

Public Spaces with Environmental Importance: The Case of the Paseo de Los Lagos del Dique in Xalapa, Mexico

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Abstract: Here we refer puntal environmental characteristics about El Paseo de Los Lagos del Dique as important alternatives for *ex situ* conservation. Furthermore, we discuss the aims propoused for the *ex situ* conservation in various international environmental document. We finalice this work with preeliminary results of a perseption study of the turist on El Paseo de Los Lagos del Dique and a definition of Biocultural Muralism.

Key words: public space, biocultural muralism, *ex situ* conservation

1. The public space “El Paseo de los Lagos del Dique” throught the Time

The history of the Lagos del Dique starts practically at the same time with the industrialization of the area. When the five textile factories appeared in the period between 1835-1945, it was thought to use a spring near the area (the Tecuanapan spring) to generate hydroelectric power with its waters. At that time “El Lago” was only one and its very small size used by the population since then as a recreational center as a walk and navigation. Later when the industries disappeared, the place became unhealthy and filled with debris [1].

The Jarista government had a modernizing vision on Xalapa in which the mixture of housing, commerce and green areas was thought of as part of the urbanization program [2]. At the time this program of modernization contemplated the “Lagos del Dique” as a great spa for its inhabitants and represented for Mexico the first Garden City Plan. However, the fleeting mandate of

Jara made impossible the realization of such projections and other visions proposed by the stridentism movement [3].

The rescue and transformation of “Los Lagos del Dique” as we know them today, was due to the former governor Rafael Murillo Vidal (1968-1974) ordered its remodeling, expansion and cleaning, with the intention of making it a tourist attraction for the area [1]. Despite this, attempts to improve or maintain the healthy appearance of these lakes are now null and void, or if there were any, they have been sporadic, isolated and undocumented. Although the walk around the lake has been carried out remodeling and installation of new attractions.

It is known that “Los Lagos del Dique” are in a hypertrophic state, according to Trujillo-Núñez, reported in 2013. In 2017, preliminary studies indicate that its trophic status has not changed (Environmental Quality Laboratory of the Faculty of Biology-UV, unpublished data). Trujillo-Núñez (2013) [4], also reported a low sanitary quality of “Los Lagos del Dique”, due to the high presence of fecal coliforms in its waters, concluding that its waters are not suitable for

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recreational use. Unfortunately, this situation has not improved in 2017, since studies carried out in the Environmental Quality Laboratory (Faculty of Biology-UV, unpublished data), reveal that the presence of fecal coliforms in the water of these lakes has not decreased, even increased. It is known from other works and by own observations that this poor sanitary condition may be due to the surrounding houses still discharging their sewage directly into the lakes.

2. The Biodiversity of “El Paseo de Los Lagos del Dique”

We know that biodiversity, according to Franco (2015) [5], is:

“means the variability among living organisms of any kind, including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”

This definition is what will be used in the work since in the legal framework of the conservation of species in Mexico, basically the General Law of Ecological Equilibrium and Environmental Protection uses the same definition as that found in Franco (2015) [5].

The organisms that make up the biodiversity of a particular place can be natural or introduced. The importance of this characterization of biodiversity and its conceptual segregation lies in the ecological effects that the introduced elements have on the natural elements, the ecological dynamics and the economy and subsistence of the human populations that use these resources.

The native livestock, also called by Franco (2015) [5] as natural elements, are those that:

“They appear in a determined time and space without the induction of man.”

Although for some politicians, the so-called animalovers (amateurs in the unscientific conservation of species) and in regular people not educated in

scientific-technical aspects of biological conservation, the introduction of species to environments from which they are not native may seem like an event innocuous and that for their understanding help the environment, cause serious damage to it.

This introduction of exotic species leads to serious imbalances in ecosystems, such as the local extinction of susceptible species to be part of the diet of introduced animal species. In the case of plants a similar process occurs; the competition between the plants occurs in the form of a “chemical warfare”, that is to say the liberation of certain substances, called allelopathy, to their nearby space, which can cause the inhibition in the growth of other plants and also change the chemical composition and microbiological of the soil, also the inhibition in the growth or simply the competition for the space, between native and introduced plants. These organisms causing such imbalances are recognized under the concept of invasive species (whether or not they are exotic), the Convention on Biological Diversity [6] defines them as:

“Those that thrive without the help of human beings and threaten natural or semi-natural habitats, outside their usual distribution area.”

The environmental impacts that these species can cause on the environment are: extinction of populations and native species, the degradation of aquatic and terrestrial environments, particularly insular ones, the alteration of ecological processes and functions and the modification of biogeochemical cycles [7].

The loss of biodiversity is one of the most worrying phenomena caused by man, and although naturally extinction of species is an evolutionarily natural process, the current rate of disappearance of natural populations of animals, algae, plants and fungi, it is not explained as a natural phenomenon [8]. All these environmental impacts cause a drastic imbalance in the chains food and biological composition of the ecosystems. As it is observed in “Los Lagos del Dique”,

that although it is an artificial reservoir the animal species that inhabit it are introduced.

Some of the species found by García-Rivera (2015) [9] bordering “Los Lagos del Dique” promenade are: *Meliosma alba*, *Persea schiedeana*, *Persea americana*, *Heliocarpus donell-smithii*, *Inga jinicuil*, *Casuarina equisetifolia*, *Nectandra lauraceae*, *Rapanea miricoides*, *Citrus sinensis*, *Heliocarpus Appendiculatus*, *Jacaranda mimosifolia*, *Liquidambar macrophylla*, *Morus alba*, *Spathodea campanulata*, *Trichilia havanensis*, *Piper*, *Solanum*, *Syzygium jambos*, *Psidium guajava*, *citrus sp*, and *Coffea arabica*. This is interesting since some of these species can be taken as a reference when generating a tree planting program, because some of these are typical of the mountain mesophilic forest.

As part of the project, research is being carried out on the ichthyofaunal in the area. The species found so far are: *Oreochromis aureus*, *O. mossambicus* and *Vieja fenestrata*, as well as notable species such as *Myleus pacu*, *Hypostomus plecostomus* and *Atractosteus tropicus* [10].

3. Opportunities for Ex Situ Conservation

As part of the activities in favor of the conservation of natural elements within the ecosystems, sustainable activities are carried out that also seek the ecological restoration of the ecosystems. Franco (2015) [5] defines ecological restoration as:

“Set of activities aimed at the recovery and restoration of conditions that promote the evolution and continuity of natural processes.”

“El Paseo de Los Lagos del Dique” to be immersed in the urban sprawl can host projects of *ex situ* conservation of plant species that also provide habitat for animal species such as butterflies, some birds and reptiles native to the ecosystem of the green belt that surrounds Xalapa. *Ex situ* conservation is defined according to Lascurain (2009) [11] as:

“... the application of a wide variety of resources, techniques and specialized infrastructures that

contributes to the recovery and survival of individuals or populations outside their habitat.”

Some international organizations, such as the World Conservation Union [11], have suggested some technical guidelines on the management of *ex situ* populations for their conservation, in which it is pointed out that the goals of this management are:

- Increase public and political awareness, as well as understanding important conservation issues and the meaning of extinction.
- Coordinated management of the genetic and demographic population of threatened taxa.
- The reintroduction and support to wild populations.
- The management and restoration of habitat.
- The long-term maintenance of gene banks and biological material.
- Institutional strengthening and professional training.
- The equitable distribution of benefits.
- Biological and ecological research on issues relevant to in situ conservation.
- Procuring funds to support all of the above.

4. Preliminary Results of Interviews with Visitors

As part of the research carried out by the first author of this work to obtain the master's degree, surveys have been applied to visitors with the intention of knowing the perception that visitors have of the place of “El Paseo de Los Lagos del Dique”.

Although “El Paseo de los Lagos del Dique” is a local attraction, the activities that visitors do in the place are related to what they have been told so much can do. There are few visitors who know all the tourist activities they can do, in turn a significant part of the population has done harmful activities to the place such as introducing exotic species (turtles or fish) into the waters of the lakes, feeding the fish with what they had at their disposal, they have thrown garbage to the place.

Visitors come to this place in search of nature, taking *nature* as a space that has vegetation and non-domestic animals. Much of what visitors mention is the tranquility that this public space provides them. However, visitors are also aware that the place is deteriorating, because they perceive that water is highly contaminated, that merchants generate audiovisual contamination and that trash collection systems are overflowed. In addition, visitors from Xalapa or other cities (even foreigners) ignore most of them, the existence of “ANP Predio Barragán” in “El Paseo de Los Lagos del Dique”, the history of the place and the common species that they can observe during their visits.

5. Environmental Education Proposal

The intervention of the place raised during the thesis work includes the interaction with the merchants, the municipal government and the visitors to the place. However, and for the purpose of showing activities in processes for this congress, only environmental education will be addressed through *biocultural murals*.

The artistic manifestations in the public spaces are varied, being able to be visual arts. In the case of contemporary muralism associated with public spaces, the one that narrates the collective memory of a particular population stands out. Here, art becomes a social and communicational process that transmits, among other things, the economic, political and cultural history of those who are and have come this far. In contemporary societies the search for contact with nature has revalued their culture and the natural resources that surround them. That is why mural paintings have emerged in different parts of Latin America that generate a harmonious mix between local cultural aspects and the biodiversity that surrounds the muralist.

It is in this way that the concept of *biocultural muralism* is born, which we take as an artistic creation of the mural type in which the content that integrates it

is an expression of what the local artist observes and is part of his/her life. The elements that the artist shapes can be as many as his creativity harmonize, for example, musical instruments, short popular phrases, sentences or literary fragments that describe a local feeling, historical local characters, the typical flora or fauna that the inhabitants recognize and feel their own, primary productive activities (such as fishing, carpentry, etc.), craft production of clothing, beverages, food, decorative crafts and local traditions. A biocultural mural narrates in an image the social interactions with the environment that the local population understands as natural and the tangible and non-tangible results of that interaction.

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