

Proposal for a design of an Interpretation Center to Raise Awareness about Wild Fauna

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Abstract. The present investigation proposes the design of an environmental interpretation center in the Huáscar Zonal Park in the district of Villa El Salvador, which will allow to sensitize and minimize the illegal traffic of wild fauna. The most recurrent species are birds, specifically parrots and macaws; small primates like the marmoset monkey, the monkey friar, or the maquisapa monkey that is acquired as a pet and in some cases commercialized in the markets as "bush meat" for the consumption of the population; Likewise, reptiles such as the Titicaca frog that are also sold in the markets as a revitalizing juice, as a mechanism of this a harmonious design is proposed that mimics the environment of the park, which in its great majority presents trees and species. Also, to achieve the objective of creating the Interpretation Center, it is necessary to accomplish a behavior change and generate respect for the natural environment and harmony between man and nature.

Keywords. Wildlife; interpretation Center; sensitization; population.

1. Introduction

Peru is a megadiverse country; it is a popular destination for ecotourism because one of its main attractions, among many, is the diversity of its wildlife. The loss of species due to trafficking produces harmful changes in ecosystems, and consequently, our ecotourism resource is directly affected.

According to the National Forest and Wildlife Service (SERFOR), in Peru, more than 80,000 live individuals of wild fauna have been seized between 2000 and 2018; 25% of these corresponded to an endangered species. Investigations into illegal wildlife trafficking at the national level indicate that more than 80% of the trafficking is concentrated in the markets of Lima, Tumbes, Loreto, and Ucayali. [1]

In the illegal wildlife trade, the most recurrent species are birds, specifically parrots and macaws; small primates such as the marmoset, the friar monkey, or the maquisapa monkey that is acquired as a pet and in some cases sold in the markets as "bush meat" for the consumption of the population; likewise, reptiles such as the Titicaca frog which is also sold in the markets as a revitalizing juice. [2]

On the other hand, environmental education plays an essential role in the fight against wildlife trafficking in forming people's awareness regarding the conservation of the environment and natural resources. Thus, in various countries, they have created numerous environmental interpretation centers as a tool for changing citizen behavior regarding the care and conservation of the environment, to create spaces where the visitor understands ecological problems, that make them feel participatory and that facilitate the intention to change the attitudes that contribute to environmental issues. [3]

In this context, public spaces are an excellent opportunity to promote environmental awareness since they allow access to a more significant number of people of all socioeconomic levels. Unfortunately, in Lima, there is a deficit of these spaces. Currently, access to information on wildlife and specific information that educates to prevent the purchase of wild animals is minimal. The population is sensitized about the nature they have to go to a Natural Protected Area. Consequently, there are no urban spaces that educate and educate the people about this problem.

Therefore, this research focuses on designing an interpretation center to generate a public space that sensitizes and educates the population environmentally about the importance of conserving wildlife, showing their characteristics, the dangers they face. and its importance within the ecosystem to prevent

the purchase of these species as pets in informal markets, thus indirectly contributing to the reduction of wildlife trafficking at the national level. [4]

2. Materials and methods

2.1. Study Site

The Huáscar Zonal Park is located at 12°14'03 "S and 76°55'33" W in the Limeño district of Villa el Salvador between the intersections of Avenida 200 Millas and Revolución (Figure 1), it has 666,970.18 m² of total area. It is one of the ten zonal parks in the city of Lima. SERPAR administers these; this is a decentralized body of the Metropolitan Municipality of Lima. Its objective is to satisfy the recreational, cultural, and sports needs of the population of Metropolitan Lima. The Huáscar Zonal Park is the second most visited public space, with 1,098,532 visits in 2017. [5] Therefore, given the annual scope of visits to the Park, it is favorable to carry out an intervention of the type proposed in this research to reach the largest population. In the same way, this location is good because the Park has a mini zoo, a lagoon with islands of monkeys, and a forest nursery, a suitable environment to generate interest in the conservation and protection of biodiversity. [6]

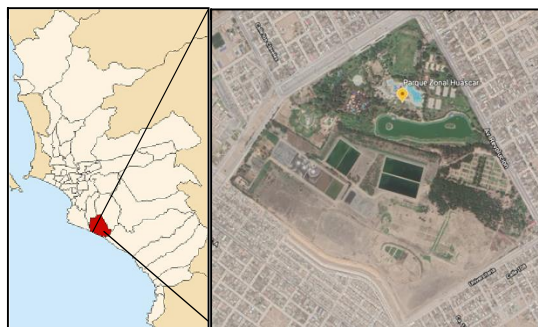


Figure1.Location of the Huáscar Zonal Park

2.2. Centers for Environmental Interpretation and Awareness

An interpretation center is a space that reveals the meaning and relationship of heritage with the visitor through experiences and by applying the principles, qualities, and strategies of the interpretive discipline. Interpretation centers play a crucial role at the site entrance or at the beginning of its journey since it presents a synthesis of the cultural or natural assets preserved or presented by the different institutions they introduce. [7]

The objective of an interpretation center is to provoke relevant sensory experiences in its visitors, by which the heritage interpretation is promoted, whether natural or cultural, helping to understand the importance of the conservation of natural and cultural resources, the keywords in the conception of this center are: information, guidance, and awareness. [8]

A determining point for the development of these centers is the containers that allow their operation; we are talking about architecture, interpretation centers can work in different types of buildings, from small and straightforward constructions to large buildings. In all cases, and from the design phase, it is essential to reduce the negative impacts that the infrastructure could cause on the landscape. At the same time, the design should seek to highlight the positive aspects of the landscape, especially those that enhance the visitor experience.

The use of the senses provides an infinite variety of opportunities to interpret the natural heritage; for example: touching the bark of a tree or hugging it could mean an important motivation in the first communication with nature, analyzing the place through the sound of water, the music of the environment, an area designed to take deep breaths that lead to the pleasant sensation of oxygenate the body and find serenity, taste some fruit from the road, new flavors of the place, differentiate its textures and flavors, it is a good time To be able to refer to the diversity of products in the food of the area, the view can be promoted and encouraged in different ways with dynamics in an unknown location, or with the use of some instruments to observe details, from a distance. [9]

2.2.1. Bamboo is the sustainable construction material for the interpretation center

Bamboo is a high-performance material for thousands of uses. Above all, it is a renewable resource with numerous environmental qualities; it represents a sustainable construction material that does not compromise the integrity of ecosystems. Various bamboo species grow in Peru, one of them the best known and the one with the most significant demand for use in construction is the species commonly

called "Caña Guayaquil." [10] Likewise, bamboo has the lowest ecological footprints compared to other construction materials, so bamboo represents the best way to reduce the environmental impact and makes it more sustainable. [11]

2.2.2. Clean and sustainable technology for the interpretation center

Photovoltaic solar technology consists of transforming solar radiation into electrical energy from semiconductor materials, such as photovoltaic cells, which are made from silicon, one of the most abundant metalloids in the world. The particles of sunlight, called photons, hit one of the faces of the photovoltaic cell producing an electric current that is used as an energy source (see Figure 2). This phenomenon is known as the photoelectric effect. [12] Photovoltaic solar panels are photovoltaic cells with the same characteristics, connected in series or parallel, that generate electricity in direct current. Therefore, for the design of the Interpretation Center, the installation of solar panels on the roof of the building was considered.

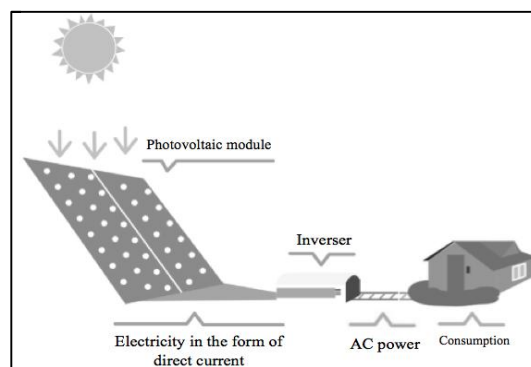


Figure 2. Formation of photovoltaic solar energy. Source: Osinergmin

2.3. Wildlife

2.3.1. Conservation status of Wild Fauna species in Peru

Illegal wildlife trafficking is the third-largest worldwide, after drugs and people. Unfortunately, the latter two are receiving much more attention from government entities than wildlife. What coincides with the three traffics is that they are organized criminal networks and result in instability in various parts of the world. [13]

The International Union for Conservation of Nature (IUCN) is the environmental organization that has created the Red List of species to provide a structured classification system according to the conservation status of species. The Convention manages three Appendices or categories, with Appendices I and II being the strictest.

For example, in Peru, we have 496 species classified in the said appendix. The most notable species are birds and mammals, which are in the most significant concern about their conservation as they are organized in Appendix I and II. (see Table 1).

Table 1. Peruvian Wildlife Species of the CITES Appendices, according to MINAM

Class	App. I	App. II	App. III	Total
Actinoperigium	0	22	0	2
Amphibians	1	45	0	46
Anthozoans	0	5	0	5
Birds	10	274	7	284
Chondrichthyans	1	17	0	18
Holothuroids	0	0	1	0
Mammals	29	84	7	113
Reptiles	7	21	1	28
TOTAL	48	448	16	496

According to the WWF report, illegal wildlife trafficking has increased despite the international community's efforts, governments, and civil society. A value chain is established for the legal and illicit trade wildlife that ranges from capture, transport, and marketing to consumers or buyers. Intermediate capture destinations can be found along the chain. Across national borders, organized crime groups form distribution networks to unite countries of origin and consumer countries, using indirect avenues to avoid detection.[14]

At the international level, Peru has signed a series of Conventions and Agreements committing to conserve and protect wild species of flora and fauna from excessive and uncontrolled exploitation, such as the Convention on Biological Diversity (CBD) and the Convention on Trade International Endangered Species of Wild Fauna and Flora CITES, which must be respected and complied with by the Peruvian State. [15]

The Peruvian State is committed to promoting the sustainable use and conservation of biological diversity and protected natural areas; According to the Political Constitution of Peru, it is established that everyone has the right to enjoy a balanced and adequate environment for the development of their life. Within this framework, the National Environmental Policy has been drawn up to define and guide the actions of the entities of the National, Regional, Local Government and the private sector and civil society in environmental matters in a coordinated and concerted manner, to improve the quality of people's lives, guaranteeing the existence of healthy, viable and functional ecosystems in the long term.

2.3.2. Wild Fauna Species of the Huáscar Zonal Park

The Huáscar Zonal Park has a small zoo in whose environments there rare primates such as the maquisapa monkey, woolly monkey, and the friars, located on small islands within the artificial lagoon created in the place, in addition to the tigrillo, macaws, parrots, kestrels, coatis, turtles, and the boa Montana. It also has exotic species such as peacocks, collared pheasants, guinea fowl, Australian parakeets, and malar duck. Likewise, domestic species such as alpacas and llamas, creole horses for walks, goats, rodents (guinea pigs and rabbits), Chilean roosters, geese, and ostrich. [16]

Table2. Conservation status of species in the Huáscar Zonal Park

Common name	Scientific name	Conservation status
Mono Maquisapa	Ateles chamek	Endangered
Mono choro	Lagothrix cana	Endangered
Mono tití	Callimicogoeldii	Vulnerable
Tigrillo	Leopardustigrinus	Vulnerable
Guacamayo	Ara militaris	Vulnerable
Loro	Leptosittacabranickii	Vulnerable
Cernicalo	Falco sparverius	Leastconcern
Coates	Nasuellaolivacea	Vulnerable
Tortuga charapa	Podocnemisespansa	Endangered
Boa mantona	Boa constrictor ortonii	Endangered

3. Results

The results of the design of the interpretation center to sensitize the population about the importance of conserving wildlife were outlined in 3 stages: conceptualization, design, and execution of the survey.

For the conceptualization, the total number of species that the Park has and their state of conservation were considered to determine their relevance in terms of the design of the interpretation center.

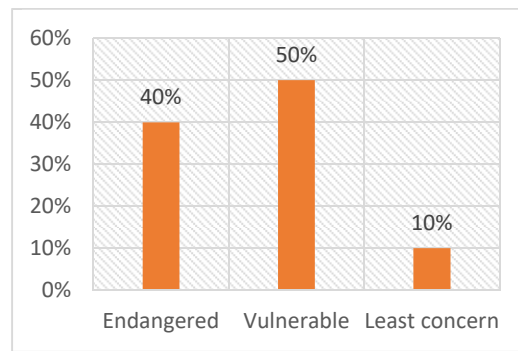


Figure 3. As shown in the graph, half of the wildlife species in the Huáscar Zonal Park mini-zoo are in a vulnerable state of conservation. It should be noted that the values indicate the percentage of species regardless of the number of individuals

From the evaluation of the state of conservation of the species of wild fauna present in the Huáscar Zonal Park, the proposal for the design of the Interpretation Center will be based on the species that are in the categories "In danger of extinction" and "Vulnerable state" since these are the ones that present the most significant threat of extinction. [17] Thus, 36% of the species are in danger of extinction: maquisapa monkey, woolly monkey, charapa turtle, and boa mantona. Likewise, 45% are in a vulnerable state of death: marmoset, tigrillo, macaw, parrot, and coatis. In this sense, to identify the conservation status of these species, a corresponding legend is displayed.

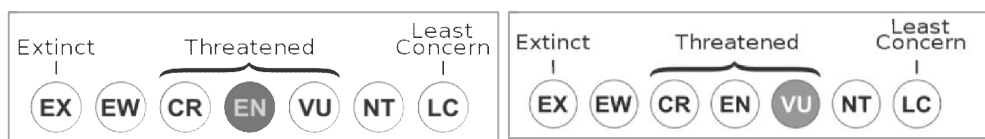


Figure 4. Legend for species "Endangered", abbreviated in the acronym "EN" and in status "Vulnerable", abbreviated in the acronym "VU," a nomenclature defined by the IUCN. Within the Zonal Park, the interpretation center will be located in front of the entrance to the lagoon, where the monkey islands are also found. [18]

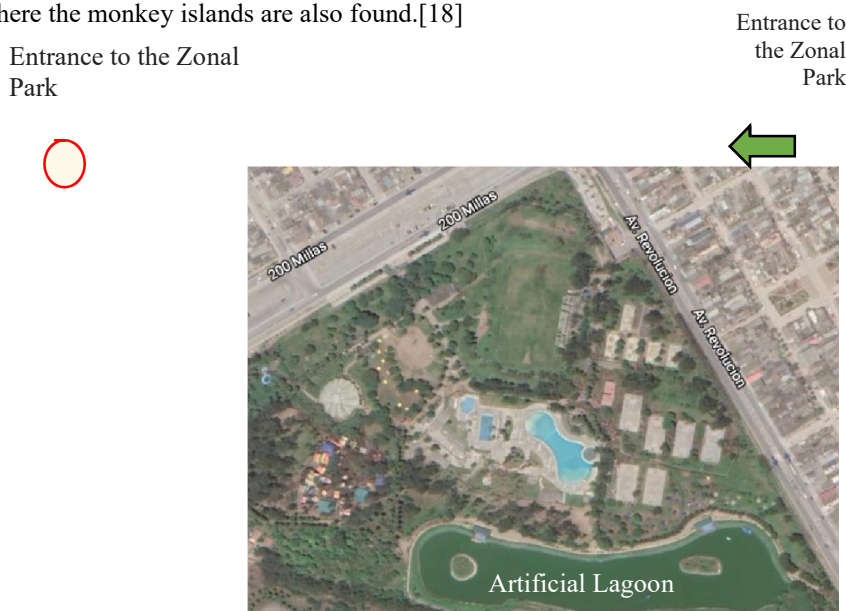


Figure 5. Interpretation Center area. In the figure, you can see the entrance to the Park, the artificial lagoon, and the area proposed for the Interpretation Center in a red circle.



Figure 6. (a) Front isometric view of the Interpretation Center layout, and (b) Side view of the Interpretation Center

Regarding the design, a raised structure was considered so that visitors can observe the lagoon and the monkey island while enjoying the audiovisual material of the place. Likewise, solar panels are included on the side and rear of the roof to operate multimedia equipment. (see figure 5) [19]

The information to be provided in the interpretation center will be presented on panels located around the second level, a video of the wild animals in danger of extinction will also be projected; this video includes sounds of the jungle and the sounds that the animals make. (see figure6).[20]



Figure7.Detail of the location of the projection equipment and the projection wall of awareness videos.

4. Conclusions

It is notorious that as a society, we have ignored the nature of our territory, a worrying indifference evidenced in the irresponsible way of living and building the city. Thus, the sustainable urban architectural design of an Environmental Interpretation Center fulfills its purpose to disseminate information about the conservation of wildlife to the urban population that visits the Huáscar Zonal Park.

Furthermore, due to its sustainability components (materials and clean technologies) and its harmonious design, it blends in with the park's surroundings, which mostly feature trees and arboreal species. Likewise, to achieve the objective of creating the Interpretation Center, it is necessary to accomplish a behavior change and generate respect for the natural and socio-cultural environment to obtain harmony between man, environment, and development. Additionally, this space allows an interrelation with visitors to achieve an environmental culture.

Therefore, the design of a Wildlife Interpretation Center in the Huáscar Zonal Park will allow the visiting population to know, learn and value the importance and role that wildlife plays within the ecosystem. In this way, the project seeks to solve the lack of educational and technological spaces to acquire an excellent environmental education and teach environmental education classes. Furthermore, as this is the second most visited public space in Lima, it will have a great scope, and at the same time, this will have an indirect impact on reducing the traffic of wildlife intended to be petted. In this way, the importance of non-formal environmental education is demonstrated, by complementing the efforts of formal education, in the difficult task of creating or modifying values and attitudes towards nature and biodiversity, as well as offering concepts and knowledge that Perhaps in school classrooms they are complicated to visualize and that, through education and experiences provided in public spaces, there is a greater probability of remembering and internalizing concepts that favor the care of the environment.

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