

2.3.2 Field Observation

The data on the natural resources potential of Forest Park, obtained through a literature review, were then verified in the field. Natural resources for recreational and natural tourism activities are identified by recording current conditions and their potential use in the future [7]. Identifying natural resources for tourism focuses on unique and interesting natural features, such as shapes and colors [7]. The data recorded included the potential of plants and animals with unique appeal and beauty in terms of aesthetics, protected plants, species with distinctive morphology, those widely found, and species used by the community. The methods used to collect plant and animal data were as follows.

a. Plant data begins with literature studies, interviews, and field identification, which involves examining the presence of species in the field. The collected data include species information on plant potential, encompassing plants with unique attractiveness and beauty in terms of aesthetics, protected species, those with distinctive morphology, widely distributed species, and those utilized by the community.

b. Wildlife data begins by examining the dynamics of key animals based on literature studies, scientific reports, and interviews, which are then verified again in the field. Observation was continued by focusing on individual animals over a specified period to collect detailed data describing their behavior during active periods. Observations were conducted from 06.00 to 17.00 UTC+7 for at least three days. The results obtained included data on the time and location of animals, animal activity, and points of interest for viewing animals.

Data on the potential of Forest Park's natural resources are then assessed based on modifications to the Guidelines for Operational Area Analysis - Objects and Natural Tourism Attractions (OAA-ONTA), compiled by the Director General of Forest Protection and Nature Conservation (2003) [8]. The application of data analysis using OAA-ONTA aims to assess the area's condition and determine a priority scale for the development and planning of alternative tourism destinations. The elements/sub-elements are listed in Table 2.

Table 2. OAA-ONTA assessment criteria.

Data Type	Elements of Assessment
Attraction	- Beauty
	- Uniqueness
	- Scarcity
	- A variety of tourist activities that can be done
Accessibility	- Road conditions and distance from the capital city of Riau Province
	- Travel time from the Capital City
	- Distance to Sultan Syarif Kasim II Airport
Supporting facilities and infrastructure	- Tourism infrastructure
	- Public infrastructure
	- Conditions of facilities and infrastructure
Security	- Travel safety
	- Fire
	- Illegal logging
	- Encroachment

2.4 Data Analysis

The data and information collected were analyzed using the modified Analysis of the Operational Area Analysis - Objects and Natural Tourism Attractions (OAA-ONTA) developed by the Director General of PJKA in 2003. ONTA assessment recapitulation was analyzed using a scoring method. The value of each criterion is the sum of the values of each related element or sub-element. The weight value of each criterion varies from one another, ranging from 1 to 6. The value of each element and sub-element can vary depending on the condition of the object being assessed based on predetermined criteria. The attractiveness criterion has the highest weight value of six, as it is the primary factor that attracts visitors. Accessibility is assigned a weight of five because it is an important factor in encouraging visitor attendance. The supporting infrastructure is 3, because procurement is not too difficult. Security is given a weight of five, as it relates to the comfort of visitors [11]. The sum of the values for one criterion was calculated using the following formula:

$$S = N \times B$$

Information:

S = Score/value of a criterion

N = Number of values of elements in the criterion

B = Value weights

The results of the ONTA assessment were classified in order of priority using the following formula:

$$\text{Result of ONTA potential assessment} = A/B \times 100\%$$

Information:

A = Score criteria

B = Total score of criteria

The feasibility index (%) was obtained after comparison. A feasibility rate of more than 66.6% was classified as highly feasible. A feasibility rate of 33.3%–66.6% was classified as moderate feasibility, and a feasibility rate of less than 33.3% was classified as low feasibility. This allows us to determine the feasibility of further developing the tourism destination.

3. Results and Discussion

3.1. Results

3.1.1. Potential Natural Resources in Forest Park

The physical potential in the SSH Forest Park area includes potential river and lake water resources. The largest river flowing in the SSH Forest Park area is the Takuana River. On the edge of the SSH Forest Park area, there is also a lake whose water originates from the Takuana Sonsang River, a tributary of the Takuana River. This lake is one of the natural attractions of the SSH Forest Park. Lakes found in Forest Parks include Lake Ammo, Lake Sultan, and Lake Pak Sadar.

Plant diversity can be seen from high-economy wood species of the Dipterocarpaceae family which are still widely found such as singkawang (*Shorea singkawang*), meranti rambai (*Shorea acuminata*), lime (*Dryobalanops lanceolata*), lime guras (*Dryobalanops oblongifolia*), kruing (*Dipterocarpus crinitus*), and tengkawang (*Shorea seminist*). The species of stakes, poles, and trees found in SSH Forest Park include spoons (*Endospermum diadenum*), medang (*Litsea firma*), terap (*Artocarpus elasticus*), petatal (*Ochanostachys amentacea*), chelate (*Syzygium densiflorum*), aloe (*Aquilaria malaccensis*), bird mackerel (*Melicope ptelefolia*), fences (*Ixonanthes icosandra*), mempening (*Quercus robur*), and marpoyan (*Rhodamnia cinerea*).

Non-woody plant species found in the SSH Forest Park include rattan or palms (Arecaceae), ferns (Pteridophyta), pandanans (Pandanaceae), and taro (Araceae). On the forest floor, species of herbs, palms, and ferns can also be found, such as *Labisia pumila* (Myrsinaceae), *Tacca chantrieri* (Dioscoreaceae), *Scindapsus* sp. (Araceae), the palm *Liquala* sp. (Arecaceae), and the fern *Diplazium* spp. (Athyriaceae). In open places, teki (*Cyperus* spp.), spikes (*Nephrolepis* spp.), *Mucuna* sp., and resin or andam nails (*Dicranopteris linearis*).

Based on the results of identifying potential wildlife in SSH Forest Park, the species of wildlife found include agile gibbons (*Hylobates agilis*), langurs (*Trachypithecus cristatus*), long-tailed monkeys (*Macaca fascicularis*), southern pigtail macaque (*Macaca nemestrina*), coconut squirrels (*Callosciurus notatus*), Sumatran elephants (*Elephas maximus sumatranus*), stone kite (*Hirundo tahitica*), finch lizard (*Pycnonotus aurigaster*), house lizard (*Apus nipalensis*), cow wallet (*Collocalia esculenta*), and spotted dove (*Streptopelia chinensis*), Sumatran ampis takur (*Calorhamphus hayii*) and finch lizard (*Pycnonotus aurigaster*). Predatory birds were found in abundance around the camping area. Some of them are the black eagle (*Ictinaetus malayensis*) and the crested serpent eagle (*Spilornis cheela*). Other bird species encountered are punai (*Treron olax),* white-throated kingfisher (*Halcyon smyrnensis*), cinenen (*Orthotomus* spp.), the long-tailed shrike (*Lanius schach*), bubut alang alang (*Centropus bengalensis*), and spotted dove (*Streptopelia chinensis*). Grand Forest Park also found several species of butterflies, such as *Papilio nephelus*, *Delias* sp., *Junonia iphita*, and *Eurema hecabe*.

3.1.2. Objects and Natural Tourism Attraction (ONTA) Assessment

a. Attractiveness Criteria

1. Natural Beauty

The criteria of natural beauty can be observed from a loose view of the object, the variety of views, color harmony, and the view of the environment within the object [13]. Assessment of the beauty element/subelement yielded a value of 30. The value is obtained from four sub-elements: the view of the direction of the object, the variation of views, color harmony, and the view of the environment in the object (Table 3).

Table 3. Assessment of elements of natural beauty.

Sub elements	Number of appropriate sub elements				
	4	3	2	1	None
a. Detach view towards the object * b. Variation of views * c. Views of the environment in object * d. Colour harmony *	(30)	25	20	15	10

Note: *appropriate sub elements; the number in the circle is score of the assessment

2. Uniqueness of Natural Resources

The uniqueness of natural resources is characteristic of a tourist destination that may not necessarily be found in other locations. The SSH Forest Park has a value of 25 because it has four unique SDAs (Table 4). This uniqueness includes plants, animals, lakes, and an Elephant Training Center. The uniqueness of natural resources from plant sub-elements is evident in the main composition of the SSH forest park ecosystem. The uniqueness of natural resources from animal sub-elements is evident in the presence of mammals and birds, which visitors can easily observe in their natural habitats. The uniqueness of natural resources from the lake sub-element is evident in the existence of two lakes that were accidentally formed in the SSH Forest Park, which in turn created a distinctive ecosystem. The uniqueness of natural resources in Forest Parks can also be seen from the existence of the Elephant Training Center. PLG Minas is a conservation area managed by the BBKSDA in Riau Province.

Table 4. Assessment of elements of uniqueness of natural resources.

Sub elements	Number of appropriate sub elements				
	5	4	3	2	1
a. Plant* b. Animal* c. Lake* d. Elephant Training Center* e. Customs/culture	30	(25)	20	15	10

Note: *appropriate sub elements; the number in the circle is score of the assessment

3. Scarcity of Natural Resources

The SSH Forest Park area is home to a diverse array of rare and endangered plant species. Plant species that are threatened with extinction based on the IUCN Red List include agarwood (*Aquilaria malaccensis*) CR, meranti turmeric (*Shorea conica*) CR, chestnut (*Castanopsis argentea*) EN, balam (*Madhuca sericea*) VU, singkawang (*Shorea singkawang*) VU, keruing (*Dipterocarpus crinitus*) VU, and so on. The forest area of Sultan Syarif Hasyim Forest Park is important because it also contains endangered/protected species, according to the IUCN Red List, CITES, and Minister of Environment and Forestry No. 106/MENLHK/SETJEN/KUM.1/12/2018. Some species found in the field include the southern pigtail macaque (*Macaca nemestrina*) VU/App II, long-tailed monkeys (*Macaca fascicularis*), langurs (*Trachypithecus cristatus*) VU/App II, agile gibbons (*Hylobates agilis*) VU/App II/Protected, Sumatran elephant (Elephas maximus) CR/App I/Protected, black eagles (*Ictinaetus malayensis*), and App II/Protected. The assessment of the scarcity element/sub-elements obtained a value of 30. The assessment of natural resource scarcity in the SSH Forest Park is presented in Table 5.

Table 5. Assessment of elements of natural resource scarcity. .

Sub elments	Number of appropriate sub elements			
	3	2	1	None
a. IUCN Red List* b. CITES Appendix* c. Minister of Environment and Forestry Regulation No. P.16 of 2018*	(30)	25	20	15

Note: *appropriate sub elements; the number in the circle is score of the assessment

4. Variety of Nature Tourism Activities

A variety of natural tourism activities is a type of nature-based tourism activity that can be performed in tourist destinations. The SSH Forest Park receives a score of 30 because it has more than five types of natural tourism activities. These activities included enjoying the natural beauty, observing animals, exploring potential forest stands, fishing, and swimming. The assessment of the activity variation is shown in Table 6.

Table 6. Assessment of elements of variation in natural tourism activities.

Sub elements	Number of appropriate sub elements				
	5	4	3	2	1
a. Enjoy the beauty* a. Education, research * b. Tracking and camping* c. Wildlife tourism* d. Photo hunting/ photograph	(30)	25	20	15	10

Note: *appropriate sub elements; the number in the circle is score of the assessment

Natural tourism attraction serves as the primary reason for travelers to visit a particular destination. The assessment of natural tourism attraction criteria in Sultan Syarif Hasyim Forest Park yielded a score of 690, indicating a high feasibility classification. This score was obtained by multiplying the total value of all elements by the weight of the natural tourism attraction criteria. The results of the attractiveness criteria assessments are presented in Table 7.

Table 7. Attractiveness criteria assessment results.

Sub elements	Assessment scores
Natural beauty	30
Peculiarities of natural resources	25
Scarcity of natural resources	30
Variety of nature tourism activities	30
Total value of all elements	115
Score (Total number times weight 6)	690
Feasibility index value	95.83%
Development classification	High feasibility

a. Accessibility Criteria

Accessibility is a factor that makes it easier for visitors to travel to tourist destinations. Sultan Syarif Hasyim Forest Park is located on the edge of the highway connecting the cities of Pekanbaru, Minas, Duri, and Dumai. The SSH Forest Park is a strategic tourist destination due to its proximity to the capital of Riau Province, Pekanbaru City. The journey to SSH Forest Park from the center of the Provincial Capital City was 25 km, with a travel time of 37 minutes. If the trip starts from the air gate, the Sultan Syarif Kasim II Airport is reached in approximately 32 km in 50 minutes. The SSH Forest Park is also accessible for ± 2 h from Duri City or the center of Siak City. The road leading to the SSH Forest Park is a provincial road that has been paved with a width of 35 meters, allowing various types of land vehicles to access it. However, directional signs towards Forest Park Sultan Syarif Hasyim have not been found

along the way, making it difficult for visitors who want to come, and resulting in this area not being well known by the public. Directional signs are found only in inter-city directions. ONTA assessment of the accessibility criteria yielded a score of 135. The assessment results are listed in Table 8.

Table 8. Assessment of accessibility elements.

No	Elements/sub elements	Assessment scores			
1	Road conditions and distance from the capital city of Riau Province	Good Asphalt road width > 3 m and there is public transportation Common	Sufficient The asphalt road is < 3 m wide and there are vehicles Common	Moderate Stone road and no vehicles available common	Bad Dirt roads and no vehicles available common
	Distance < 30 km	(80)	60	40	20
	30≤ Distance < 40 km	60	40	25	15
	40≤ Distance < 50 km	40	20	15	5
	Distance ≥ 50 km	20	10	5	0
2	Travel time from center Pekanbaru city	1 – 2 hours (30)	2 – 3 hours 25	3 – 4 Hours 20	> 5 hours 15
3	Distance to international air gate, airport Sultan Syarif Kasim II	< 30 km 30	30 – 40 km (25)	40 – 50 km 20	> 50 km 15

Note: the numbers in the circles are of result of the assessment scores

The accessibility assessment in Sultan Syarif Hasyim Forest Park yielded a score of 675, resulting in a high feasibility classification. This score was obtained by multiplying the total value of all elements by the weight of the accessibility criteria. Accessibility is essential as it facilitates ease and convenience for visitors in undertaking their travel and tourism activities. The classification of the accessibility criteria is presented in Table 9.

Table 9. Accessibility criteria assessment results.

Sub elements	Assessment scores
Road conditions and distances	80
Road Type	30
Travel time from the airport	25
Total scores of all criteria	135
Score (Total number times weight 5)	675
Feasibility index value	96%
Development classification	High feasibility

b. Criteria for Supporting Infrastructure Facilities

Tourism development is closely tied to the availability of facilities and infrastructure. Infrastructure plays a role in supporting the ease of travel. The elements assessed in this criterion include tourist infrastructure, public infrastructure, and infrastructure conditions. An assessment of the elements and sub-elements of infrastructure facilities is presented in Table 10.

Table 10. Assessment of infrastructure elements.

Element/sub elements	Number of appropriate sub elements				
Tourism infrastructure	5	4	3	2	1
a. Information center* b. Tree signage* c. Natural tourist object map d. Interpretation poles e. Natural resources banner	30	25	20	(15)	10
Public infrastructue facilities	5	4	3	2	1
a. Electric network * b. Telephone network* c. Direction signboard * d. Restroom* e. Place of worship*	(30)	25	20	15	10
The condition of infrastructure facilities	Very good 30		Good 20		Less good 10
a. Information center					✓
b. Tre Signage			✓		
c. Electricity network	✓				
d. Direction sign board					✓
e. Telephone network	✓				
f. Restroom					✓
g. Place of worship			✓		

Note: *appropriate sub elements; the numbers in the circles are result of the assessment scores

The assessment of facilities and infrastructure yielded a score of 555, corresponding to a medium feasibility classification. This score was calculated by multiplying the total value of all elements by the weight assigned to the supporting facilities and infrastructure criteria. The results of the facility and infrastructure assessment are presented in Table 11.

Table 11. Results of assessment criteria for infrastructure facilities.

Sub elements	Assessment scores
Tourism facilities and infrastructure	15
Other facilities and infrastructure	30
Condition of facilities and infrastructure	130
Total value of all criteria	175
Score (Total sum multiplied by weight 3)	555
Feasibility index value	64.81%
Development classification	High feasibility

d. Security Criteria

Safety is a factor that affects the comfort and satisfaction of visitors to tourist attractions. Security criteria are divided into the following categories: tourist security, visitor safety protection, fire, illegal logging, encroachment, threats to wildlife, and threats to the SSH Forest Park area (Table 12). The tourist safety element receives a score of 15 because SSH Forest Park disturbances may arise from the disturbance of long-tailed monkeys. Visitor safety protection received a value of 20 because the SSH Forest Park was not equipped with information and danger warning boards. The fire element received a value of 20 because, historically, fires have occurred in the SSH Forest Park area. Forest and land fires have the potential to occur in the SSH Forest Park, which is supported by natural factors and community activities. The illegal logging element received a value of 20 because illegal logging activities were still found in 2022. The threat to wildlife received a score of 15 because there was still potential for animal hunting, elephant deterrence, and community and wildlife conflicts. The threat element to the SSH Forest Park area can be seen in the pile of garbage in the SSH Forest Park.

Table 12. Security element assessment.

Elemens/sub elements	Number of appropriate sub elements			
Tourist Safety a. Long-tailed monkey disturbance* b. Fallen tree* c. Visitor injured due to falling/slippery conditions* d. Slipped/drowned in the lake*	None	1	2	3
	30	25	20	(15)
Protection of visitor safety a. Visitors assurance b. Information boards and boards Hazard warning c. Supervision* d. Visitors assistance*	4	3	2	1
	30	25	(20)	15
Fire (by cause)	Nature	Unintentional	Intentional	Other
	30	25	(20)	15
Illegal logging	Private	Public	Sale and purchase	Ilegal wholesale trade
	30	(25)	20	15
Encroachment a. Shifting cultivation b. Permanent cultivation* c. Plantation* d. Settlement*	None	1	2	3
	30	25	20	(15)
Threats to wildlife a. Wildlife hunting* b. Elephant removal* c. Conflict with wildlife*	None	1	2	3
	30	25	20	(15)
Threats to the region a. Garbage* b. Vandalisme c. Disruption of environmental function	None	1	2	3
	30	(25)	20	15

Note: *appropriate sub elements; the numbers in the circles are result of the assessment scores

The security criteria assessment resulted in a score of 675 with a medium feasibility classification. This score is obtained by multiplying the total value of all the elements by the weight of the security criteria. The results of the security criteria assessments are presented in Table 13.

Table 13. Security criteria assessment results.

Sub elemenst	Assessment scores
Tourism security	15
Visitor safety protection	20
Fire	20
Illegal logging	25
Deforestation	15
Threats to wildlife	15
Threats to the area	25
Total value of all criteria	135
Score (Total sum multiplied by weight 5)	675
Feasibility index value	64.28%
Development classification	Medium feasibility

e. OAA-ONTA Assessment Recapitulation

ONTA, with its "high feasibility" assessment classification, is a priority for development. In contrast, ONTA with a "medium" and "low feasibility" assessment can be recommended for the next stage of development because it still requires significant improvement. Based on the four criteria analyzed using the modified Analysis of the Operational Area - Objects and Natural Tourism Attraction, it was found that the criteria with the highest feasibility value and classification are natural tourism attraction and accessibility. Meanwhile, other criteria have a medium feasibility value, supported by classification infrastructure and security criteria. The ONTA assessment in Forest Park resulted in a highly developed classification, which is feasible. The ONTA potential assessment classification results are presented in Table 14.

Table 14. Recapitulation of ONTA assessments in SSH Forest Park.

Elements/sub-elements	Feasibility index value	Classification
Attraction	95.83 %	High
Accessibility	96.00 %	High
Supporting infrastructure	64.81 %	Medium
Security	64.28 %	Medium
Development classification	80.23 %	High Feasibility

3.2. Discussion

Based on the results of ONTA assessments, SSH Forest Park has a development level with a high feasibility classification. Important elements contributing to tourism development in SSH Forest Parks are the potential for tourist attractions and accessibility. The assessment results are based on research by Sainu et al. [14] on several tourist attractions in Lohia District, Muna Regency, where tourist attractions have high potential but have not been optimally developed. The SSH Forest Park boasts unique resources that could become a tourist attraction, including various species of plants and wildlife listed in the IUCN Red List and CITES Appendix II categories, as well as lakes and the Elephant Training Center. Therefore, the type of tourism being developed is natural tourism.

Nature tourism is a concept that aims to enhance the quality of life of local communities while preserving the natural environment [15]. Local communities are being involved in the development of natural tourism not only in Indonesia but also in other countries [16][17]. Nature tourism plays a crucial role in the national economic development of many countries. It encourages the potential of natural resources and cultural ecosystem services, serving as a medium for promoting sustainable development systems [18][19]. Tourism programs that can be developed at SSH Forest Park are described below.

3.2.1. Wildlife Tourism

Wildlife tourism enables visitors to interact directly with wildlife in their natural habitats. Wildlife tourism is important because there have been efforts to increase visitor awareness

of animal conservation. Wildlife tourism activities can occur along the entrance of the SSH Forest Park from the gate to the campground and PLG. Wildlife tourism activities can be adjusted to accommodate the timing of animal encounters and the location of their sightings. This activity can be performed independently or with the assistance of guiding services. Wildlife tourism activities include eagle and primate tourism. A map of wildlife tourism potential is shown in Figure 2.

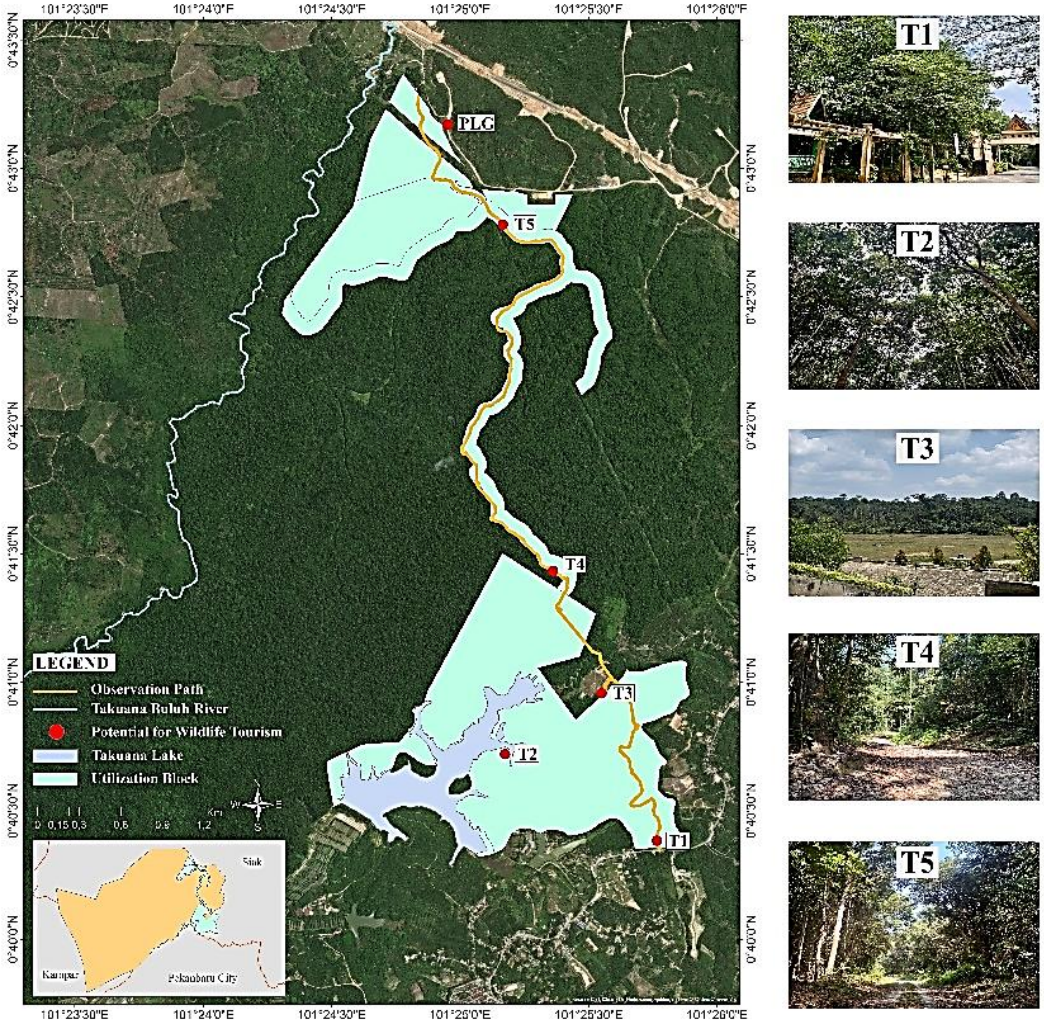

Figure 2. Map of wildlife tourism potential.

The availability of feed and fruit trees influences the movement of animals. The fruit-bearing trees in the SSH Forest Park do not bear fruit simultaneously, but at different times. Based on the results of field observations, point 1 is a potential site for observing primates, including gibbons, langurs, macaques, and long-tailed macaques (Figure 3). This location is the territory of one ungko agile gibbon family, consisting of a pair of adult parents, followed by two teenage children and a baby. Based on the results of field observations, the family group of agile gibbons typically consists of no more than four individuals. Agile gibbons emit shrill sounds as signs of existence and warnings to other agile gibbon pairs in the morning. The resulting tonality characteristics begin with a high note and then decrease with a lower note. The shrill sound is usually followed by the same sound of other agile gibbon couples, thus breaking the silence of Sultan Syarif Hasyim Grand Forest Park in the morning. Langurs (*Trachypithecus cristatus*) are also found in one group and comprise 6-8 heads. Lutung was always found searching for food in fence trees (*Ixonanthes icosandra*), belayang (*Aglaia spectabilis*), and pulai (*Alstonia scholaris*) between 09:30 and 10:00 UTC+7. Macaques and long-tailed monkeys also forage around this location. Long-tailed monkeys usually forage at 15.00 UTC+7, followed by macaques at 16.00 UTC+7.

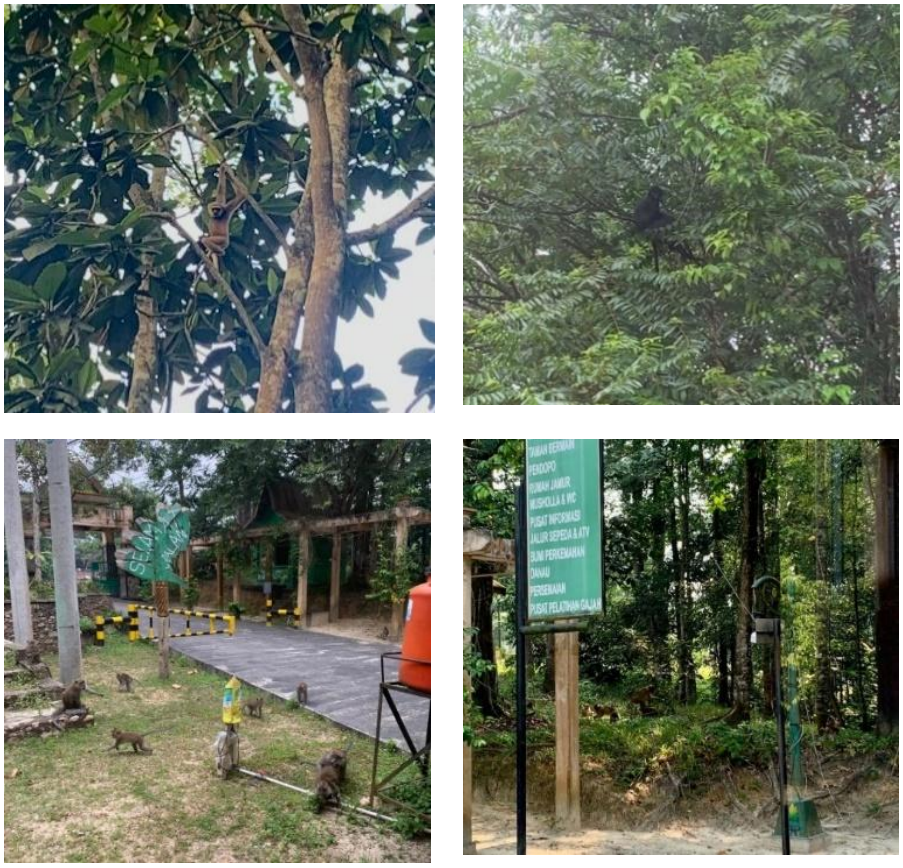

Figure 3. Species of primates that visitors can encounter.

Birds are another species of wildlife found in this location. Stone swallows (*Hirundo tahitica*), sooty-headed bulbul (*Pycnonotus aurigaster*), house crows (*Apus nipalensis*), cow wattles (*Collocalia esculenta*), and spotted dove (*Streptopelia chinensis*) can be found around guesthouses, flying in search of food in the morning and evening. The sounds of Sumatran ampis takur (*Calorhamphus hayii*) and sooty-headed Bulbul (*P. aurigaster*) can be heard to break the silence of the SSH Grand Forest Park in the morning.

Point 2 is located at the border of the lake. The lake border is the area of land that surrounds and is at a certain distance from the lake's edge, serving as a protective area for the lake. Lake borders are crucial habitats for wildlife. This location can be found in various species of wildlife such as agile gibbons (*Hylobates agilis*), langurs (*Trachypithecus cristatus*), squirrel tupai (*Tupaia* sp.), and various species of birds such as king meninting shrimp (*Alcedo meninting*), which were found to look for fish on the edge of the lake. When viewed from the perspective of wildlife movement, this location serves as a resting and sleeping area for animals after they have circled the Grand Forest Park area to find food. This location was also the source of the morning call for agile gibbons at 06 o'clock. 00 – 07.30 UTC+7. Wildlife is more difficult to find in this location than in other locations, such as Point 1. This is because humans rarely visit this location; therefore, the animals living around it are more sensitive to the presence of humans.

Point 3, wildlife tourism, is located near the campground and serves as an eagle spotting point. Based on the results of field observations, it was found that the top predators, namely black eagles (*Ictinaetus malayensis*) and crested serpent eagles (*Spilornis cheela*), were flying at 11.00 – 12.00 UTC+7. Based on the results of field observations, the best time to see eagles is from 10.00 – 12.00 UTC+7. Other species are also found in this location, such as punai (*Treron olax*) with an encounter time of 10.00 – 10.30 UTC+7 perched on a chelate tree (*Syzygium densiflorum*). This point can also be observed in several other species of birds, such as the white-throated kingfisher (*Halcyon smyrnensis*), cinereous (*Orthotomus* spp.), the

long-tailed shrike (*Lanius schach*), the bubut alang-alang (*Centropus bengalensis*), and the spotted dove (*Streptopelia chinensis*).

Points 4–5 are located on the path to the PLG accessed from the campground. This point is a potential point to see the southern pigtail macaque (*Macaca nemestrina*). At this point, there is the presence of southern pigtail macaque feed trees, including mbacang (*Mangifera foetida*), chelate (*Syzygium densiflorum*), rambai burung (*Baccaurea tetrandra*), cempedak (*Artocarpus integer*), balam (*Madhuca sericea*), sendok-sendok (*Endospermum diadenum*), kandis (*Garcinia parviflora*), berangan (*Castanopsis argentea*), and tampui (*Baccaurea macrocarpa*). Based on studies using camera traps conducted in the SSH Grand Forest Park, this point is also the trajectory of wild elephants and tigers.

3.2.2. Thematic Plant Collection Garden

Biodiversity conservation at SSH Forest Parks can be achieved by establishing a collection park to effectively monitor and preserve important species of value. The proposed collection gardens in this study included Riau plant collection parks, plant collections of the Dipterocarpaceae family, medicinal plants, and fruit-producing plants.

a. Collection of Riau Plants

The existence of the SSH Forest Park must accommodate a typical plant collection garden in Riau Province, thereby differentiating it from other natural tourist destinations. In addition to being a center for environmental studies, this can also serve as a branding opportunity for the SSH Forest Park. When visitors from other provinces want to visit and travel to Riau Province, it is enough to get to know Riau's biodiversity by visiting the SSH Forest Park. Typical plant species in Riau are listed in Table 15.

Table 15. Species of plants typical of Riau.

No	Local Name	Scientific name	Note
1	Kulim	*Scorodocarpus borneensis*	The wisdom of the people of Kuantan Singingi Regency
2	Tenggek burung	*Melicope ptelefolia*	Endemic to Riau
3	Dendan/darendan	*Lansium* sp.	Typical fruit plants of Kampar Regency
4	Rambai	*Baccaurea motleyana*	Typical fruit plants of Bengkalis Regency
5	Asam paya	*Eleiodoxa conferta*	Riau fruit
6	Tampui	*Baccaurea macrocarpa*	Kampar Regency forest fruit
7	Gerunggang	*Cratoxylum arborescens*	Local plant of Bengkalis Regency
8	Kuras	*Dryobalanops* sp.	Endemic Riau

Enrichment of species through the procurement of seeds needs to be performed to increase and better monitor species richness. One species of a typical Riau plant that has not been found in SSH Forest Park is nibung (*Oncosperma tigillarium*). Nibung is a species of palm that grows across Indonesia, but for the people of Riau, this species has been considered a symbol of unity and brotherhood. Nibung has also been designated as a typical flora of Riau Province because this species has long been integrated with the lives of the Riau people.

b. Plant Collection of Family Dipterocarpaceae

There are 238 species of plants of the Dipterocarpaceae Family in Indonesia. Sumatra Island is one of the islands with a high population density of Dipterocarpaceae and a diverse array of species [20]. Based on the characteristics of Forest Park Sultan Syarif Hasyim, the SSH Forest Park is a habitat for plants of the Dipterocarpaceae Family [21]. However, the plants of the Dipterocarpaceae Family found in Forest Park have only 20 species [22]; therefore, species enrichment is possible through the procurement of seeds from outside. The species of Dipterocarpaceae plants in Forest Park are listed in Table 16.

Table 16. Plant species of the family Dipterocarpaceae in SSH Forest Park.

No	Local Name	Scientific name
1	Meranti batu*	*Parashorea aptera*
2	Meranti lempung*	*Shorea leprosula*
3	Meranti pirang*	*Shorea parvifolia Dyer*
4	Kapur guras*	*Dryobalanops oblongifolia*
5	Singkawang*	*Shorea singkawang Burck*
6	Meranti kunyit*	*Shorea conica*
7	Meranti rambai*	*Shorea acuminate*
8	Keruing*	*Dipterocarpus crinitus*
9	Keruing	*Dipterocarpus rigidus*
10	Mentenan	*Anisoptera marginata*
11	Marsawa	*Anisoptera sp*
12	Kapur	*Dryobalanops lanceolate*
13	Cengal	*Hopea sangal*
14	Merawan	*Hopea mengarawan*
15	Balau	*Parashorea*
16	Meranti harsik	*Shorea atrinervosa*
17	Tengkawang	*Shorea seminist*
18	Singkawang	*Shorea singkawang*
19	Meranti	*Shorea stenoptera*
20	Resak	*Vatica stapfiana*

Description * = Found in Block Utilization

c. Collection of Medicinal Plants

Medicinal plants are all known species and are believed to possess medicinal properties. They are grouped into traditional, modern, and potential medicinal plants [23]. Forty-four (44) species of medicinal plants from 28 families were found in SSH Forest Park. Table 17 presents some species of medicinal plants identified in this study.

Table 17. Species of medicinal plants in SSH Forest Park.

No	Local Name	Scientific name	Medicinal properties
1	Tenggek burung*	*Melicope ptelefolia*	Lowers blood pressure
2	Pasak bumi*	*Eurycoma longifolia*	Increase stamina
3	Merpayang*	*Scaphium macropodum*	Overcoming deep heat
4	Kulim*	*Scorodocarpus borneensis*	Deworming
5	Sendok-sendok*	*Endospermum diadenum*	Anti-tumor/cancer
6	Marpoyan		Diarrhea and abdominal pain
7	Laban*	*Vitex pinnata*	Back pain
8	Mendarahan*	*Knema malayana*	Headache
9	Petai*	*Parkia speciose*	Diabetes
10	Pisang-pisang*	*Polyalthia lateriflora*	Toothache
11	Pulai*	*Alstonia scholaris*	Fever, abdominal pain
12	Simpur*	*Baccaurea macrocarpa*	Runny nose, stomachache
13	Terap*	*Artocarpus elasticus*	Tuberculosis drugs
14	Trempinis*	*Sloetia elongate*	Natural contraceptives
15	Medang*	*Cinnamomum cinereum*	Anti-aging
16	Gaharu*	*Aquilaria malaccensis*	Drugs inside
17	Mahang*	*Macaranga triloba*	Antidote to snake venom
18	Tempunik	*Artocarpus nitidus*	Areca nut substitute
19	Terong asam	*Solanum ferox*	Cough medicine, asthma, fever

Description: *Found in Block Utilization

d. Collection of Fruit-Producing Plants

Plant species belonging to fruit-producing groups are crucial in the food chain, particularly for birds and mammals, such as long-tailed monkeys and macaques, which have high population densities [24]. Fruit cultivation in the SSH Forest Park area did not yield immediate results. The availability of sufficient feed greatly affects wildlife movement. The Journal of the Center for Plant Conservation at the Botanical Garden-LIPI states that there are 226 species of fruit plants native to Indonesia, with 184 species growing wild in the forest, 62 species cultivated, and 18 species endemic [25]. Sumatra Island has the highest number of fruit-producing plants compared to other islands in Indonesia, reaching 148 species [26]. The species of fruit-producing plants identified in this study are presented in Table 18.

Table 18. Species of fruit-producing plants in SSH Forest Park.

No	Local Name	Scientific Name	Family
1	Mbacang*	*Mangifera foetida*	Anacardiaceae
2	Kedondong hutan*	*Santiria* sp.	Burseraceae
3	Manggis hutan*	*Garcinia bancana*	Clusiaceae
4	Manggis hutan*	*Garcinia nervosa*	Clusiaceae
5	Kandis*	*Garcinia parviflora*	Clusiaceae
6	Berangan*	*Castanopsis argentea*	Fagaceae
7	Kuranji*	*Dialium platysepalum*	Leguminosae
8	Kecapi*	*Sandoricum koetjape*	Meliaceae
9	Keleneng*	*Artocarpus* sp.	Moraceae
10	Terap*	*Artocarpus elasticus*	Moraceae
11	Cempedak*	*Artocarpus integer*	Moraceae
12	Tempunik*	*Artocarpus rigidus*	Moraceae
13	Marpoyan*	*Rhodamnia cinereal*	Myrtaceae
14	Belimbing hutan*	*Sarcotheca diversifolia*	Oxalidaceae
15	Rambai burung*	*Baccaurea tetrandra*	Phyllanthaceae
16	Rambutan hutan*	*Nephelium cuspidatum*	Sapindaceae
17	Laban*	*Vitex pinnata*	
18	Tempinis*	*Sloetia elongate*	Moraceae
19	Kelat*	*Syzygium densiflorum*	Myrtaceae
20	Meranti batu*	*Parashorea aptera*	Dipterocarpaceae

Description: *Found in Block Utilization

Enrichment of species through the procurement of seeds is necessary to increase species richness and better monitor it. Based on Minister of Environment and Forestry Regulation No. 3 of 2020, forest plant seeds are intended to ensure the sustainability of genetic resources and the production of high-quality seeds. Table 19 presents some species of local fruit-producing plants that can be introduced into the SSH Forest Park.

Table 19. Plant species that can be introduced in SSH Forest Park.

No	Local Name	Scientific Name	Varieties
1	Durian	*Durio zibethinus*	Pelintung Tambang Bakul, Sembilan ruang Durian Tembaga Durian ome Kampar Durian sirih, daun
2	Nangka	*Artocarpus heterophyllus*	Nangka mini
3	Mangga	*Mangifera indica*	Kuini palas
4	Jeruk	*Citrus* sp.	Jeruk kuok
5	Duku	*Lansium domesticum*	Duku darendam
6	Pisang	*Musa paradisiaca*	Pisang tanduk
7	Manggis	*Garcinia mangostama*	Manggis bawang
8	Rambutan	*Nephelium lappaceum*	Rambutan kundru
9	Kedondong	*Santiria rubiginosa*	Kedondong mini
10	Nam-nam	*Cynometra cauliflora*	
11	Rukam	*Flacourtia rukam*	Okam
12	Petaling	*Ochanostachys amentacea*	
13	Kuras	*Shorea* sp.	
14	Ridan rawa	*Nephelium* sp.	
15	Asam gelugur	*Garcinia bancana*	
16	Asam kelubi	*Nypa fruticans*	
17	Buah asam pinggan	*Blumeodendron kurzii*	
18	Limau kusik	*Citrus* sp.	
19	Kabau golang	*Ortholobium bubalinum*	
20	Arang paro	*Nephelium cuspidatum*	
21	Cempedak	*Artocarpus* sp.	Cempedak kasumbo

4. Conclusions

The physical and biotic aspects of the tourist attraction in Forest Park Sultan Syarif Hasyim include the diversity of typical plants and animals, lakes, and the Elephant Training Center. The assessment of the potential and attractiveness of natural tourism shows that the Forest Park SSH area received a high assessment classification (feasible), developed based on the criteria of attractiveness, accessibility, infrastructure, and security. The development of natural tourism in SSH Forest Park can begin with the establishment of a tourism branding for SSH Forest Park. The Forest Park branding proposed in this study is "Getting to Know Riau's Distinctive Biodiversity Collection in Sumatran Lowland Tropical Forest Representatives." The proposed development includes wildlife tourism (primate tours featuring gibbons, langurs, macaques, and long-tailed monkeys) and thematic plant collection parks, which feature collections of typical plants from Riau Province, the Dipterocarpaceae family, medicinal plants, and fruit-producing plants.

Author Contributions

BA: Writing, Editing, Acquisition of data, analysis and/or interpretation of data, drafting the manuscript; **EHM**: Conception and design of the study; Methodology, Review, Supervision, Critical review/revision; **RH**: Conception and design of the study; Review, Supervision, Critical review/revision.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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