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ABSTRACT

Green areas can contribute to the quality of life of the citizen and the urban environment in various ways and are of great importance to the community. In this way, these spaces are references in large urban centers and are more associated with the recreational function, because they offer various

types of activities, such as walking, games and relaxation, in addition to working as a point of socialization. The objective of this work was to analyze the activities developed in the Municipal Park of Mindu, its environmental compatibility and to diagnose the potential of tourism. In addition to observing its characteristics, biodiversity, history, attractions, opening hours, main activities and observe the operation of the trails, their potential, possible threats of the existing biome and their importance for tourism and recreation activity. Regarding the methodology, we opted for the qualitative approach of exploratory and descriptive character with direct observation, information was also collected through informal conversations with two employees of the park; news on the website of the Manaus City Hall and local news portals. The results showed that the Mindu Municipal Park is a very popular and ideal place for ecological tourism, recreation, contact with nature and good experiences on paved or dirt trails. The largest flow of people is on weekends for physical activities, yoga, contact with nature and regional breakfast, there are also activities related to sustainability and the environment. It currently has ten tracks; some have the shape of "U" and others that connect with other secondary trails. Points to be improved and suggestions, maintenance of information boards, installation of educational signs about the environment, identification of trees and guided tours in partnership with universities, the creation of a park website to disseminate the activities and other important information, so that the visitor and the tourist record good memories, find signs with adequate information and have autonomy to carry out their activities safely and independently.

Keywords: Mindu park, recreation, trails.

1 INTRODUCTION

The urban green spaces have been reduced to make way for buildings, streets and avenues, in this way, not only the fauna, but the population has also lost these fundamental spaces for the development of tourist and recreational activities to recover the energies and relieve the stress of the routine. According to the study of the authors Dray and Simonetti (2012), the tourism sector and the

environment have a close relationship of dependence and the development of tourism and recreation in a natural environment, such as urban parks, can cause numerous environmental problems.

However, Lima and Guimarães (2019) explain that the development of tourism activity in Conservation Units can also contribute qualitatively to the preservation and sustainable use of these green spaces, however, they also state that for there to be positive results it is necessary adequate planning that contemplates sustainability and not only the exploitation of nature.

And speaking of planning, Brito and Sá (2014) warn of the case of neglect in planning on the part of managers, the possibility of errors increases significantly causing consequences at all stages, so well-structured planning covers all the actions involved in the process from management to the resources to be used. In this sense, when there is a failure in planning, many urban parks do not fulfill their function and compromise the environment and tourism and recreation activities become unsustainable.

Given this context, the objective of this study was to analyze the activities developed in the Municipal Park of Mindu, its environmental compatibility and diagnose the potential of tourism and recreation. The specific objectives were: To analyze the characteristics of biodiversity, attractions and physical facilities; Check the main activities, the operation of the trails and their potential; Observe possible threats of the existing biome and their importance for tourism and recreation activity.

2 THE CONTRIBUTION OF URBAN PARKS AND GREEN AREAS TO THE QUALITY OF LIFE OF THE CITIZEN

Green areas can contribute to the quality of life of the citizen and in the urban environment in many ways, being of great importance to the community, since this type of space, currently, refers to the best quality of life. Thus, the parks are characterized as a type of urban green area that integrate the built environment, but have a predominance of vegetation. In this way, green areas are references in large urban centers, being more associated with the recreational function, because they offer various types of activities, such as walking, games and relaxation, in addition to working as a point of socialization (SZEREMETA; ZANNIN, 2013).

In this same reasoning Lobola and De Angelis (2005, p. 131) understand that the quality of life of the population is linked to some factors, among them the environment, "the public green areas constitute essential elements for the well-being of the population, because it directly influences the physical and mental health of the population. " And in the sequence these authors reinforce that "In order to improve the quality of life, by recreation, environmental preservation, areas of preservation of water resources, and the sociability itself, these areas become attenuating of the urban landscape. " (LOBOLA; DE ANGELIS 2005, p. 131).

Within this perspective, urban parks as green spaces are paramount for outdoor physical activities, satisfactory leisure and recreation contributing to the reduction of sedentary lifestyle, mental health, good mood and self-esteem, in addition to motivating a healthy lifestyle.

2.1 THE MINDU MUNICIPAL PARK AND ITS RELEVANCE TO THE POPULATION

During the research it was possible to realize the importance that the Parque do Mindu has for the city of Manaus, agreeing with the understanding of Silva (2014) which emphasizes that the parks have their relevance for society in general, contributing to the quality of life of the population, especially when it comes to a Conservation Unit in urban area.

According to Law No. 9,985 of July 14, 2000, the Mindu Municipal Park is inserted as a Conservation Unit – UC, in the group of Integral Protection Unit, with characteristics of leisure and ecological tourism¹².

It is the minister by the City Hall of Manaus, through the Municipal Department of Environment and Sustainability - SEMMAS. Located on street Perimetral, s/n, in the neighborhood of park Dez de Novembro, center-south zone, in the urban area of Manaus, 15 minutes from the city center. With 40.8 ha., (approximately 408,011.87 m²) the park was born from a movement of the surrounding residents to protect the fragment of primary and secondary forests, against the action of invaders in 1989 (PREFEITURA DE MANAUS, 2014).

The park houses much of the flora and fauna of the region and is one of the refuges of the Sauim-de-Coleira (*Saguinus bicolor*), endemic monkey threatened with extinction, belonging to the *Callitrichida* Family existing only in the region of Manaus, unfortunately it is an endangered species. In addition to other animals such as the sloth (*Bradypus tridactylus*), the agouti (*Dasyprocta aguti*), the squirrel (*Sciurus antunes*), the hawk (*Buteo spp*) the macaw (*Ara macao*) and a diversity of plant species. It has native vegetation of shallow forest / igapó or floodable areas, dry land and secondary capoeira forest. The park is crossed by the Mindu creek, from where the name originated³ (CASCAIS, 2011).

Thus, according to the above contextualization, through the typology explained by Pires (2013) the Mindu Municipal Park has the aspect of a natural area, considered a Conservation Unit protected by the Government, with picturesque paths, because most of the trails are not paved and are used for

¹ They are natural areas created and protected by the Government, municipal, state and federal. Conservation Unit: territorial space and its environmental resources, including jurisdictional waters, with relevant natural characteristics, legally established by the Government, with conservation objectives and defined limits, under a special administration regime, to which adequate guarantees of protection apply. Law No. 9,985 of July 14, 2000.

² Integral Protection Units is composed of the following categories of Conservation Units: Ecological Station; Biological Reserve; National Park; Natural Monument; and Wildlife Refuge

³ Shallow Amazonian watercourse, consisting of a larger river arm.

countries. This group remained in the area for three weeks clearing the site, building bridges, opening several trails. The Fertility Monument was also built, using stones sent by children from various countries.

Figure 2 – Fertility monument



Figure 3 – Kapok



Source: Google (2022).

Another striking fact, which occurred in 1993, was the legal recognition as an "area of ecological interest", as he explains (CASCAIS, 2011, p. 3).

In 1993, through Law 219, of November 11, the Mindu Park received legal recognition as an "area of ecological interest" with an extension of 309,518 m², being incorporated into the Municipal System of Conservation Units as a category of Municipal Park of Conservation Units, becoming governed by the regulation of Brazilian National Parks. In 1994, a federal decree authorized the assignment for the installation of a public ecological park, with the objective of environmental preservation of the area, starting to have its land situation regularized.

In 2007, through Decree No. 9,043, of May 22, 2007, the area of the park was expanded from 309,518 m² to 408,011.87 m², meeting the demand of civil society and the public power to protect the forest fragments of the municipality of Manaus (CASCAIS, 2011).

In 1996, the Manaus City Hall implemented the physical infrastructure of the park adding the urbanization of the trails, environmental library, parking, thematic squares, orchidarium, suspended trail and educational signage, aiming to develop environmental education programs. In 2006 the park was reopened by the Manaus City Hall, and a closed auditorium was built, the support kitchen in the large straw hat, the paved trail for people with special needs, expansion of the orchidarium and the recovery of all facilities. The last revitalization happened in 2014 when the World Cup sporting event, the park gained new adequate physical structures and internal landscaping, painting, drainage,

electrical and hydraulic installations, new signage with more than 220 signs in Portuguese / English, revitalization of trails and bridges (PREFEITURA DE MANAUS, 2014).

3 RESEARCH METHODS

Regarding the form of approach, we opted for qualitative research of exploratory and descriptive character. Gerhardt and Silveira (2009, p. 31) describe that "Qualitative research is not concerned with numerical representativeness, but with deepening the understanding of a social group, an organization, etc." Bastos (2016) mentions that qualitative research works with the universe of meanings, motives, aspirations, beliefs, values and attitudes that cannot be quantified.

As for exploratory research, Gil (2008) states that the main purpose of exploratory research is to clarify and modify ideas, propose hypotheses for future research, usually involves the case study, bibliographic and documentary survey and non-standard interviews. "This type of research is carried out especially when the chosen topic is little explored and it becomes difficult about it to formulate precise and operationalized hypotheses." (GIL, 2008, p. 27).

And as for descriptive research Cervo (2007, p. 61) mentions that "Descriptive research observes, records, analyzes and correlates facts or phenomena (variables) without manipulating them." The author also informs that this type of research occurs frequently in the humanities and social sciences, describing characteristics, properties or relationships that occur in the community, in addition to involving opinion research, case study and data collection.

For the development of this study, observations were made *in loco* to have greater affinity with the activities developed in the Municipal Park of Mindu, its environmental compatibility and diagnose the potential of tourism. In addition to observing the characteristics of biodiversity, history, attractions, physical facilities, main activities and observe the functioning of the trails and their potential, possible threats of the existing biome and their importance for tourism and recreation activity. And indirect observation, information was collected through informal conversations with two employees of the park; news on the Manaus City Hall website and local news portals.

The images of the attractions and other important elements for the development of this work and achieving the purpose of the research were also made. The first visit took place on October 25, 2022 in the morning and the second visit on November 6, 2022 in the afternoon.

4 RESULTS AND DISCUSSION

The park is a fragment of forest in the middle of the urban area, very popular among the manauaras, easily accessible by public or private transport, has a security guardhouse at the entrance

and ample parking, it is not necessary to pay or schedule the visit unless it is a significant large group, there is also no turnstile or the guestbook.

Figure 4 – Parking near the entrance of the park



Source: Authors (2022).

During the two visits, there were few people in the park, some young people taking walks, families using the outdoor gym, other families with children having fun on the main trail and in Peace Square. In the big straw hat is marketed the regional breakfast on Saturdays, Sundays and holidays, starting at 6:30 a.m. and ending at 2 p.m., in the amount of R \$ 40.00 in the *self-service* system and *a la carte*, has no other type of commerce besides these. As for the facilities, it has the bathroom of the employees and another for the use of visitors, as the administrative area is a little precarious needing maintenance, equipped with air conditioning, drinking fountain, a small covered patio and next to it a small library. Next to the administrative area has the amphitheater large and well maintained, the place also has plastic bins, but are not selective collections. Next to the straw hat has exclusive parking for seniors and PwD.

Figure 5 – Straw hat



Figure 6 – Outdoor gym Source: Google (2022).



Source: Authors (2022).

There is also a place to receive recyclable solid waste, has an orchid garden, but was interdicted and in need of maintenance.

On the first Sunday of the month there is a craft fair, and on Saturday mornings there is a group that practices yoga in Praça da Paz.

Figure 7 – Solid waste collection center



Figure 8 – Amphitheater



Source: authors (2022).

The park's hours of operation are 5:30 a.m. for the public who practice walking and the gates close at 5 p.m., however officials warn visitors to close their activities at 4:30 p.m. to facilitate concierge service. Regarding the cleaning, it was observed that it is done with whim in all the areas visited, including the trails are swept with a kind of duster of grapevine leaves that does not harm the environment and there are dumpsters in the course of the trails, however several were damaged.

There is no guided tour or guidance for the visitor to stay on the trail or not to cause damage to biodiversity.

4.1 FAUNAS AND FLORAS

The park has a wide variety of animals from the region, such as birds (toucans, saracuras, owls and hawks), agoutis, snakes, iguanas, squirrel monkeys and the famous Sauim-de-Coleira. In addition to alligators on the bank of the Mindu creek (creek that crosses the park and several neighborhoods, it is 23 km long, unfortunately with a high level of pollution).

Figure 9 – Mindu creek bank



Figure 10 – Sauim-de-Coleira



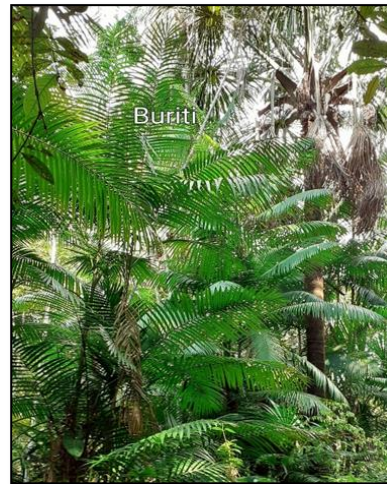
Source: Google (2020).

About the flora, according to the Department of Environment and Sustainability – SEMMAS, the flora existing in the park is composed of 70% of native species. During the visit, we identified varieties of medicinal plants from the region grown in horizontal gardens identified with plaques. There are also plenty of palm trees and fruit trees: açaí, buriti, cupuaçu, mangoes among other native species. In addition to popular trees such as brazilwood, andiroba, kapok, among others. There are informational signs, however, some are worn out by time, broken, rusty, hidden by roots needing changes or **maintenance**.

Figure 11 – Pau-brasil



Figure 12 – Buriti

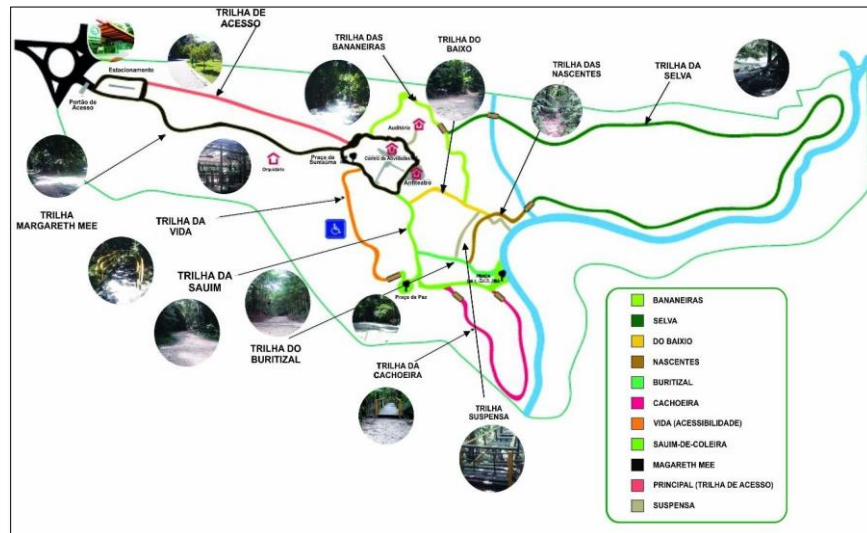


Source: Authors (2022).

4.2 TRAILS

Currently the park has 10 (ten) interpretive trails identified as: Main Trail, Margareth me Trail, Trail of Life, Trail of Sauim-de-coleira, Buritizal Trail, Suspended Trail, Banana Tree Trails, Trail of Springs, Jungle Trail, and Waterfalls Trail, are used for physical activities such as hiking, bird watching and other animals that inhabit the park and interaction with nature.

Figure 13 – Map of the trails of Mindu park



Source: Mosqueiro (2020).

Some of these trails were closed awaiting maintenance, the travel time is approximately 30 to 60 minutes. The Main Trail and the Trail of Life are the only paved and suitable for wheelchair users with cemented floor, some parts the Main Trail is suspended because of small reliefs of the ground, also has small curves forming a gentle delineation between the trees and valuing the landscaping.

Figure 14 – Main track

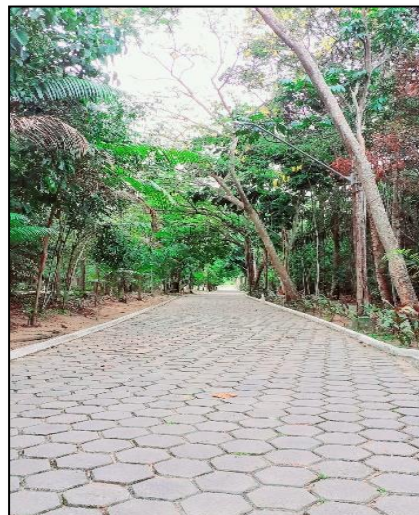


Figure 15 – trail of life



Source: Authors (2022).

The other trails within the forest are dirt with a layer of pebbles and sand, it is also noted that all the trails interconnect one in the other or have a "U" shape and have access to the main area where the straw hat and the park administration are, in this way, it is possible that the flow of visitor's access in one direction and return by another, preventing the soil from being harmed by trampling, and the noise from bothering the animals. However, there is no educational guidance as to the proper way to use the trails, so the visitor ends up accessing the trails randomly going back and forth in the same direction, which characterizes negative impacts as previously mentioned. There were also no educational signs about not feeding the animals with inadequate food, since they feed on the fruits produced by the forest.

Figure 16 – suspended track

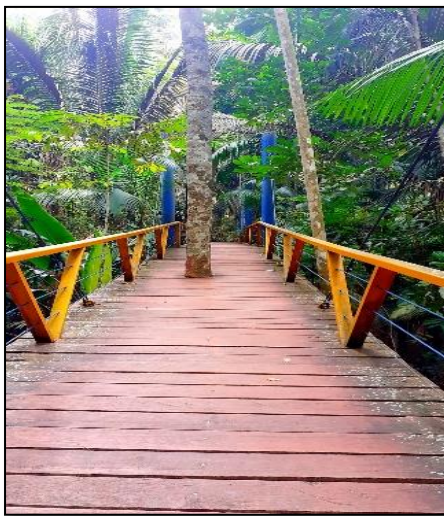


Figure 17 – Sauim-de-Coleira trail



Source: authors (2022).

During the visits, it was observed that the trails have drainages for rainwater and the dirt trails covered with sand in some stretches are compromised with lateral erosion, some tree roots are already exposed and bruised, including the historic Sumaúma tree in the central area of the park planted by the Prime Minister of Norway in 1992. Most of the trails have a slight relief, but nothing that is exhausting for the walk.

Figure 18 – Exposed roots figure



19 – Drain in the trail



Source: authors (2022).

According to the report of the collaborator of the park, it is also very common the natural fall of trees on the trails in times of heavy rains and wind, in this case it is cut and divided into logs and removed properly.

Walking along the Trail of the life, the visitor finds the Peace Square, a space for meditation surrounded by the forest, round shaped and covered by sand, with benches available for rest. According to the collaborator, yoga is practiced on weekends at the site, a project that has existed for eight years, open to the general public, the project also includes socio-environmental actions such as the collection of solid waste and the collection of items intended for donations to charities. Given this context, it confirms the words of the authors Szeremeta and Zannin (2013) regarding urban parks and these green spaces that collaborate with the socialization of users who integrate these activities.

Another curiosity in Peace Square is that there is also a flagpole with a message in three languages: Portuguese, English and Japanese "May Peace prevail in the World."

Figure 20 – Trail of the Vida



Figure 21 – Mast of the square



Source: Authors (2022).

5 CONSIDERATIONS

The objective of this work was to analyze the activities developed in the Municipal Park of Mindu, its environmental compatibility and diagnose the potential of tourism and recreation. The specific objectives were: To analyze the characteristics of biodiversity, attractions and physical facilities; Check the main activities, the operation of the trails and their potential; Observe possible threats of the existing biome and their importance for tourism and recreation activity.

The Mindu Municipal Park is an ideal place for ecological tourism, recreation, contact with nature and beautiful experiences on the paved or dirt trails.

According to the *observations in loco*, and the conversation with two collaborators of the park in the two visits, it was identified that the place is very popular, the largest flow of people is on weekends for physical activities, yoga, contact with nature, the regional breakfast, the craft fair on the first Sunday of the month. However, it is not possible to estimate the number of visitors, since there is no turnstile equipment at the entrance to do the counting. Other specific activities are also highlighted in the park, such as World Environment Day in June, SEMMAS promotes various activities related to the environment and environmental sustainability, planting and donation of plant seedlings, cleaning in the Mindu creek, physical activities such as stretching performed by professionals, literary meetings with writers and authors, in addition to other recreational and leisure activities.

It was possible to observe that the main attractions for the general public is the Main Trail paved with asphalt and the observation of the Sauim-de-Coleira. And the secondary attractions are the bird watching, and the agouti on the trails, the alligators on the bank of the creek and the regional coffee marketed in the straw hat.

Because of its popularity, the park becomes an ideal place for recreation, physical activity practices and with great potential for studies of the native biodiversity of the forest. The visit of students from the public and private schools is also a great opportunity to guide them on environmental education, respect for the fauna that takes refuge in the park, contact with the forest, medicinal plants and other living beings that live in this urban forest fragment.

Regarding the trails, some have the shape of "U" and others that connect with other secondary trails. Only two are paved (Main Trail and Trail of Life). In the other trails the visitor has direct contact with a layer of sand and pebbles, however, this layer may not be enough to prevent soil compaction and losses of living organisms. In some stretches of the trails, there are wooden aerial bridges due to the unveiling of the soil, these bridges contribute to protect the soil and the microorganisms.

The positive points of the park are the easy access both by public and private transport, as it is located within the urban area, this context recalls the studies of Rosa and Anjo (2022) which ensure that most of the most visited Brazilian national parks are close to large cities or even large metropolises.

And continuing the considerations, the Mindu Park has guardhouse at the entrance with one or two employees, ample and free parking, there are three employees who take turns to make the security round. It has no trace of vandalism and cleanliness is noticeable in all environments. The trails offer a pleasant environment to enjoy the shade and sound of the forest and its curious inhabitants high in the trees, these do not always prefer to be seen, however, in quiet hours with little human presence they risk themselves quietly on the trails. The contact with this biodiversity offers a sense of well-being, gratitude and respect for the environment, conducive to a reflection of responsibility, zeal and respectful interaction between the human and nature.

Points to be improved and suggestions, there were many informative signs in Portuguese and English in the course of the trails, most needing maintenance, because they are already with the letters completely erased and others submerged to tree roots and vegetation.

Absence of educational signs on environmental education and how visitors should behave with animals and interaction with the forest, guidance on the disposal of waste in the dumpsters, guidance on how to use the trails, absence of containment of erosion on the side of the trails, absence of benches for rest mainly for people with reduced mobility or other difficulties. Absence of annual calendar of activities, map of the park and the hours of its operation.

And about security, on the first visit there was a feeling of insecurity, because the park was very isolated and there was no employee in the guardhouse, fortunately was seen a visitor who was walking, already leaving the park and she guided us how to get to the park administration. In the administration, we found the friendly Mr. Paulo, collaborator of the park that guides visitors who need information, after sharing with him the reason for the visit and the feeling of insecurity, he took a huge tuxedo and gently accompanied us on the forest trails, on the way reported the stories of invasion and thefts of açaí caused by people who access the park by the Mindu creek, and cases of attacks against visitors, which made us more frightened! We went to the bank of the Mindu creek to see the ferocious alligators, and the sucuri snake that ate the cat, luckily, we did not find any, but the friendly "guide" was excited to show them. In this way, we realize how a tourist feels visiting the park for the first time and how we can suggest improvements so that the visitor registers good memories, finds signs with adequate information and autonomy to carry out their activities safely and independently.⁴

The second visit was quieter and with fewer doubts and scares, and more productive as well. It was noted during the two visits that some problems are in the management of the park, agreeing with the research of Dray and Simonetti (2012) when referring to the maintenance of trails and signs with the appearance of abandonment and absence of other fundamental information already addressed above.

⁴ Machete.

And as a contribution of this study, it is suggested the maintenance of the signs of the trails and educational signs about the environment, the identification of trees for later cataloguing and guided tours in partnership with universities and institutions that teach the courses of tourism and environment. The creation of a park website to disseminate the activities and other important information, so that the visitor and the tourist register good memories, find signs with adequate information and have autonomy to carry out their activities safely and independently.

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