Designing interpretation tracks for nature tourism in Tahura Gunung Menumbing, West Bangka

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Abstract. Taman Hutan Raya (Tahura) Gunung Menumbing is a well-known protected area in West Bangka, Indonesia, and a popular heritage site for its old historical house located at the top of the mountain that was used by the Dutch to isolate the founding fathers of the Republic Indonesia during the war era. Although it has been a popular tourism site, many potential attractions in Tahura Gunung Menumbing are still unexplored. This research aimed to design interpretation tracks for nature tourism in Tahura Gunung Menumbing to increase tourism destination attractiveness. To achieve the research purposes, this research used the combination of field surveys, literature reviews, and interviews. We followed the procedure from the Bureau Land of Management to score the landscape attractiveness. It was found 142 plant species, 61 animal species, and 12 landscape points of interests that were potential to be the interpretation objects. We identified 10 interpretation tracks varied from 160 to 4,200 meter in length and contained 2 – 8 interpretation objects. Six interpretation programs are then proposed, such as Menumbing Jungle Tracks, Tin Mining Explorations, Primates of Menumbing, Snakes to Explore, Menumbing-Belt Adventure, and Menumbing's landscape and socio-culture.

1. Introduction

Taman Hutan Raya (Tahura) Gunung Menumbing is a well-known protected area in West Bangka Regency, Indonesia because of the unique plants and animals in it represent the lowland forest ecosystem of Bangka-Belitung Island. Besides having the richness in biodiversity, Tahura Gunung Menumbing (TGM) is also a well-known heritage site for its old historical house locally called pesanggrahan, located at the top of the mountain (± 450 meters above sea level) that was used by the Dutch to exile the founding fathers of the Republic Indonesia such as Ir. Soekarno, Mohammad Hatta, among others, during the war era. Moreover, the landscape in the surrounding of the pesanggrahan is beautiful, where Bangka Strait can be clearly seen along with the Muntok city sceneries. For this reason, TGM has attracted domestic as well as international tourists and become one of the popular tourist destinations in Muntok and thus significantly contributed to the Local Own-Source Revenue (PAD) of West Bangka District.

Even though it has become a popular tourist destination, there are still many potential tourist objects in TGM that have not been explored and optimally managed. According to the West Bangka Regency plan, TGM will be developed as an ecotourism area. In order to develop ecotourism in TGM, nature interpretation activities are needed to gain benefits for both conservation and community in the surrounding area. Through nature interpretation, environmental education can be delivered to educate tourists to respect and appreciate nature and the environment.
Nature interpretation uses the interpretation track that will bring tourists to a new experience in understanding nature. The interpretation track will connect several points of interest that contain unique objects and attractions with conservation and environmental messages. The interpretation tracks contain interpretation programs that deliver messages about the natural phenomena, historical values, and geological values, etc. to visitors [1].

This research aims to design nature interpretation tracks in TGM to increase tourism destination attractiveness. We followed guideline from the Bureau Land of Management to score the landscape attractiveness and then developed interpretation programs. The results of this research will be useful for the authorities such as West Bangka Tourism Office and West Bangka Environmental Office to improve both the economy and ecology of TGM. Moreover, through this nature interpretation program, illegal forest encroachment activities in TGM can potentially be minimized due to the provision of alternative income to the community.

2. Methodology

2.1 Study area

Tahura Gunung Menumbing (±3,333.20 Ha) is administratively located in Muntok sub-district, West Bangka Regency, Bangka Belitung Islands. Geographically, Tahura Gunung Menumbing is located between 105°09’29” - 105°14’34” East Longitude and between 1°59’26”- 2°02’29” North Latitude. The topographical conditions range from flat to very steep slope, with the highest peak reach 450 meters above sea level (m.a.s.l.). TGM has A-type climate according to Schmidt-Ferguson climate classification indicating a very wet condition throughout the year with monthly rainfall variations between 0.8 (dry months) to 311.0 mm (wet months). The lowest rainfall occurs in September, while the highest rainfall occurs in January. The average air temperatures ranging between 23.5°-26.5°C, and the air humidity ranges from 57%-97%.

![Figure 1. Location of Tahura Gunung Menumbing.](image)

2.2 Methods

In order to design the interpretation tracks, data were collected by field observations, literature studies, and interviews. These data included natural resources such as flora, fauna, and landscape, and the local culture inside TGM. The potential objects of interpretation were determined based on the types of flora, fauna, and landscape whether they are interesting, rare, and unique that was found along the observation track. Next, for each object, we identified the morphological characteristics and potential attractions. Specific to landscape attractiveness, we used the guideline from the Bureau of Land Management which the assessment of potential landscape was based on landscape elements such as landscape form,
vegetation, colour, scenery, rarity, and structural modification [2]. For the local culture attractiveness, the data were collected by interviewing the TGM manager and the surrounding community.

All the potential objects of interpretation were marked by using GPS (Global Positioning System). Along with the interpretation objects, the interpretation tracks were designed based on the following criteria: the short way to the spectacular objects, existed walking pathways, avoid sensitive plant communities and wildlife habitats, avoid a straight pathway and considering the total time durations [3].

2.3 Data analysis
We used a descriptive analysis based on the literature reviews and interviews with the local guides to define all the potential interpretation objects both natural objects and cultural objects. The spatial analysis was carried out using ArcGIS v.10.4 software to create the interpretation track and locate the point of interest. Then, we visualized the interpretation tracks together with its geographic position, topographic conditions, and various other information needed to support the interpretation programs.

3. Results and discussion
3.1 Potential nature and culture interpretation objects in the Tahura Gunung Menumbing
We identified floras as many as 142 species of trees, shrubs, palms, orchids and herbs inside the TGM. From this number of floras, a total of 21 species were used as objects of interpretation, including Chalophyllum pulcherimum, Palaquium rostatum, Eurycomia longifolia, Syzygium zeylanicum, Arenga pinnata, Calamus rotang, Dillenia suffruticosa, Mangifera caesia, Calamus manan, Melaleuca leucadendron, Handroanthus chrysotrichus, Ficus exasperata, Ficus annulata, Ficus rumphi, Ficus variegata, Dendrobium leonis, Hevea brasiliensis, Acacia mangium, Pithecellobium jiringa, Parkia speciosa, and Aeschynanthus pulcher. Species of ficus were found scattered along the observation track and were interesting because it has small fruit and grown scattered in the stem (lateralis). In addition, we found an orchid namely Dendrobium leonis that grow well on rocks. Moreover, we found Palaquium rostatum that is the identity flora of Bangka Belitung Island.

Besides floras, we found faunas as many as 16 species of mammals, 30 species of birds, and 15 species of herpetofauna. A total of 19 types were used as objects of interpretation, namely Tarsius bancanus, Nycticebus lansang, Chrysopelea paradise, Chrysopelea ornata, Ahaetulla prasina, Gonyosoma oxycephalum, Lycodon capucinus, Tropidolaemus wagleri, Macaca fascicularis, Polypedates leucomenic, Prinia inormata, Caprimulgus affinis, Hydrophilax chalconotus, Centropus sinensis, and Rana chalconota. Tarsius bancanus, Prionodon lansang, and Haliaeetus leucogaster were listed as protected species according to the Ministry of Forestry and Environment number 106. Moreover, Tarsius bancanus and Nycticebus bancanus are listed as vulnerable species according to the IUCN Redlist database [4] [5]. These two species are well-known as the fauna identity of Bangka Belitung Island.

Based on the field observations, we identified at least 12 points of interest that have beautiful landscape sceneries in TGM. Using guideline from the Bureau of Land Management, it was identified that four points of interest have had a medium landscape quality level and eight points have had a high landscape quality level. Four points that have had medium quality such as Post 1 Menumbing, Goa Jepang, Kelekkak, and Tahura border, whereas those that have had the high quality were gazebo 3, Pesanggrahan Menumbing, Menumbing slope, TVRI Tower, Menumbing water source, Watervank water source, Argotirta water source, and illegal ex-mining. From these 12 points of interest, Argotirta water source is found to have the highest value since this point has the views of green hills and abundant storage of water.

For the culture potential objects in TGM, the Pesanggrahan Menumbing is the main attraction in TGM where we can see an old historical building, a place of exile for 8 national figures including the founding fathers of the Republic of Indonesia, the first president and vice president, Ir Soekarno and Moh. Hatta during the colonial period. Pesanggrahan Menumbing had also been designated as a cultural heritage in Muntok, West Bangka.
3.2 Proposed nature interpretation tracks in Tahura Gunung Menumbing

Figure 2. shows the proposed interpretation track map including the interpretation objects. We identified ten interpretation tracks varied from 160 to 4,200 meter in length and contained 2 – 8 interpretation objects. Six interpretation programs are proposed, such as Menumbing Jungle Tracks, Tin Mining Explorations, Primates of Menumbing, Snakes to Explore, Menumbing-Belt Adventure, and Menumbing's landscape and socio-culture.

Figure 2. Interpretation tracks map.

Post 2 - Menumbing water source interpretation track had 160 meters away and 10 minutes away by foot. The condition of the lane at the beginning had been laid out with blocks and arranged steps, however at the end of the lane there was still a dirt road. This track had the objects of interpretation *Prionodon linsang, Ficus rumphii, Nycticebus bancanus, Ficus exasperata, Palaquium rostatum, Rana chalconota*, and the landscape of Menumbing water sources. Post 2 - TVRI tower interpretation track had 230 meters away and 15 minutes by foot. The condition of the track was laid out with rocks, only in the middle of the lane arranged steps up to the top of the tower, on the right and left side of the track was still left natural. This track had the object of interpretation of *Polypedates leucomystax, Acacia mangium, Pithecellobium jiringa, Haliaeetus leucogaster, Ficus variegata*, and the landscape of the TVRI tower. Post 1 - Watervank water sources interpretation track had 810 meters away and 30 minutes away by foot. The condition of the track, namely the track of less than 1 m that cut through the forest, when crossing the track, you had to be careful because there were many thorny plants such as rattan. This track had the object of interpretation of *Prinia inormata, Mangifera caesia, Calamus manan, Centropus sinus*, *Chalophyllum pulcherimum, Eurycoma longifolia, Tarsius bancanu*, and watervank water source landscapes. Out track Menumbing interpretation had 670 meters away and 45
minutes away by foot. On this track, there was no usual track, that it looked more like going through a forest. It was on a Menumbing slope that you had to be more careful because some points on the track were quite steep. This track had the object of interpretation of *Ficus annulata, Handroanthus chrysotrichus, Macaca fascicularis, Chalophyllum pulcherimum*, Menumbing slope landscapes and *Goa Jepang*.

Area boundary interpretation track had 870 meters away and 30 minutes away by foot. The condition of the track was in the form of a footpath that passed through a rubber plantation that could be passed only by foot, however on the side approaching the border of the area marked with cassava vegetation, motorized vehicles can pass it. This track had the object of interpretation of *Hevea brasiliensis, Parkia speciosa, Phaenicophaeus curvirostris, Caprimulgus affinis, kelekak landscapes, and Tahura borders*. Post 1 - the top Menumbing interpretation track had 4200 meters away and it taken 15 minutes by walking a motorized vehicle. The condition of the road on this track was paved, there were many bends and inclines. In this track there were two objects of primate interpretation, namely *Macaca fascicularis* and *Tarsius bancanus*. Post 1 - Argotirto water source interpretation track had 2000 meters away and 60 minutes away by foot. On this track, the condition was a dirt trail and several former mining water flows. When crossing this track, you had to be careful because it was an ex-illegal mining area that some points may still be muddy. This track had the object of interpretation in the form of ex-illegal mining landscapes, *Melaleuca Leucadendron, Dillenia suffruticosa, Alcedo Meninting, Haliaeetus leucogaster*, and argotirto water source landscapes.

Water source- the top Menumbing interpretation track had 350 meters away and 20 minutes away by foot. The condition of the track was paved roads then stepped rocks. This track had the object of interpretation of several types of snakes found near *pesanggrahan*, including *Chrysopelea paradise, Chrysopelea ornate, Ahaetulla prasina, Gonyosoma oxycephalum, Lycodon capucinus, Tropidolaemus wagleri*, and *Malayopython reticulatus*. Post 1 - Pavilion 1 Interpretation Track had 4130 meters away and taken 20 minutes by motorized vehicle and about 50 meters of walking from the parking lot to reach Pavilion 1. This track had an object of interpretation in the form of a landscape at post 1 Menumbing, gazebo 3, the top of the *Pesanggrahan* Menumbing, and pavilion 1. The last tracks, Menumbing circle interpretation track has 280 meters away and 10 minutes away by foot. The condition of this lane was a fairly wide paved road. This track had the object of interpretation of *Syzygium zeylanicum, Aeschynanthus pulcher, Caprimulgus affinis, Haliaeetus leucogaster, Dendrobium Leonis, Ficus annulata, Arenga pinnata*, and *Calamus rotang*.

### 3.3 Discussion

The results show that ten interpretation tracks designed then six interpretation program themes were proposed, namely Menumbing Jungle Tracks, Tin Mining Explorations, Primates of Menumbing, Snakes to Explore, Menumbing Belt Adventure, and Menumbing's landscape and socio-culture. The theme of Menumbing Jungle Tracks was a program that aims to introduce Menumbing's nature resources including flora, fauna and landscapes. This theme was used on post 2 - Menumbing water source track, post 2 - TVRI tower track, post 1 - Watervank water source track, out track Menumbing, and Menumbing circle track. The theme of Tin Mining Explorations used on post 1 - Argotirto water source track aims to introduce forest ecosystems affected by illegal mining and the nature resources were still there. The theme of Primates of Menumbing used in the Menumbing post 1 - at the top track aims to introduce primates that could be found in the Tahura Gunung Menumbing (TGM). Topics explored from this theme were the characteristics, behavior and distribution of these primates. The theme of the Snakes to Explore located in the top - Menumbing water source track aims to introduce the snakes around the Menumbing guesthouse that they could identify the types of snakes, their habitats, and their handling. The theme of Menumbing Belt Adventure used in the border line of this area to introduce tahura area and the surrounding vegetation. Finally, the theme of Menumbing's landscape and socio-culture was used in the post 1 - Pavilion 1 track, which aims to introduce history in the area as well as stories that live in the community and points that had interesting natural scenery. The six themes form a core that
TGM was a natural habitat for flora and fauna in it and had its own natural beauty which could be a nature tourist attraction.

4. Conclusion
Based on the results, it could be concluded that TGM had the potential for nature and culture resources that could be used for nature interpretation activities. Potential nature and culture resources in the area, including the potential for flora, there were 142 species, while the potential for fauna had 61 species of fauna, the potential for the landscape had 12 potential points, and culture potential was in the historic building of Pesanggrahan Menumbing, a cultural heritage and the myth of the snake guard that accompanies it. The design of nature interpretation tracks in the TGM area produces ten interpretation tracks with varying distances from 160-4200 meters and each track had about 2-8 interpretation objects. The proposed interpretation program design consists of six interpretation themes, namely Menumbing Jungle Tracks, Tin Mining Explorations, Primates of Menumbing, Snakes to Explore, Menumbing Belt Adventure, and Menumbing's landscape and socio-culture. This showed that the potential of nature and culture resources in TGM could be developed as ecotourism in the future. Therefore, it was hoped that this research could improve the supervision and management of the area to the maximum and improve the welfare of the surrounding community by optimizing the existing potential.

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