

The use of Conservation Units as an Environmental Education Tool: Literary Review on Mindu Municipal Park - Manaus -Am

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Abstract— Conservation units (UCs) are legally protected territorial spaces that provide outstanding natural features, however (UCs) do not ensure that the areas are fully preserved. Brazil has a vast biological diversity, having several protected areas, these protected spaces have a fundamental role in the protection of nature, fauna and flora. The aim of this study was to make a literary review of the articles published about one of the existing conservation units of the capital of Amazonas, the Mindu Municipal Park, chosen for being located in the heart of Manaus about fifteen minutes from downtown. Parque do Mindu, is the dwelling that houses several species of fauna and flora of the region: animals like Sauim-de-Coleira (*Saguinus bicolor*). The maintenance of the park as observed in loco, it is noticeable that suspended trails are with maintenance on time. It is noteworthy that existing activities in urban parks aim to promote environmental education (EA). Do Mindu Municipal Park is a (UC) example of perseverance to exist today, thanks to the efforts of society and federal, state and municipal laws. Literary resources about the Park are of great importance to understand the history and development of a conservation unit located in an urban area feeling the impacts of anthropization.

Keywords— Conservation Units, Parks, Environmental Education.

I. INTRODUCTION

In the middle of the last century humanity was able to follow the consequences of a remaining system that was the Industrial Revolution, where the focus was only productivity and economic growth, not ensuring environmental quality (POOT and ESTRELA, 2017). For Sampaio, (2015) "the Industrial Revolution was the triggering milestone of a society founded on consumption, and this society imposed increasing pressure on natural resources.

Among the existing environmental problems, we can highlight that the environmental problem is a result of capitalist globalization (MARION, 2013). In 1972 in Stockholm, Sweden, there was the first meeting with the environmental theme, it was considered a historical milestone, because there was the "finding that the system of production of goods of industrialized countries negatively affected the environment planetarium" (ROCHA, 2003). The Stockholm declaration aimed to assist in preserving fauna and flora, reducing toxic solid waste and supporting underdeveloped countries (IPHAN, 1972).

About twenty years after the Stockholm

declaration, there was the United Nations Conference on Environment and Development, known as Rio-92 or Eco-92, in the city of Rio de Janeiro, Brazil. It was an event that addressed dominant guidelines on the environmental issue, and especially sustainable development, its result was agenda 21, aimed at combating deforestation, poverty, biological conservation and changing consumption patterns (OLIVEIRA, 2012).

In 1995, the Conference of Parts I (COP-1) took place in Berlin. In 1996, COP-2 in Geneva; and in 1997, COP-3 was held in Kyoto, establishing a document called the Kyoto Protocol, these conferences had as its main objective to reduce greenhouse gas emissions, and also defined strict adjustments regarding global warming (ANDRADE and COSTA, 2008). Later, at Rio+20 held in Brazil, the following question was raised: "What future do we want?" (WENCESLAU, ANTEZANA, CALMON, 2012).

All environmental treatises aimed to reduce the causes of river contamination, air pollution and leakage of harmful chemicals. Against departure, rulers around the world began to discuss ways of remediation or prevention of these impacts on the environment (POOT e ESTRELA,

2017).

Brazil has environmental laws set out in the National Environment Policy (PNMA), which aim to protect flora and fauna, waters, environmental instruction, environmental crimes and environmental administrative misdemeanors, as well as conservation units, genetic heritage, protection and elevation to classical knowledge, benefit sharing and genetically modified organisms (TRINDADE, DIAS, 2008).

According to the Ministry of the Environment (MMA), according to Law No. 6,938/81 (PNMA) that directs the guidelines, concepts, objectives on environmental issues, cites in Art 6 on:

“The organs and entities of the Union, states, the Federal District, territories and municipalities, as well as the foundations established by the Public Power, responsible for the protection and improvement of environmental quality, will constitute the National System of the Environment Environment - SISNAMA. The National Council for the Environment (CONAMA) aims to advise, study and propose to the Governing Council, government policy guidelines for the environment and natural resources and deliberate, within the scope of its competence, on standards and environmentally friendly standards ecologically balanced and essential to sound quality of life”.

The main laws covering the precautionary idea of environmental preservation according to the Ministry of the Environment (MMA) are: Law 9.605/1998 - Environmental Crimes Law; Law 12.305/2010 - Establishes the National Solid Waste Policy (PNRS); Law 11.445/2007 - Establishes the National Basic Sanitation Policy; Law 6,766/1979, provides for the Portionment of Urban Soil; Law 7,347/1985 - Law of Public Civil Action; Law 9,433/1997- Water Resources Law; Law 12.651/2012 - New Brazilian Forest Code, among others.

Through these laws, we seek ways to preserve, mitigate, reduce environmental impact and deforestation, and thus, the National System of Conservation Units (SNUC) was created in 2000, supported by Law No. 9,985/2000, with the innuúide of protecting areas of relevant ecological interest(MMA,2019).

Conservation Units (UC's) are legally protected territorial spaces, which provide important natural characteristics, and have as main function to ensure the representativeness of significant and ecologically viable samples of different populations, habitats and ecosystems, in order to preserve biological, geological and evolutionary heritage (SOUZA, et al., 2017). According to Couto, (2017), conservation units (UC) do not ensure that the areas are fully preserved, the author shows that it is necessary to implement environmental education so that society can engage and become aware of the importance of preservation of the environment.

Brazil has a vast biological diversity, having several conservation units. In the Amazon according to the Secretary of State for the Environment (SEMA), there is the management of 42 conservation units (UC's), eight of which are full protection and 34 of sustainable use, totaling 18,907,378.34 hectares of legally protected forest, which represents 12.13% of the state area. The state of Amazonas has 97% of its fully preserved vegetation cover, and Sema acts with constant actions to ensure preservation and prevent deforestation (SEMA, 2019).

In Manaus, the capital of Amazonas, the total of protected areas according to the State Secretary of Environment and Sustainability (SEMMAS, 2019), there are twelve (12) protected areas in the city, ten (10) conservation units and two (2) Ecological Corridors. These specially protected territorial spaces occupy 4.75% of the area of the municipality of Manaus, with a fundamental role in the protection of nature, fauna and flora.

In view of the above, the main objective was to make a literary review of the articles published on one of the existing conservation units, which is the Mindu Municipal Park, chosen to be located in the urban area of Manaus about fifteen minutes from the city center (SEMMAS, 2019).

II. LOCATION

Mindu Municipal Park is situated in the south-central portion of the city of Manaus, Parque Dez de Novembro district, between perimetral ii and efigênio sales avenues, is located under geographical coordinates 03°04'51" south latitude and 60°00'09" west longitude. It has approximately 29 hectares. The Mindu Municipal Park by the Manaus Environmental Code (Law No. 605, 2001) is a Conservation Unit - UC, including in the Municipal Park category (DRAY, SIMONETTI, 2012).

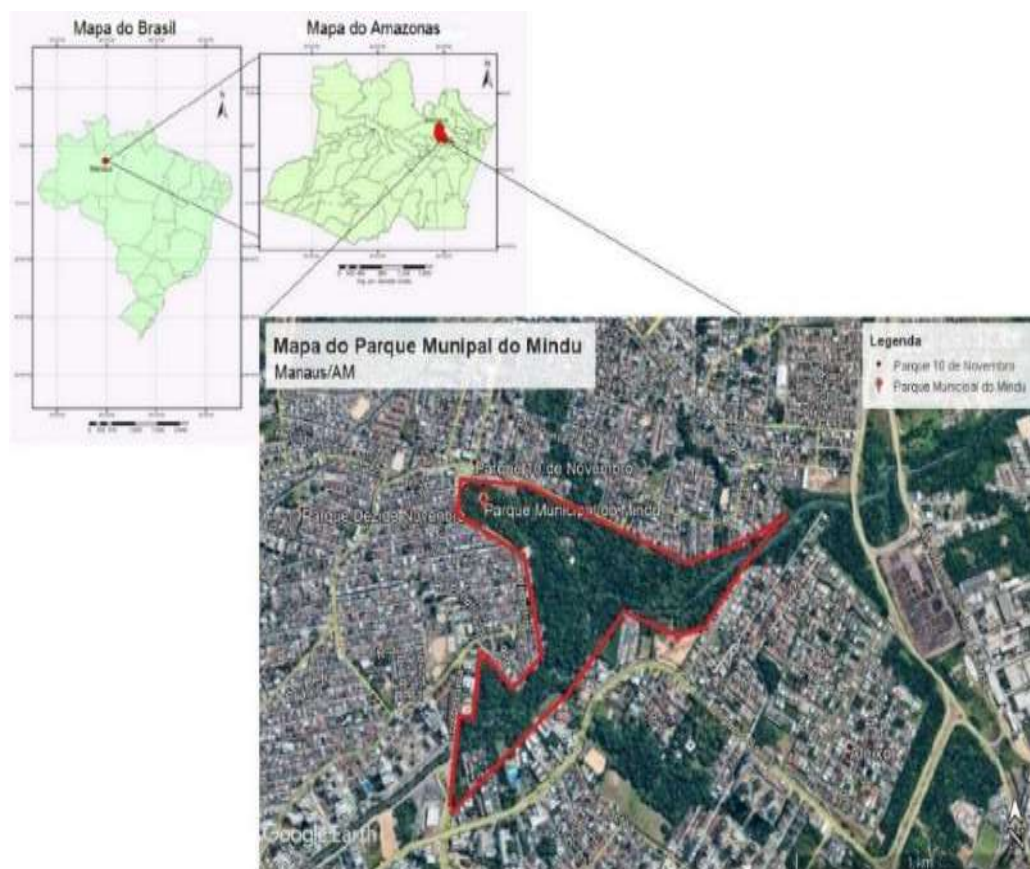


Fig.1 - Map of the geographical location of Mindu Municipal Park, Manaus - AM. Source: (ALMEIDA, et al., 2017; GOOGLE EARTH, 2019)

III. CONCEPT OF ENVIRONMENTAL MANAGEMENT AND URBAN PARK

To understand the literary results analyzed, it is necessary to describe about the environmental management sector. Corroborating this subject, Oven (2017) that management in Latin means *gestio*: act of managing, management, of administering. The concept of management is associated with the administrative idea, for this reason, it is necessary to distinguish between the concepts of *gestar* and *manage*, so if management is to be, *manage* means to be and *manage*.

For Silva (2014) environmental management arises from the obligation that man had to organize his life, combining with his actions in the environment. However, Giesta (2009), environmental management is an alternative to achieve better adjustment with capitalist growth and environmental conservation.

The Mindu Municipal Park, has a management system led by the Manaus City Hall, through the Municipal Department of Environment and Sustainability - SEMMAS, which is the body responsible for hiring the manager, secretary, inspectors of security and also accepts the registration of academics to be volunteer interns.

SEMMAS is the body that coordinates the protected areas and is subject to the standards of CONDEMA - Municipal Council for Development and Environment (CASCAS, 2011).

According to Gomes (2014), the creation and implementation of parks in many cities is related to the set of guidelines imposed by the United Nations since the 1970s, as a way to promote sustainable development, among other aspects, in the propagation of "green spaces." Urban parks are usually places rich in biodiversity, most of which are the fauna and flora of the locality, where according to Cascas (2011), a number of leisure, culture and teaching activities are carried out for knowledge about the environment, issues that need to be discussed in the community and by society.

The author Melo (2013), also mentions that in addition to leisure practices, the parks are representative in the urban environment, due to the presentation of nature, bringing a thermal comfort, mitigating air pollution, amortizing effects of soil waterproofing, in addition to species of fauna and flora in the world urban environment (Figure 2).

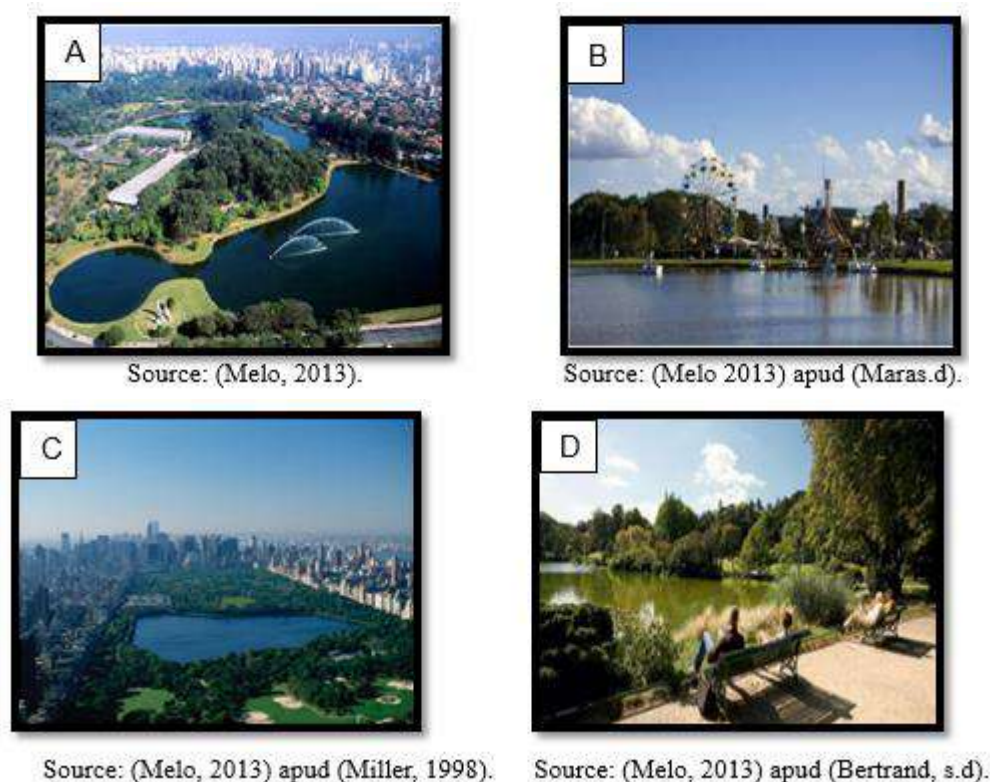


Fig.2 - Urban Park. Legend: a) Ibirapuera Park - SP; b) Barigui Park in Curitiba - PR.; c) Central Park - NY; d) Montsouris Park in Paris.

IV. HISTORY OF MINDU MUNICIPAL PARK

According to Cascas (2011), in the area where today is located the Mindu Municipal Park, around 1940, a grotto was installed in honor of Our Lady of Lourdes, on the banks of the Mindu stream, an area that was known as the quarry site. At the beginning of 1960, the area was sold to the Redemptorist priests of the Parish Of Our Lady of Aparecida, being used as a retreat by the Salesian community, where activities were developed, such as planting fruit trees and growing Vegetables.

In the late 1960s and early 1970s, with the construction of the Humberto de Alencar Castelo Branco Housing Complex, located near the creek and with the land invasions, the mindu stream began to become polluted. In 1975, with increased pollution, the land was sold to the Ministry of Finance and incorporated into the green area of the city. Without the care due by the responsible body, the area began to be the target of real estate, invasions and deforestation (CASCAS, 2011).

Silva (2014), corroborates saying that the park originated through an initiative of the residents of the surrounding area and the Manaus City Hall, which intervened against an invasion, which aimed to transform the green area into an "area of real estate speculation", having even deforested about 15% of the total area of the park.

After reestablishing the control of the park the Manaus City Hall, according to CitaCascas (2011), developed a project called "Projeto Gaia" (Mãe Terra), composed of 142 adolescents from 44 countries. Author Silva (2014) corroborates informing that the "Gaia Project" took place on March 18, 1992, the City Hall led the movement with members with the presence of the Prime Minister of Norway, Gro Harlem, who planted one of the inaugural landmarks of the Park, a tree of the species "Sumaumeira" (*Ceiba pentandra L. Gaertn*), currently, is a symbol of the defense of ecology and the breaking of limits. The Fertility Monument was also built, using stones sent by children from different countries.

The incorporation of mindu Municipal Park to the Municipal System of Conservation Units, according to Cascas (2011): "occurred in 1993, through Municipal Law No. 219, of November 11, Mindu Park received legal recognition as "area of interest with an extension of 309,518 m², being incorporated into The SNUC and is governed by the regulation of Brazilian National Parks. In 1994, a federal decree authorized the assignment to install public ecological park, with the objective of environmental preservation of the area, having its land situation regularized".

V. LAND TRAILS AND SUSPENDED TRAILS

In 1996, the Manaus City Hall implemented the physical infrastructure of the park: urbanization of trails, suspended trail, orchid, environmental library, thematic squares, parking, and educational signage, aiming to develop environmental education programs (CASCAS, 2011).

According to Dray, Simonnetti (2012), there are nine (9) trails in Mindu Park are all open for public visitation, according to (DOM, 2006), along the trails, which contain information about the region's rich ecosystem, all trails have nine specific so-called: Jungle

Trail, located in the area of baixio; the MargarethMee Trail; the Banana Trail, which features the wild banana tree; the Trail of Life; the Sauim-de-Manaus Trail; the Baixio Trail; the Trail of the Springs, which is situated in an area of high incidence of plant species; the Buritizal Trail; and the Suspended Trail (Figure 3), which provides closer contact to the visitor with the treetops.

However, at the time when the authors Dray, Simonnetti (2012), described about the suspended trails stressed that they were under maintenance. And currently as observed on site, it was noticed that the suspended trails are up to date.



Fig.3 – Hanging trails. Source: (A) (DRAY, SIMONETTI, 2012); Source: (B)(DIAS, 2019); Source (C) : (DIAS,2017); Source: (D) (DIAS, 2019).

VI. FEATURE ABOUT THE FAUNA AND FLORA OF MINDU PARK

The Park is the habitat that houses several species of fauna and flora of the region: animals such as the Collared Sauim (*Saguinus bicolor*), endemic monkey threatened with extinction, belonging to the Callitrichida family existing only in the region of Manaus, laziness (*Bradypus tridactylus*), typical rodents of the region such

as cutia (*Dasyprocta aguti*) and squirrel (*Sciurus antunes*), birds such as hawk (*Buteo* spp), macaw (*Ara macao*) and a diversity of plant species (CASCAS, 2011). As Maia (2018) quotes Maia (2018), which in addition to the collared Sauim, the park has the presence of other species of The Amazonian fauna, such as Jacaré (*alligatoridae*), Cutia (*Dasyprocta agui*), Cobra Coral falsa (*Dipsadidae*) (Figure 4)



Fig.4 - Resident Fauna In Mindu Municipal Park

Source: (DRAY; SIMONETTI, 2012; TAPAJÓS, 2014; ALMEIDA, 2018).

It has native vegetation of *baixio/igapó* forest or flooded areas, dry land and secondary *capoeira* forest. According to Ribeiro, Araújo, Santana (2007), there are species that have been introduced (*Euterpe oleracea* Mart., *Eleaëis oleifera* (Kunth) Cortés) and four species are of secondary forest or anthropized forest (*Astrocaryum aculeatum* G. Mey., *Attalea maripa* (Aubl.) Mart., *Oenocarpus bacaba* Mart. and *Syagrus inajai* (Spruce) Becc.) increasing the number of species occurring in the park. The spring that runs through the park is called Igarapé do Mindu, from where the name of the park originated (CASCAS, 2011).

As Vieira (2012), the Igarapé do Mindu runs between the neighborhoods of Manaus, its source is located in the Neighborhood Jorge Teixeira, in the East Zone, in the Parque Nascentes do Mindu, near the Botanical Garden of the Ducke Reserve, then crosses the city towards northeast-southwest, traveling and delimiting numerous neighborhoods, such as Jorge Teixeira, Tancredo Neves, Cidade Nova, Cidade de Deus, Aleixo, Parque 10 de Novembro, N. S. das Graças, São Geraldo to the Neighborhood São Raimundo. It is noteworthy that the main source of the creek is preserved Parque Nascentes do Mindu, but the situation of the creek, as observed in the Municipal Park of Mindu is catastrophic, full of plastic, chemical and solid tailings.

VII. THE INSERTION OF ENVIRONMENTAL EDUCATION IN MINDU PARK

Mindu Park receives tons of waste that are caused by the water course, resulting from the action of the

anthropic, which irregularly discards its waste in the streets and streams of the city (SEMMAS, 2017). According to Maia (2018) programs aimed at reducing solid waste is poorly practiced in communities and for ecological awareness in the collective recycling projects to be a solution for public policies in relation to the reuse of waste.

Over the years, much has been heard about the problem currently installed about the misuse of man in relation to the environment. Comments Medina (2016), that the environmental problem is the result of the misuse of natural resources, air and water pollution, destruction of ecosystems, among other forms of destruction, in which it is in the dimension of inefficient public policies in the concerning the lack of political commitment and education.

In this context, Environmental Education (As) appears in a perspective to bring reflections on the actions of anthropic, in raising awareness and raising awareness of the permanence of biological biodiversity for future generations. With regard to EA incentives in Mindu Municipal Park, according to (SEMMAS, 2017) since 2013 a project called "D Day, all against solid waste", where community is invited together with companies to participate in the collection of solid waste that accumulate in the creek inside the park. For Serafini, Santos (2007), the accelerated growth of the urban population of Manaus was accompanied by a density of environmental problems, related irregular occupations, the destruction of plant cover, pollution of watercourses and the lack of Sanitation.

In 2018, this action removed 3.9 tons of waste from the banks of the creek, in the stretch that cuts through Mindu park. And in 2019 the amount of waste collected was 3.6 tons (SEMMAS, 2018; SEMMAS, 2019).

According to Maia (2018), the solid waste existing on the banks of the Mindu stream are of various materials (Figure 5), which take years to decompose in the environment. The Ministry of the Environment (MMA, 2019), informs that the natural decomposition time of

paper is three to six months, metal takes more than 100 years, aluminum 200 years, plastic takes more than 400 years and glass takes more than 1000 years to decompose.

In this respect, Carvalho (2008, p. 38), draws attention to us in terms of a socio-environmental vision in relation to nature, the Mindu Municipal Park recognizes that, in order to solve the environmental problem it is necessary that the community be involved.



Fig.5 – Solid Waste characteristics found on the banks of the Mindu Creek.

Source: (MAIA, 2018).

It is noteworthy that the socio-environmental context that THE appears in a perspective of bringing reflections on the actions of man, of raising awareness and raising awareness of the permanence of life for future generations (OLIVEIRA et. al., 2019). Corroborating the authors Cavalcante, Teixeira, Moura, (2013), stating that EA and its actions contribute to human and social transformation, focusing on the three R's (Reduce, Reuse, Recycle), sensitizing and informing society, with the objective of adding environmental awareness.

According to Oliveira et. al., (2019), on the term of sustainability, which has won the world, and the global concern of environmental problems has driven several conferences to discuss the paradigm of development in a sustainable way. The introduction of the community in conservation units is a means of informing about various environmental impacts that can often be mitigated with simple attitudes.

The Mindu Park, was reopened in 2006 by the Manaus City Hall, and gathered other activities to attract visitors through gastronomy with the restaurant in Chapéu de Palha, whose runs are on weekends and holidays, and also through activities such as lectures, theater and music held in the Amphitheater, in addition the park is an excellent place to perform physical education activities where there is even a public academy, and for those

seeking some relaxing activity there is on Saturdays yoga. It is noteworthy that some activities are of public organizations and also private non-governmental organizations, the more the purpose is to promote actions to establish an internal visitation and knowledge about the operation of conservation unit, without assaulting resources Natural (CASCAIS, 2019).

Existing activities in urban parks aim to promote environmental education, corroborating the theme quotes Rezende et al., (2012), pointing out about the VictórioSiquierolli Park, located in Uberlândia - MG, which has an Environmental Education Center that aims to encourage extra-class activities by guiding users to explore the environment of a sustainable nature from the knowledge acquired in the park.

For Menezes (2011), based on his results collected in the Bosque John Kennedy Municipal Park, that of the frequency of visitors in the parks, demonstrates that the vast majority of users visit the place with due to the fact of the walkway for the practice of exercises physical, walking, walking, taking children to play. However according to Viana et al.; (2014), in Manaus in addition to mindu municipal park, there are other parks such as Sumaúma Park, Botanical Garden and Mindu Springs Park, both are located in the north and east zones, and according to their collected results the population has

the view that areas greens only serve as shelter and misuse of marginals and addicts, who use the place to drug themselves and do robberies. This factor that should be analyzed, because for THE to be disseminated, socio-environmental actions need to be distributed equally.

VIII. FINAL CONSIDERATIONS

Today's environmental issues are of great social importance in the face of threats that the degradation of the environment can lead to men and life on planet Earth. Conservation Units were children to prevent globalization from destroying native natural environments. The Mindu Municipal Park is one (UC) with an example of perseverance to exist today, thanks to the efforts of society and federal, state and municipal laws.

The literary resources about the park are of great importance to understand about the history and development of a (UC) located in urban area feeling the anthropic impacts. Widespread information and changing habits are the basis for mitigating the impacts on urban parks, environmental awareness can not only be too much in laws, it also has to be present in the daily attitudes of society, this can be done both at the national and local level. Finally, the realization of the literary study on CUs goes far beyond conservatism. It is a radical transformation of mentality in relation to quality of life, which is directly linked attitudes, values and actions with the environment.

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