

# Environmental Impact due to incorrect waste disposal in River Miriti-AM

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**Abstract**— *The present work is an exploratory and descriptive research, which seeks to expand knowledge about the degradation of the Miriti River located in the municipality of Manacapuru-AM, to present the main characteristics of this degradation. The research was conducted in July and August 2019, and was mainly related to the observational method that highlights the characteristics of the observed facts. The work that is presented is classified as field research and unsystematic observation because it did not have a guiding script. Data collection took place on Sundays, the day when the flow of people in the Miriti resort is higher and sought to verify people's care in relation to the waste produced in the use of the living space of the resort. The results indicate the presence mainly of plastic and metallic waste such as bottles and cans of beverages. Contact with people in informal conversations indicate that many agree that users of the site lack awareness of the disposal of solid waste.*

**Keywords**— *Solid Waste; Miriti; Degradation.*

## I. INTRODUCTION

One of the most common practices today is the disposal of solid waste in rivers which leads us to a necessarily sanitary problem in urban areas, as it has reached a numerous number of ecosystems, in this case rivers, lakes, oceans and others. According to Botelho (2011), the search for people for leisure spaces and other activities, causes them to ratify and channel rivers, thus modifying their ecosystems, without considering river geomorphology and hydrology thus causing various types of environmental degradation.

According to Cempre (2010) the responsibility to take care of the environment and give the best disposal of waste produced by human beings is an obligation of the public authorities, companies and of course of the population, that is, it is everyone's, this is also very clear in the new Law of solid waste (Law No. 12,305 of August 2, 2010), where it clarifies us that everyone should give the best destination to waste produced and consumed.

Also, in this context of environmental damage and how to preserve the environment, just as governments play a key role in this issue, other actors also play a relevant role, such as educators, Non-Governmental Organizations (NGOs) and the media communication. In this sense Silva (2010) in studies describes to us that environmental education is very important in solving this problem, since the actors mentioned can encourage people to know and do their part, such as avoiding water waste

and improper disposal of solid waste. In addition to these factors, a more educated society is able to consume products from environmentally friendly companies and charge more its representatives to comply with environmental legislation.

Santos (2015) reports to us that the disposal of solid waste in rivers has caused major environmental damage in these ecosystems and is a permanent concern of all involved. Water resources have been greatly affected by pollution, and this causes concern for the importance of this natural resource for all forms of social organization to carry out their activities. It is worth remembering that throughout the history of humanity, the rivers in became the backbone of the cities, because they organized themselves near their banks as a way to promote human development, through the benefits of maintaining life. Rivers are able to structure urban fabric and become axes of development of the design of cities, but their importance is forgotten when people by their actions start to degrade this resource.

We realized in Almeida's words (2010), that if we take into account the history of the occupation, modification and degradation of rivers, especially those located near the cities, these are relatively recent, since the history of human beings in land is at least two million years old and the processes cited increased on a higher scale from the 1st Industrial Revolution, i.e. 150 to 200 years ago.

The river, object to this study is of great importance to the city of Manacapuru, whether in the environmental or tourist issue, aspects that justify the study on the environmental damage that the river has been suffering over the years. On this we will realize that the river is showing clear signs of environmental problems, due of course by the large number of solid waste discarded its banks, which cause bad smell, dirt and various other types of damage. All aspects mentioned justify this study, because its data, research and examples of combating environmental damage will serve as a socio-environmental parameter for all those who care about future generations.

In view of the problem, the objective of the work was to report and analyze the physical processes (environmental problems or damage) resulting from the inappropriate disposal of solid waste in the Miriti River, located in the municipality of Manacapuru/AM, in the area where the Miriti Resort is located. The disposal of solid waste in the river has direct connection to the environmental damage that the river has been suffering over time, as it is these waste that cause problems such as water pollution, bad smell, whistling and various other problems that should be avoided.

## II. MATERIAL AND METHODS

### The search

Regarding the objectives, this work is an exploratory research defined by Zanella (2013), as one that "aims to expand knowledge about a given phenomenon".

Thus, the work that is presented now seeks to expand the knowledge of the characteristics that define river degradation and the recognition of the reasons that lead to this degradation.

The work is also a descriptive research, explained by Zanella (2013) as "the one centered on the concern of identifying determinant or contributing factors in the triggering of phenomena". In seeking to identify the reasons that cause the degradation of the Miriti River, the work presents them as causative stemming from them and seeks to describe its origin of these causes.

As for the approach, the research is classified as qualitative, defined by Zanella (2013) as "the one that is based mainly on qualitative analyses, [...], characterized in principle, by the non-use of statistical instruments in the analysis of data." Thus, the identification of the characteristics of environmental degradation of the Miriti River, in Manacapuru-AM, occurred from the observation of the actions and impactful processes.

### Collection Area

The Miriti River is located about 7 km from the urban area of the city of Manacapuru/AM (Figure 1) has a population of 96,236 inhabitants (IBGE, 2018), and with approximately three hectares including the beach and river area. Also, the Miriti River is one of the main sights of the municipality, welcoming many visitors during the week. For the study, on-site visits were performed every 15 days during July and August 2019.

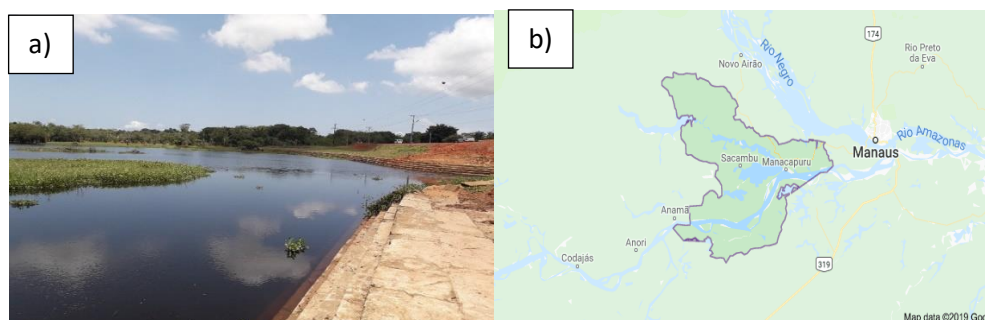


Fig.1 -: a) Image of the Miriti River; b) Map of the municipality of Manacapuru – AM Source: Google Maps 2019).

The present study is characterized as qualitative research, since it aims to observe, record, and correlate facts or phenomena, trying to describe them, classify them and interpret them for the purpose of studying and observing the damage caused by the disposal of solid waste in the Miriti River, a river located in the municipality of Manacapuru - AM. Thus, all the content obtained was analyzed, that is, the reports of the observations, the analysis of documents and the other information available, such as reports and observations on

site. In addition to seeking foundation in theorists who treat the environmental cause with different looks, using texts of their works in the theoretical foundation.

Data collection consisted of the on-site visit aiming at observational verification, described by Zanella (2013), as the highlight of a set, of objects, people, animals, in order to list its main characteristics.

As for the observation made to elaborate the present work, it can be classified as field work, given its particularities, and unsystematic observation, because it

does not have a guiding script or guide, but with the focus on objectives and problem of work.

### Data Analysis

Data analysis consists of reading and interpreting the content of the collected documents, as well as on-site observation records. This research procedure is a tool for always renewed action due to the increasingly diverse problems that it proposes to investigate.

In this way you can describe and interpret the contents of the entire class of documents and publications read about the subject covered. This analysis leads to systematic, qualitative or quantitative descriptions, helping to interpret messages and achieve an understanding of their meanings at a level that goes beyond a common reading.

The analysis of the collected data is fundamental so that we can know if there are in fact serious environmental problems, as well as its causes and consequences. With the analysis of observations, for example, we note that often because there are not enough containers for the collection of these materials and the lack of education, residents and bathers end up throwing the waste used on the banks of the river, demonstrating lack of concern for the environment. Another issue that helps in this practice is the lack of on-the-spot surveillance, which favours the infringement, since many people only realize the mistake made when they receive a warning.

### III. RESULTS AND DISCUSSIONS

Fresh water with characteristics suitable for consumption, has great importance for humanity, and its availability is limited only to rivers, lakes and other superficial sources, so that according to Silva (2018) if we consider only the characteristics suitable for consumption, available water represents 0.4% of.

In a study on the main characteristics of the springs used as sources of supplies in the municipalities of the Solimões-Amazonas River, Azevedo (2016), points out the Miriti River in Manacapuru-AM, as a superficial source of supply of the municipality, however, it indicates that the river is threatened by the launch of domestic sewage, and according to the data collection for the present work the threat also lies in the large-scale presence of solid waste, since its presence in water bodies can harm animal life.

The Miriti River is an important source of leisure and supply in the city of Manacapuru/AM, and for these reasons an analysis of the possible environmental impacts caused by the disposal of solid waste in the region was carried out. Technical visits were made during 07, 14, 21 and 28 July and on 04, 11 and 18 August 2019, with the

objective of visually verifying possible impacts and causatives. It was observed that along the Miriti River there is a wide variety of solid waste discarded on the banks of the river, especially in the Balneário region of the same name. In Table 1, we can see some of the materials found.

Table 1 - Waste found in the Miriti River Resort.

| Class                   | Waste  |
|-------------------------|--|
| <b>Plastic</b>          | Plastics, PET bottles, cup, pot, packaging, Bags, hammock, straws, covers and other.   |
| <b>Paper</b>            | Newspaper, packaging, disposable diapers, cardboard.                                   |
| <b>Glass</b>            | Pieces of glass and bottles.   |
| <b>Metal</b>            | Soft drinks, iron.   |
| <b>Wood</b>             | Popsicle toothpick, barbecue skewers, crates and matchsticks.                          |
| <b>Organic</b>          | Leftover soups, fruits and feces of animals.   |
| <b>Waste in general</b> | Debris from construction material, cigarette portfolios, fabrics and lighters and etc. |

Lopes and Jesus (2017) report that historically societies have always developed their economic and social activities based on water resources and the increasing diversification of human activities to develop economically and socially, has required higher volumes of water to meet various consumptions. Among so many forms of use of water resources, Souza (2014), points out that there are other non-consumptive use that are activities related to recreation, leisure, landscape harmony and tourism.

In the case of the Miriti resort, the use is public and can be used at any time, however, it is noticeable that some users do not contribute to the maintenance of the quality of the environment they use, therefore, it is necessary that users have the design according to Brum et al (2013) that public spaces should be the main icons of defense of the environment, because their absence in the urban context, should be compensated with the correct use of these spaces especially when there are water resources in evidence.

It is essential that people know the various types of waste or garbage and do whenever possible the correct disposal, because if we do this with certainty we will have a less polluted environment. Another factor that can make a difference for people to better dispose of their waste is for governments to provide adequate places for waste collection, recycling and disposal. Table 1 demonstrates how solid waste is disposed of in days of great movement of people in the resort.

Table 2 - Disposal of waste, cleaning and organization of the Miriti River.

| Spa of RiverMiriti<br>Months of July and<br>August | Clean | Organized | With waste scattered<br>on the banks of the<br>river | Deposited in the<br>appropriate places |
|--|-------|-----------|--|--|
| 07/07/2019   | No    | No        | Yes  | No                                     |
| 14/07/2019   | Yes   | Yes       | Yes  | Yes                                    |
| 21/07/2019   | Yes   | Yes       | Yes  | Yes                                    |
| 28/07/2019   | Yes   | Yes       | Yes  | Yes                                    |
| 04/08/2019   | Yes   | Yes       | Yes  | Yes                                    |
| 11/08/2019   | No    | No        | Yes  | No                                     |
| 18/08/2019   | No    | No        | Yes  | No                                     |

According to MMA, (2010), the use of packaging in commercial products and by-products is essential for the protection of inputs during its distribution, storage, marketing, handling and consumption stage. Among the functions of the packaging is in ensuring safety and quality of life for the population, allowing access to different products from food or medicines to electronics and utensils in general in all regions of the country. Incorrect disposal of packaging is the major problem with regard to the necessary consumption of these inputs.

The main criterion for if one could know if the site is clean, organized and with adequate waste disposal or not, went to observation on site, because with the observation of the place we can see how they are to the physical characteristics, such as if there are garbage thrown on the banks and on the beach, as well as the behavior of the river goes in relation to this problem. The data covered above are nothing more than the vision I had of how the site was in the memento of the visit and observation.

When analyzing the characteristics of environmental impacts on water bodies, it is possible to realize that elements capable of identifying degradation in these places, according to Braga and Azevedo (2013) are mainly due to increased density population that without proper planning begins to launch its domestic effluents into water bodies, causing their pollution.

Albuquerque (2014), comments that although it is one of the most important waterways in the municipality of Manacapuru-AM, the river suffers each year from intense human actions that impair water quality.

The site presents on weekends a large number of regulars, this ends up facilitating the irregular disposal of waste on the banks of the river, among other bad

characteristics, and that we noticed in Table 1, is that the Spa of the Miriti River presents in some days waste is deposited improperly, in addition to disorganization and lack of cleaning. During the observations it was worrying to see how people do not care about making their disposals correct and keeping the place clean, which makes us think that there is much lack of awareness with the environment and future generations.

All these on-site visits were fundamental not only for the collection of real data, but also to better understand the situation and the problem addressed among other factors. Images 1; 2 and 3 show a small picture of the situation of the river and how it suffers from pollution, the lack of adequate place, in this case of dumpsters for the disposal of waste is only one example of the problem, in the images we also perceive the solid waste deposited both in the banks as in the river bed causing numerous environmental damage.

In informal conversations with residents and bathers in the resort, about what they think of the irregular disposal of solid waste on the Miriti River, they believe that what is lacking for people is more awareness and education in dealing with garbage, another aspect claimed by them, is that it should have more participation of the public authorities in raising awareness and care for the environment, because there are still adequate places to dispose of the materials, an example would be the lack of places for selective garbage collection and dumpsters in the resort and Nearby. These are just one of the examples that could be applied to at least minimize the problem of pollution of the Miriti River, both by residents and bathers.





Fig.2 - State of the dumpsters in the spa of the Miriti river; solid waste deposited on the riverbed and waste thrown the banks of the Miriti river.

#### IV. CONCLUSION

Given the observations made in the Miriti River, especially in its locker room, it is perceived that the changes made from the need to provide attractions, to visitors to the municipality, it was found that the place suffers and will continue to undergo changes with incorrect waste disposals, because, even in view of the presence of dumpsters throughout the public use area, it is common to find residues through the ground and water, thus increasing environmental impacts such as water pollution, degradation in the area among other aspects, this is increasingly visible by the fact that the river already presents to its margins materials derived from plastic, metals and others that even take years to decompose.

Polluting sources are diverse, however, measures can be taken, initially by the municipal public authorities in partnership with the community and other environmental workers, where they can define and implement environmental education, signage and monitoring of the area with environmental guards in which when developed can at least mitigate the pollution problems of the Miriti River, since only through education and actions aimed at raising people's awareness, will it be possible to a change of attitude, since the main causes of environmental degradation are human beings. Awareness work should cover residents of marginal areas of the river who are also polluting sources and should be contemplated by government action to reduce the impacts already caused on the water body.

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