

# "THE SOUNDSCAPE IN CULTURAL ECOSYSTEM SERVICES IN URBAN AREAS SURROUNDING PETROCHEMICAL COMPLEXES".

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## Introduction

As Domínguez (2019) proposes, the city has undergone an increase in its volume, with industries playing a major role. At one historical moment, they were the typical sound of large urban hubs; today, cities emit multiple sonic events.

## Objetive

Analyse of the **soundscape** in the urban context adjacent to the Petrochemical Complex for to typify the landscape area surrounding the industry and its impact on **Cultural Ecosystem Services**.

## Methodology

Phenomenological and psychoacoustic approach.

Two stages:

**1. Recognition of activities and ecosystems:** surveys (experts in the areas of history and planning + area users).

**2. Recording and evaluation of the physical and acoustic environment:** survey + recording + sound map.

### Instruments methodologic

Survey	Sound map	Sound recording
Physical and acoustic environment (sounds sources and level of perception)	Sound sources. Physical environmental elements. Climate - Time and date.	Soundwalking technique. Analyze using spectrograms. Sonic visualiser software
Stage 1: expert + users.		Stage 2.

## Conclusion

- In the typification of the soundscape in different environments, there is evidence of low sound intensity and its variations.
- There is a direct relationship between sounds and the activities taking place; in quieter and less intervened environments, natural sounds predominate, including various bird songs. Spaces with urban furniture or equipment incorporate anthropogenic sounds.
- It is also determined that in spacious areas, the predominant background sound is from natural sources. However, in spaces with more activities, there is greater density and clarity of sound events.
- In the assessment analysed from the surveys, natural sounds are perceived as pleasant, with 60% highlighting the sound of waves and the breeze. Sounds that generate repulsion (25%) include mechanical (engine) and human (shouts) sounds. The loudness level of unpleasant sounds was rated from moderate to very loud. It is worth noting that the sounds of the petrochemical industry, when operating at 100%, are audible in the study area, and in some cases, they generate uncertainty and fear.
- The soundscape of the coastal axis is typified by a variety of sounds, which can vary depending on the timing of the activities.
- At the moment, there is no influence of the industrial acoustic environment on the SEC offered by the area of study.
- The sound signals and marks are associated with natural elements, reinforcing the identity of the place; the coastal landscape showcases the activities that are carried out, linking the natural, recreational and industrial landscapes, which offer different types of cultural ecosystem services.

## Referencias bibliográficas

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### The conceptual framework

**Soundscape**, expresses aesthetic reflection related to the sonic environment of a specific moment. In this context, sounds define the sonority of the city or landscape, and users interpret that social world, drawing upon collective memory and determining the spatiotemporal location while configuring the landscape's structure (Murray Schafer; 1969)

The **Cultural Ecosystem Services (CES)** are defined as the benefits that people obtain from the ecosystems, and they are essential for humans. They also support cultural diversity by providing aesthetic and spiritual experiences for humans. (Daily, 1997).

## Area of study

Located in the Puertos de Altigracia (Zulia state - Venezuela) and it is located at a distance of 1.5 km from it Petrochemical Complex.

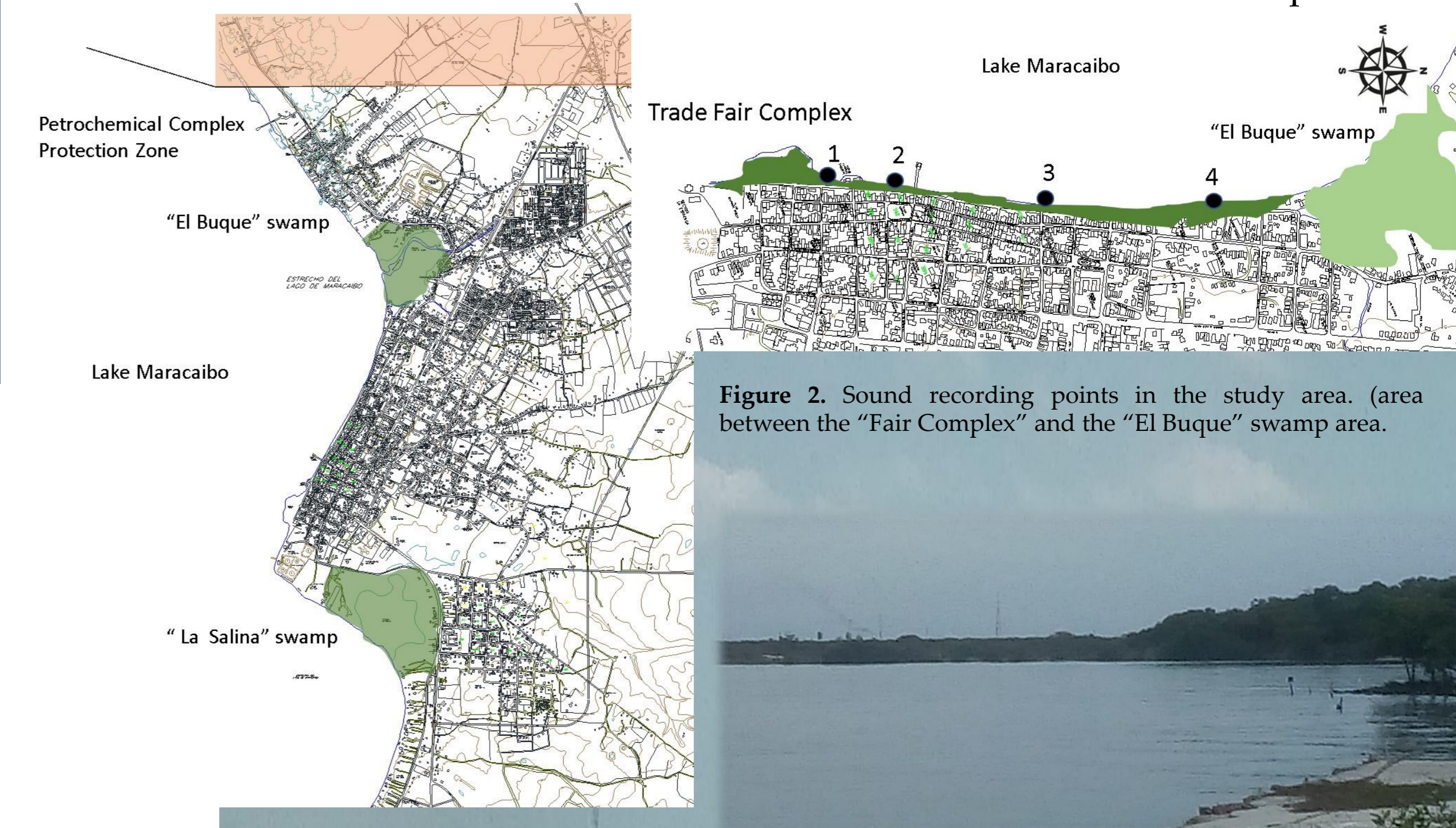


Figure 2. Sound recording points in the study area. (area between the "Fair Complex" and the "El Buque" swamp area).

Figure 1. Location of the study area in the Puertos de Altigracia- Venezuela.

## Results

### Stage 1: Cultural ecosystem services.

Environmental space.	(a) Open space.	(b) Lineal space.	(c) Park-Area.	(d) Beach.
Cultural Practices.	Exercises; contemplate the landscape; recreation-events.	Walking; contemplate the landscape.	Children's games. Recreation; contemplation; parties; celebrations.	Contemplation; fishing.
Beneficits.	Health; spiritual experience.	Recreation.	Recreation; relaxation.	Recreational; relaxation, economic.

### Stage 2: Evaluation of the physical and acoustic environment.

El Tablazo Petrochemical Complex	Spectrogram	Acoustic landscape
		Powerful soundscape.. Min. intensity 80 dB/ max > 100 dB.

• *Petrochemical industry. Characterization of the acoustic environment.*

The sound - recorded at a distance of 60 metres from Petrochemical Complex. The acoustic spectrogram characterized for low-frequency sounds, poor and repeated audio information.

• *Valuation of sound in cultural ecosystem services.*

	(a) Fair Complex	(b)Boulevard circulation axis	(c) Children's area - park	(d) Beach
Environmental				
Type of Soundscape	Clear. Figure-background.	Sharp. Figure-background.	Sharp. Figure-background.	Powerful. Background.
Time Structure	Continuous.	Discontinuous and continuous.	Discontinuous	Continuous.
Sounds sources	Birdsong, breeze, music.	Birdsong, voices, music.	Birdsong, voices-shouts, knocking.	Waves and breeze.
Intensity	Max:21.65 dB.- min:2.96 dB.	Max: 32.66 dB.- min: 3.66 dB.	Max:31.61 dB.- min: 3.66 dB.	Max:50.05 dB. -min: 2.44 dB.

It is obvious that the natural resources that shape the space are: the "El Buque" swamp and the Lake Maracaibo; and despite the high levels of pollution and the impact on the beaches, which are declared to be unsuitable for swim, ming the area still offers ecosystem services that enhances biodiversity. According to SEC, there is a direct relationship between the cultural practices and nature, focused on recreation and relaxation.