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The assessment of low intensity complex heritage landscapes. The case study of Sancti Petri (Cádiz)

Valoración de paisajes patrimoniales complejos de baja intensidad. El caso de Sancti Petri (Cádiz)

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ABSTRACT There are areas where heritage elements are not associated with the common idea of heritage, which increases their invisibility and lack of protection. The aim of this research is to recognise the existence of these heritage environments known as Low Intensity Complex Heritage Landscapes (LICH), through the case study of Sancti Petri. The proposed methodology firstly identifies the attributes that make up the heritage reality of this place, in order to subsequently address its valuation and the definition of its heritage intensity in terms of the relationship between all its factors. Secondly, it identifies the structure and density of the heritage reality, with the elaboration of maps, being able to justify whether it is a LICH. The results reveal the number of heritage attributes that characterise the environment and its relationships, which reveals the difficulty of its management and the absence of regulatory figures for its protection.

RESUMEN Existen entornos donde concurren elementos patrimoniales no asociados a la idea común de patrimonio, lo que aumenta su invisibilidad y desprotección. El objetivo de esta investigación es reconocer la existencia de estos entornos patrimoniales denominados Paisajes Patrimoniales Complejos de Baja Intensidad (PPCBI), a través del caso de estudio de Sancti Petri. La metodología propuesta en primer lugar identifica los atributos que conforman la realidad patrimonial de dicho lugar, para posteriormente abordar su valoración y la definición de su intensidad patrimonial en función de la relación entre todos sus factores. En segundo lugar, se identifica la estructura y densidad de la realidad patrimonial, con la elaboración de cartografía, pudiéndose justificar si se trata de un PPCBI. Los resultados ponen de manifiesto la cantidad de atributos patrimoniales que caracterizan el paisaje y sus relaciones, lo que desvela la dificultad de su gestión y la ausencia de figuras normativas para su tutela.

KEYWORDS value, methodology, invisible heritage, attributes, territory

PALABRAS CLAVE valor, metodología, patrimonio invisible, territorio, atributos

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1. Introduction

Concern over the loss of significant expressions of cultural heritage in contexts that deviate from traditional standards has been growing since the beginning of the 21st century (Tarrafa and Pereira, 2021). An increasing number of studies are focusing on less visible forms of heritage, where culture and nature intersect to varying degrees (Fernández-Cacho, 2022).

It is common to find numerous heritage layers of diverse nature, where tangible and intangible attributes and values coexist (Veldpaus and Pereira Roders, 2014). This is typical in cities and territorial enclaves with significant historical significance, which possess both tangible and symbolic components that make them visible and easy to value. However, in some cases, a site's heritage value is not immediately apparent, and failing to identify it prevents applying the term "*heritage*" and its presumed associated benefits. This is common in environments composed of numerous elements of interest, but whose greatest value arises from their interaction—an interaction that involves intangible elements and is not readily visible without careful analysis. The value of each of these elements taken separately is far less than that of the synergy of the whole. They represent a continuity over time and an interaction among diverse realities that converge in this place. This reality allows for an interpretation of the territory, history, and both the physical and human landscapes.

These environments often contain heritage elements that, because of their nature or condition, are not associated with the common notion of heritage (linked to monumentality), which increases their invisibility and leads to a lack of protection that results in deterioration or disappearance. This accumulation of layers creates a place where the number of heritage elements in a single area (density), heritage intensity, and heterogeneity combine, making it more complex to understand. When the added value of uniqueness and special significance is justified, we can speak of heritage landscapes (Sánchez-Montañés and Castilla, 2020). Along these lines, Fernández-Salinas (2013) notes that "it is essential to highlight the existence of diverse categories of culturally dominant heritage landscapes, both in terms of scale and the character imparted by a specific heritage feature" (p. 130).

These multi-layered heritage landscapes, in which we might speak of a heritage reality of *apparent low intensity*, are the focus of this study. A methodological approach is needed for places that lack a primary attraction but whose combination of factors and attributes is absolutely unique—where the value of the whole lies—and that must be defined, categorized, and preserved. Thus, the main objective of this research is to propose a type of reality we will call "Low-Intensity Complex Heritage Landscapes" (hereinafter LICHL), which meets the aforementioned

parameters. This analysis is tested through a case study that addresses the research's secondary objective: to test an appropriate methodology for characterizing these LICHLs.

To this end, a methodology is proposed in which the attributes of the heritage reality are identified and evaluated, and their heritage intensity is defined based on the relationships among these factors. Next, the heritage structure and density are identified by creating specific maps to identify new relationships that emerge among the attributes and thus assess the formation of a LICHL. The study focuses on the settlement of Sancti Petri, located on the Atlantic coast of Cádiz (Spain) in the municipality of Chiclana, where the remains of the fishing village—which was the site of a major *almadraba*—are found, along with a significant number of elements and remnants of its history, which will be analyzed in the case study description.

At the same time, the question arises regarding the regulatory framework that would enable such protection. In the case of Andalusia, the Department of Culture addressed the issue of heritage from an innovative perspective with the 2007 Andalusian Historical Heritage Law (LPHA) and the creation of the "Heritage Zone" protection category (Regional Government of Andalusia, 2007), taking a further step beyond the legal category of "Historic Site" (Fernández-Baca et al., 2007). To date, Andalusia has four Heritage Zones (in Granada, Huelva, and Jaén) (Department of Culture and Historical Heritage—Regional Government of Andalusia, n.d.). These Heritage Zones could serve as a physical and regulatory approximation of the concept we propose. However, other dimensions—insufficiently protected under the existing legal framework—can be explored.

In summary, the aim is to gather information and develop a new category, PPCBI, that gives cultural administration arguments to support heritage management through a broader approach. This work presents a perspective on heritage that differs from those taken thus far.

2. Theoretical framework. The landscape as a container of heritage. Identification of cultural values and attributes

The evolution of the concept of heritage throughout the 20th century has gone hand in hand with the evolution of heritage valuation theory, which has been key to ensuring that heritage landscapes are treated as a highly relevant issue in the 21st century (Silva and Fernández, 2017). Likewise, the landscape-based approach is increasingly adopted as a management model, given the need to account for the cultural layers and assets that make up specific environments,

as well as the stakeholders involved (UNESCO, 2011). These heritage landscapes (as defined by Fernández-Salinas in 2013) have taken shape as a historical stratification, highlighting their diversity and dynamism. Understanding and valuing this formation involves broadening the identification of cultural values and attributes to a dimension that transcends the object-based and individual levels and incorporates the processes that unfold among the elements of that landscape as an added heritage value. In this century, there are international documents (Council of Europe, 2000, 2005; Naeyer et al., 2000; Rössler, 2006; UNESCO, 2012; ICOMOS, 2014, 2017) and research studies (IAPH, 2010; Verdini et al., 2017; Fernández-Cacho, 2022; Hong et al., 2024) that advocate for the need to apply this approach, recognizing the breadth of cultural values and attributes that characterize these heritage landscapes.

Reviewing international charters and texts helps us understand the scope of landscape and territorial heritage designation, identify its heritage elements, and assess their value individually and collectively. In 1972, UNESCO adopted the *Convention Concerning the Protection of the World Cultural and Natural Heritage* (1972), establishing the concepts of Cultural Heritage and Natural Heritage to unite *nature* and *culture* within the field of heritage.

In Nairobi, UNESCO (1976) adopted the *Recommendation Concerning the Safeguarding of Historic and Traditional Sites and Their Role in Contemporary Life*; the document's significance lies in introducing the term "*natural setting*" as it relates to human settlements. This definition introduces new considerations: human activities, spatial structure, and surrounding areas. Around the same time, organizations such as Greenpeace (founded in 1971) and the United Nations Environment Program (UNEP) (established in 1972) emerged, signaling the rise of environmental awareness, which was linked to recognizing natural value within heritage.

However, with the creation of the category of "cultural landscape" (UNESCO, 1992), the concept of heritage expanded and became more complex, incorporating landscape and territory into its scope. This adds dimensions of time and space from an anthropological perspective, as it recognizes interactions between humans and the environment and values the morphology of anthropized territory. The category of "cultural landscape" is the first international legal instrument to identify and protect cultural landscapes. Article 6 clearly establishes this recognition of landscape as heritage—as a joint creation of humankind and nature. Subsequently, the Burra Charter incorporates spiritual value into certain places where a connection exists with "the community and the landscape, with the past, and with lived experiences" (ICOMOS Australia, 1999, p. 1). The Florence Charter (ICOMOS, 2014) refers to historic sites as a defined landscape that evokes a memorable event (ICOMOS, 1982). Toward the end of the 20th century, the Charter on Vernacular Built Heritage (ICOMOS, 1999) focused on heritage that expresses a community's identity, its relationship with the land, and the world's cultural diversity. Later, the Convention for the Safeguarding of the Intangible Cultural Heritage (UNESCO, 2003) introduced intangible heritage, emphasizing the importance of intergenerational transmission. Communities constantly recreate intangible heritage in response to their environment and their interaction with nature and history.

These developments underscore the interaction between humans and territory as a heritage phenomenon, reflected in architecture itself and in its activities. This is confirmed in the Krakow Charter, which defines "landscape as cultural heritage (...)" a testimony to the relationship between the development of communities, individuals, and their environment" (Naeyer et al., 2000, p. 3).

The Valletta Principles (ICOMOS, 2011) introduce landscape as a common territorial reference, emphasizing the importance of historical topographical features and the skyline (views, profiles, perspectives, and landmarks), which foreshadows the appreciation of the landscape as a whole. Finally, the Recommendation on the Historic Urban Landscape adopted by UNESCO (2011, Art. 8) defines the historic urban landscape as "the urban area resulting from a historical stratification of cultural and natural values and attributes, which transcends the notion of 'ensemble' or 'historic center' to encompass the broader urban context and its geographic surroundings." This Recommendation establishes a concept of heritage from a landscape-based perspective, in which previously overlooked issues take center stage: topography,

geomorphology, hydrology, natural features, the urbanized environment, infrastructure, visual perceptions and relationships, land uses, economic processes, traditions, and intangible aspects of heritage in relation to diversity and identity.

This overview highlights that identifying a heritage landscape requires recognizing the collective value of dispersed elements of heritage significance, with the relationship between these elements and the territory in which they are embedded being particularly relevant. The landscape is a cultural asset generated from other assets—whether culturally recognized or not—resulting in a distinct heritage reality, since each asset that composes it is spatially and symbolically redefined in relation to other assets and the territory. A new heritage value emerges in the relationship between the parts and the whole. We emphasize this idea as an essential theoretical foundation for understanding the PPCBI concept we propose in this study.

Defining a PPCBI involves individually characterizing all the cultural assets that define its character and allow communities to identify with it (Troitiño, 2017; Juca Freire, 2021), understanding the intensity of their individual values and attributes, and then defining their mutual relationships and establishing a new level of heritage value. Heritage value intensity is understood as the specific relevance of that value to each cultural asset that constitutes the landscape in question, considered one by one. This relevance depends on factors such as the uniqueness or significant attributes of that element, the fact that it contributes decisively to shaping the identity of the place, or that it possesses “outstanding qualities in perceptual and aesthetic aspects, resulting from its special interaction between natural and/or anthropogenic components” (Ikt and Paisaia, 2005, p. 19). On the other hand, *density* refers to the number of elements that make up the landscape in question (Silva and Fernández, 2017). Handling the concepts of heritage *intensity* and *density* matters for this approach, since it allows analysis of landscapes whose ultimate value may arise from multiplying both factors (*density* times *intensity*), yielding a notable result. Meanwhile, a narrow search for singular heritage elements—which function as *heritage landmarks* or *vectors* (Silva and Fernández, 2017)—could render these sites invisible. This cross-cutting perspective allows previously overlooked places to be incorporated into the heritage sphere, as is the case with Sancti Petri.

It is important to recognize that the definition of a PPBI stems from a broad approach to identifying values and attributes from social, political, cultural, environmental, or economic perspectives, and depends on the participation of all stakeholders who inhabit and use these landscapes, as they are the ones who imbue the place with value and transform it into heritage (Silva and Fernández, 2017). In a

heritage landscape, aesthetic, visual, or perceptual values converge with natural and ecological values, as well as historical and ethnographic ones, to which are added the spiritual and symbolic values identified and appreciated by the community. In order to approach this heterogeneity scientifically, heritage assessment must address:

1. The territory in which these values are embedded,
2. The cultural assets, both tangible and intangible (cultures, traditions, customs, knowledge...), that make up the landscape,
3. The processes of formation,
4. The relationship between these (Pilquiman et al., 2020).

3. Case Study

This study examines the area around the Channel and the Sancti Petri Peninsula in Chiclana, Cádiz, Spain (Figure 1). At the entrance to the Channel lie the remains of the fishing village and the industry associated with the almadraba, which were studied in del Pozo's (2008) doctoral dissertation. This estuary is dominated by the island that is home to the Sancti Petri Castle. Various civilizations have succeeded one another at this site: the Phoenicians, who founded Chiclana; the Greeks, who arrived there following the Phoenician trade route; the Carthaginians; and the Romans (Aragón, 2011).

This study examines a productive area throughout history, as evidenced by the continued existence of salt flats and successive tuna traps. Its geographic location makes the study area a strategic enclave, leaving its mark on the territory, as seen in the Sancti Petri Castle (Figure 2) and the Carraca Arsenal (García and Mestre, 2019). In addition, the area features a monument and a natural site: Punta del Boquerón and the Sancti Petri marshes, respectively. The bay's unique characteristics also support significant geological diversity, as well as underwater historical heritage due to its coastal location (Higuera-Milena, 2021).

The area is located near a beachfront residential tourism development; consequently, since the almadraba ceased operations and the fishing village was abandoned in 1973, the area has been neglected and has become a target for speculative tourism interests.

A public debate has taken place, involving neighborhood associations, fishermen's associations, and political groups aligned with various interests (Appeal against the Coastal Authority for refusing to transfer the village to municipal control, September 1, 2016; Martínez, 2018). Although some groups advocate preserving the village, successive municipal projects have demolished parts of the complex while

consolidating certain structures, such as the church and hospitality facilities (Figure 3), based on pragmatic rather than heritage-based criteria (Reina, 2022).

Currently, no regulatory framework protects the site as a whole; therefore, we aim to identify which elements may warrant protection and to understand the scope of the territory that supports them, based on the proposed PPCBI approach. The most significant territorial category in the area is the Bahía de Cádiz Natural Park, which protects natural species and wetlands; however, many elements that shape the area's landscape are excluded, such as the aforementioned settlement, the saltworks houses, and the bunkers, among others.

The poor state of preservation of the elements in the study area that could be considered heritage assets (such as the settlement or the almadraba buildings), the low visibility of others (such as the bunkers or the saltworks structures and buildings), and the specific quality and uniqueness of nearly all of them (the aforementioned elements and, in particular, the castle) combine with the lack of collective memory regarding the historical importance of the intangible factors

present in this place (defensive, productive, or social, as shown in Figure 4). All of this makes the Sancti Petri area an ideal landscape for testing the validity of the proposed PPCBI concept and framework.

4. Methodology

To determine whether we are dealing with a PPCBI, we must identify heritage values and attributes both individually and collectively; therefore, this methodology must be approached from a transdisciplinary perspective. However, in the phase we are addressing here, we will adopt a fundamentally architectural approach, given the scope of the study we propose and as a partial methodological trial.

In general, it is difficult to establish boundaries in the landscape. However, the problem is exacerbated when dealing with landscapes that are not clearly defined and whose defining character—their heritage dimension—rarely has a clear spatial delimitation (Ikt and Paisaia, 2005; Tévar, 1996). Therefore, we will refrain from proposing defined boundaries, although the overall physical scope we focus on must be clear.

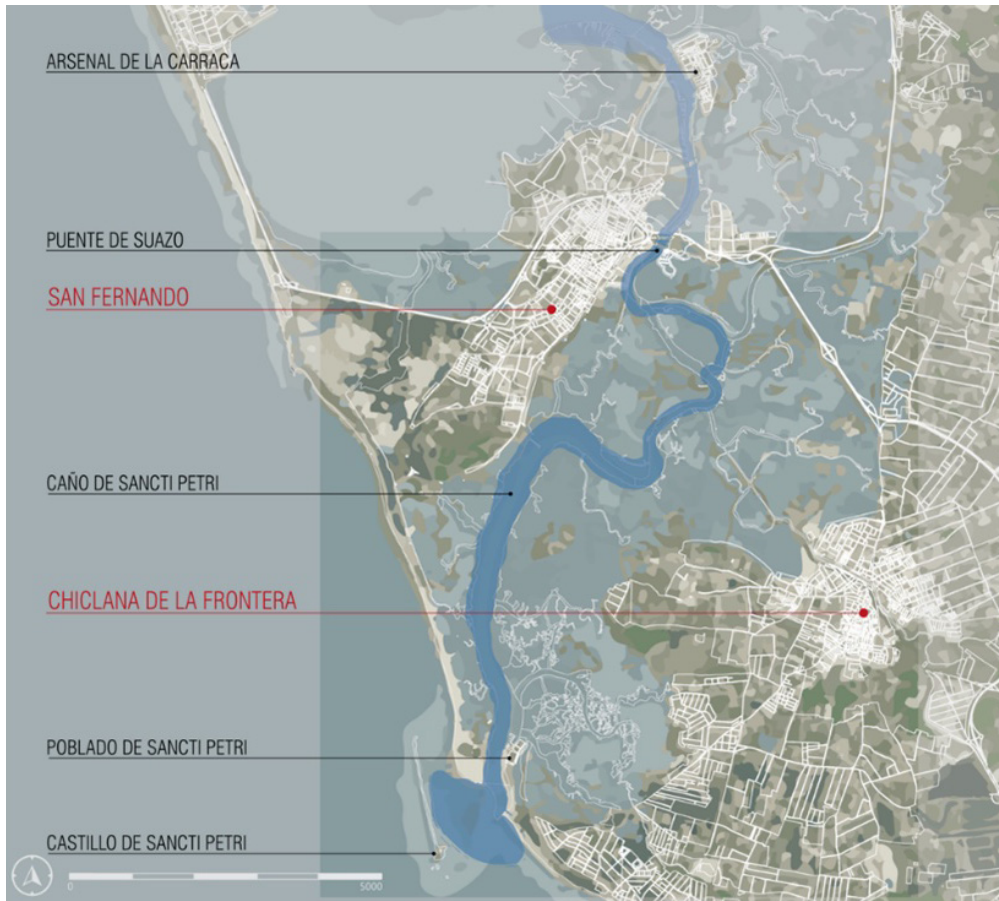


Figure 1: Map of the study area. Authors on a Google Earth map (2022)



Figure 2: Sancti Petri Castle, on the island of the same name, which guards the entrance to the channel leading to San Fernando Bay. (2022)

For the proposed case study, the following phases are suggested:

Phase I. Description of the heritage reality across different strata. Identification of heritage attributes—both tangible and intangible—based on the following scales: 1) territorial and 2) historical-cultural formation processes. In this descriptive phase, we understand the case study in its current state.

Phase II. Definition of the values of these attributes and their heritage significance. Various research studies currently focus on heritage valuation. Pereira Roders (2007), further developed by Spoormans and Pereira (2020), approaches this from three perspectives: tradition, sustainability, and processes. It proposes supplementing the four cultural values recognized by the Convention Concerning the Protection of the World Cultural and Natural Heritage—historical, aesthetic/artistic, scientific, and social (UNESCO, 1972, Art. 1)—by considering the passage of time (Riegl, 1987), thereby establishing these five values as traditional values. She also complements them with values related to the pillars of sustainability—ecological and economic values—and with processes, thereby introducing the political value (Pereira Roders, 2007). This broad approach emphasizes many values beyond traditional ones, such as historical or aesthetic value (de la Torre and Mason, 2002). In this phase, we compare existing attributes with their level of protection to determine their *heritage significance*, as defined.

Phase III. Creation of maps identifying the structure and density of the heritage landscape. The information from the previous phases deemed relevant for the analysis will be transcribed onto these maps. It will be organized by attribute families and according to criteria that facilitate interpretation.

Phase IV. Identify new relationships emerging among the attributes by overlaying the created heritage maps. This overlay, combined with the study of the social reality and the historiographical description of the site, provides a comprehensive overview for understanding it.



Figure 3: In the desolate settlement of what was once the tuna-trap village, structures such as bars and the church (pictured) have been stabilized, with interventions carried out without regard to heritage criteria. (2022)

We will consider topological, functional, historical, chronological, symbolic, and other relationships that establish conceptual interconnections. This interpretation of the case study's complex and unified nature, combined with the heritage assessment from Phase II, will allow us to determine whether it constitutes a PPCBI.

The results provide a comprehensive understanding of the case study's heritage assets. Through analysis and discussion of the results, we will be able to confirm or refine the validity of the PPCBI concept and propose subsequent lines of investigation.

5. Results

5.1. Phase I: Identification of heritage attributes

Territorial Scale

This approach focuses on the physiographic and biophysical layers. The Sancti Petri canal is located in the southern part of the province of Cádiz, within the Bahía de Cádiz Natural Park. The bay is a meeting point for numerous natural species and an abundant source of resources. Over time, it has changed, particularly in the late 19th century during the boom in salt production, and is characterized by its vast

expanse and unique morphology and topography. The result is a productive, human-shaped landscape, with a network of salt workers' houses (Figure 5) that serve as landmarks and reveal the territory through the lens of resource exploitation and workers' housing.

Various ecosystems coexist in these settings, primarily numerous plant species, fish, crustaceans, and birds. The attributes of this stratum are detailed below (Table 1):

Historical-cultural scale

The Phoenician civilization founded what is now Chiclana; the Greeks and Carthaginians arrived later. When Rome conquered and colonized the Iberian Peninsula after Carthage fell, it took Gadir in 206 B.C. Remains from these periods have been found in the area of the Castle and the settlement (Aragón, 2011).

This territory is historically linked to the nearby Strait of Gibraltar, a strategic point of communication between seas and continents. Political upheavals in the southern part of the peninsula continually disrupted communication, affecting Mediterranean trade routes (Department of Economic Transformation, Industry, Knowledge, and Universities, 2009). The Sancti Petri Channel is a navigable back entrance providing access to the Bay of Cádiz; therefore, its surveillance was crucial to the security of the Spanish navy fleet,

which had one of its main bases there. This is why an artillery fortress—the Castle—was built on the islet, atop an ancient Islamic hilltop. This circumstance defines the area's defensive nature, a dimension without which neither its history nor its heritage can be explained.

As Aragón (2011) notes, the first of the Guzmán family to repopulate the area in the 15th century were his successors, who built Chiclana's defense system; they were granted the tuna traps at La Barrosa and Sancti Petri, thereby consolidating an extractive and proto-industrial practice dating back to antiquity.

As for the settlement of Sancti Petri, Chiclana appointed a district mayor in 1870, and in 1874 the first organized "chanca" was established. Before 1890, three more would be established, along with two canneries. In 1880, José Rahola opened a cannery. Seven years later, both the industry and the population had become firmly established (García and Mestre, 2019). A "chanca" is the area within the complex known as the Real de Almadraba, where tuna is processed and handled. Thus, what is today called *the village of Sancti Petri* actually corresponds to the Real de la Almadraba de Sancti Petri. In 1908, the *Regulations for Fishing Using the Method Known as "Almadraba"* were approved, giving rise to several industries. As a result, in 1929, regulations were implemented following the Civil War through the National Almadraba Consortium (CNA), which regulates the activity. The structures visible today were built between the 1940s and 1950s and consolidated the previous facilities, including the almadraba and the processing industry; workers' housing was also built, along with services such as a church, schools, a market, etc. (Pozo, 2008). Franco-era conditions, combined with the 1973 crisis, affected the area's social and economic development. That same year, the CNA reported significant losses, which—along with poor management, limited technological development, and declining catches—led to its closure. As a result, the workers and their families were forced to leave (García and Mestre, 2019).

Figure 4: The remains of the tuna-fishing settlement still bear witness to a sense of community that reflects the social vitality tied to the place. Juan Miguel Alba (2016)



The economy and the culture of traditional work are complex and intertwined with social rhythms. For example, the saltworks embody a trade that relies on seasonal labor, creating a distinctive way of life and land use that shapes local society and its relationships and forms part of the region's characteristic rituals (Martín, 2007). Currently, saltworks are undergoing a crisis, and salt harvesting is now carried out solely as a tourist activity (Andalusian Institute of Historical Heritage, 2013). Table 2 details the historical and cultural attributes.

5.2. Phase II: Heritage assessment of the attributes and their intensity

After identifying the attributes present in the area, we proceeded to assess them, using the value framework proposed by Spoormans and Pereira (2020) as a reference. It is observed that, individually, some attributes possess a large number of values, such as the Castle of Sancti Petri. On the other hand, there are other, more intangible attributes, such as the almadraba fishing grounds, which embody a series of relevant social and identity-related values, in addition to their inherent value as a heritage of production. Other attributes with fewer recognizable values can be identified, such as the Bahía de Cádiz Underwater Area or the saltworks houses, which nonetheless

form part of the area's history and serve as vestiges of the memory of the territory and the society that has inhabited it. In Phase IV, we will discuss how, when evaluating all attributes collectively, their value is enhanced and unified. Table 3 presents the specific matrix for the study area.

Table 4 lists the regulations that apply to each attribute, which helps establish its level of intensity, given that the regulations apply to cultural properties that have already been documented and whose significance is indisputable to heritage managers and society. It is no coincidence that monumental heritage sites are the most widely accepted, have accumulated the most information, and enjoy the highest levels of protection. However, the least documented heritage is the least protected, the least known to society, and the most invisible. For this reason, this study relies on current regulations as a measure of the heritage significance of the attributes under study. From an environmental perspective, the area is protected by the Natural Park; however, productive architecture—such as the saltworks houses or the village—and everything related to the intangible are overlooked, even though these attributes shape the identity of the place (Magnaghi, 2007, in Fernández-Salinas, 2013, p. 132).

Figure 5: Los Ángeles Salt Workers' House. Juan Miguel Alba (2016)



Scale	Attribute	Description
Habitat (territory where they are located)	Bahía de Cádiz Natural Park	Presence of multiple species of underwater and riparian flora and fauna. Historical source of resources
	Sancti Petri Marshes Natural Area	160 hectares, predominantly open areas. Rich in wildlife. A refuge for migratory birds.
	Punta del Boquerón Natural Monument	A line of pristine dunes, illustrating the complex and varied coastal formation of the area
	San Fernando Diapir and Pliocene-Pleistocene	A diapiric structure composed of Triassic materials, oriented NE-SW, that distorts the surrounding marine Pliocene strata
	Caño Carbonero Salt Flats	Salt marshes that were converted for salt production beginning in the 14th century; now abandoned, but open to visitors, with remnants of the productive period still visible. Residual fishing activity
	Sancti Petri Island, Spit, and Channel	An intertidal erosion platform composed of mollusk-rich conglomerates and oyster shell rock
	Landscape of marshes and salt flats	A perceptually unified whole, comprising the elements described above. The salt pan ditches form the edge of the channel

Table 1: Attributes of the territory. Classification and description. (2024)

Scale	Attribute	Description
Historical-cultural formation processes	Facilities of the Almadrabeto Consortium in Sancti Petri	Fisheries processing and reception industry that closed in the 1970s. Currently, the settlement is in a state of near-total abandonment, with residual uses unrelated to its original purpose.
	Underwater archaeological sites in the Bay of Cádiz	5 underwater archaeological sites: La Carraca, Sillares del Castillo de Sancti Petri, Cañones del Arrecife de Sancti Petri, Desembocadura del Caño de Sancti Petri, and Pecio del Cobre
	Defensive Line of Marshes and Channels	Artillery batteries for coastal defense. Related to the proximity of the Strait of Gibraltar and access to the Sancti Petri channel
	Sancti Petri Castle	Landmark. Defense of the channel's mouth, which leads into Cádiz Bay. Mythological significance. Used to support fishing activities.
	La Soledad and Los Ángeles Saltworks	Productive use associated with the saltworks. Used for military purposes.
	A legacy of salt-making and the almadraba	Generations of people moved to live at the saltworks to carry out their work. Specific trades, such as that of the "horniguilla" (a type of salt harvester) or the net weavers
	Saltworks	The human transformation of the marshes into salt flats encouraged the establishment of salt-processing settlements (villages). Now abandoned. Natural recovery (fauna and flora) of the salt marshes
	Patron saint festivals of the Virgin of Carmen, the Carmen Fair, and the Salt Fair	Flamenco and the celebration of fairs are part of the town's identity. Intangible.

Table 2: Historical-cultural attributes. Classification and description. (2024)

5.3. Phase III: Map development: Heritage structure and density

Four maps are presented that depict the density of the heritage attributes present. For protected sites, the geographic boundaries that define them are used as a reference. It can be observed that, individually, they appear to be isolated and scattered; however, when all layers are overlaid, we find a numerous (*density*) and complex ensemble that characterizes the territory (Figure 6), along with the stages and events that contribute to its uniqueness (Figure 7).

Since the vast majority of salt-works houses are unprotected, it was decided to conduct a survey to locate them and visualize their collective distribution (Figure 8). Finally, the map shows an overlay of all these attributes, revealing how 15 attributes of varying scales—corresponding to territorial or historical-cultural processes—are distributed within this space (Figure 9). A comprehensive analysis of the site reveals a high density of heritage elements, with a strong degree of interrelationship.

The planimetric map reveals how the overlay of attributes reveals a density of heritage sites, allowing for an interpretation based on the complexity of the whole. This understanding will determine the assessment of this environment as a whole. This is discussed in the following section.

The appropriate tool for developing these maps is a Geographic Information System (GIS), which can be enriched and filtered according to various criteria to reveal the multiple possible interpretations. This development can enhance the potential of the present methodology in a subsequent phase.

Attribute	Value							
							Sustainability	Processes
	Aesthetic	Historical	Scientific	Social	Antiquity	Ecological	Economic	Political
Bahía de Cádiz Natural Park	x		x	x	x	x	x	x
Sancti Petri Marshes Natural Area	x		x		x	x	x	x
Punta del Boquerón Natural Monument	x		x		x	x	x	x
San Fernando Diapir and Pliocene-Pleistocene			x		x	x		
Caño Carbonero Salt Flat			x	x	x	x		x
Sancti Petri Island, Arrow, and Spout			x			x		
Landscape of marshes and salt flats	x		x	x	x	x	x	x
Sancti Petri Almadraba Fishing Ground		x	x	x	x		x	x
Underwater Archaeological Sites in the Bay of Cádiz		x	x		x			
Marismas and Caños Defensive Line		x	x	x	x			
Sancti Petri Castle	x	x	x	x	x		x	x
Saltworks Houses: La Soledad and Los Ángeles		x		x	x			
Abandoned saltworks houses		x		x	x			
Memories of salt-making and the tuna trap		x	x	x			x	
Salt Flats		x	x	x		x	x	
Patron Saint Festivities of Our Lady of Mount Carmel, the Carmen and Salt Fairs	x	x		x			x	x

Table 3: Matrix of Values and Attributes. (2024)

6. Discussion of the results (Phase IV of the methodology)

We are dealing with an environment in which natural, architectural, and intangible attributes intersect, all within a common framework: the territory. The proposed methodology allows for a comprehensive and detailed approach to the landscape, based on studies conducted at different scales to understand its formation. Next, we group these attributes, stratified over time but presented for simultaneous interpretation, thereby shaping the heritage landscape we have inherited. All of this is reflected in the summary plan, which allows us to visualize the new contemporary relationships established among these attributes. For the purposes of analysis, 16 main attributes have been identified. Each of these attributes establishes a network of relationships with all or some of the others, generating a matrix of exponentially multiple relationships that reflects the level of complexity of the reality described, where the elements that compose it take on a collective dimension, as noted by Silva and Fernández (2017). It is precisely this whole that we refer to as the PPCBI, given that the proposed case study meets the parameters used to describe this concept.

The settlement of Sancti Petri consists of the remains of one of the most important royal tuna traps on the peninsula. Its location and visual relationship with the castle and the salt flats, as well as its commanding view of the entrance to the channel, establish a network of functional, landscape, and topological

relationships that form the basis for the unified identification of the territory. These multidirectional relationships among all the proposed attributes form the basis for a joint landscape-heritage assessment. The site combines immense defensive importance (control of the rear entrance to the safe harbor of San Fernando via the channel) with productive significance (salt flats, almadraba, and other fisheries). This unique convergence explains the synergies that constitute the matrix of relationships.

The almadraba has been a historical resource in the area since at least Islamic times. As Vioque (1997) explains, its installation requires specific coastal morphology and seabed conditions (which form part of the landscape); at the same time, the channel provides a safe harbor for fishing vessels and transport, and the salt flat supplies an essential material for salting, which is only useful because the territory also offers sources of fresh water—factors that have enabled the human settlements associated with this complex of activities. Even the castle has survived on the islet because it has a unique artesian well of fresh water. This castle has served as a defense for the channel and the port, and in times of peace has functioned as a lookout point to monitor the schools of tuna that fed the almadraba. But in times of war, that same castle played a key role in the rear defense of the San Fernando arsenal and port, one of Spain's three most important naval

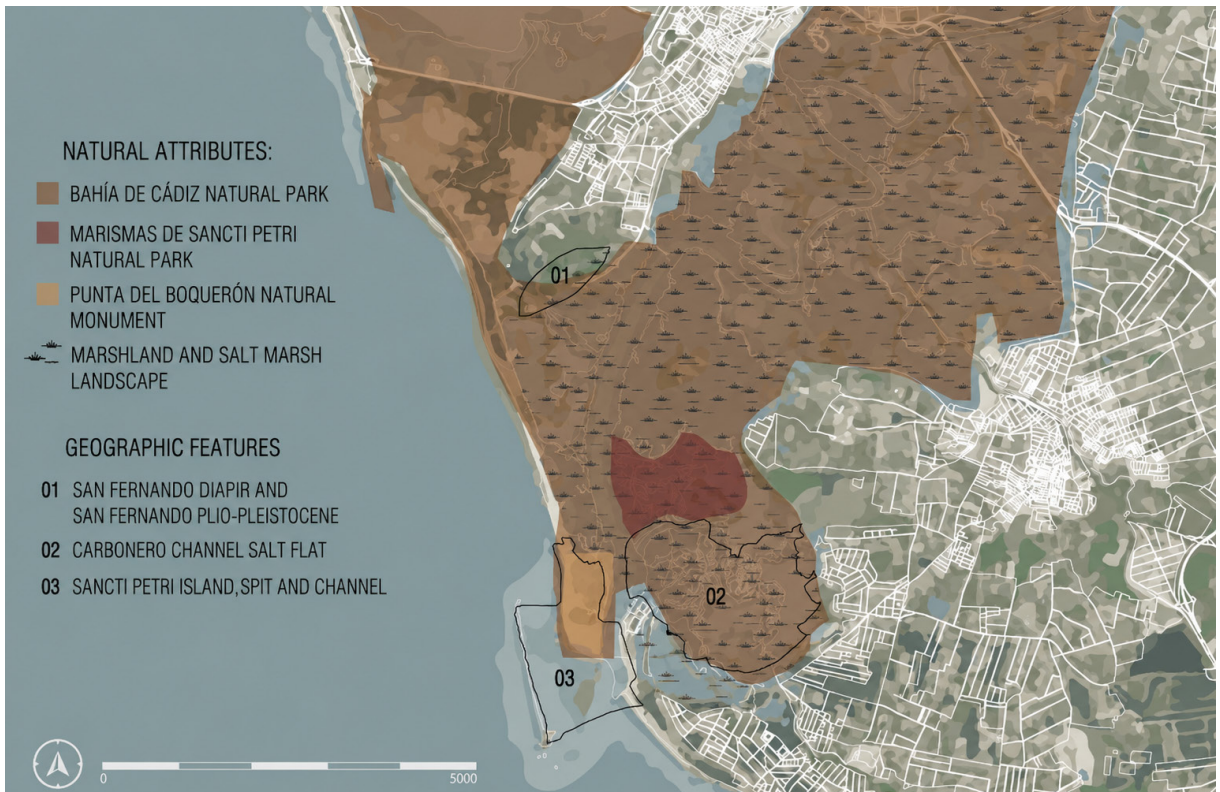


Figure 6: Location of attributes belonging to the territory. Authors on Google Earth map (2022)

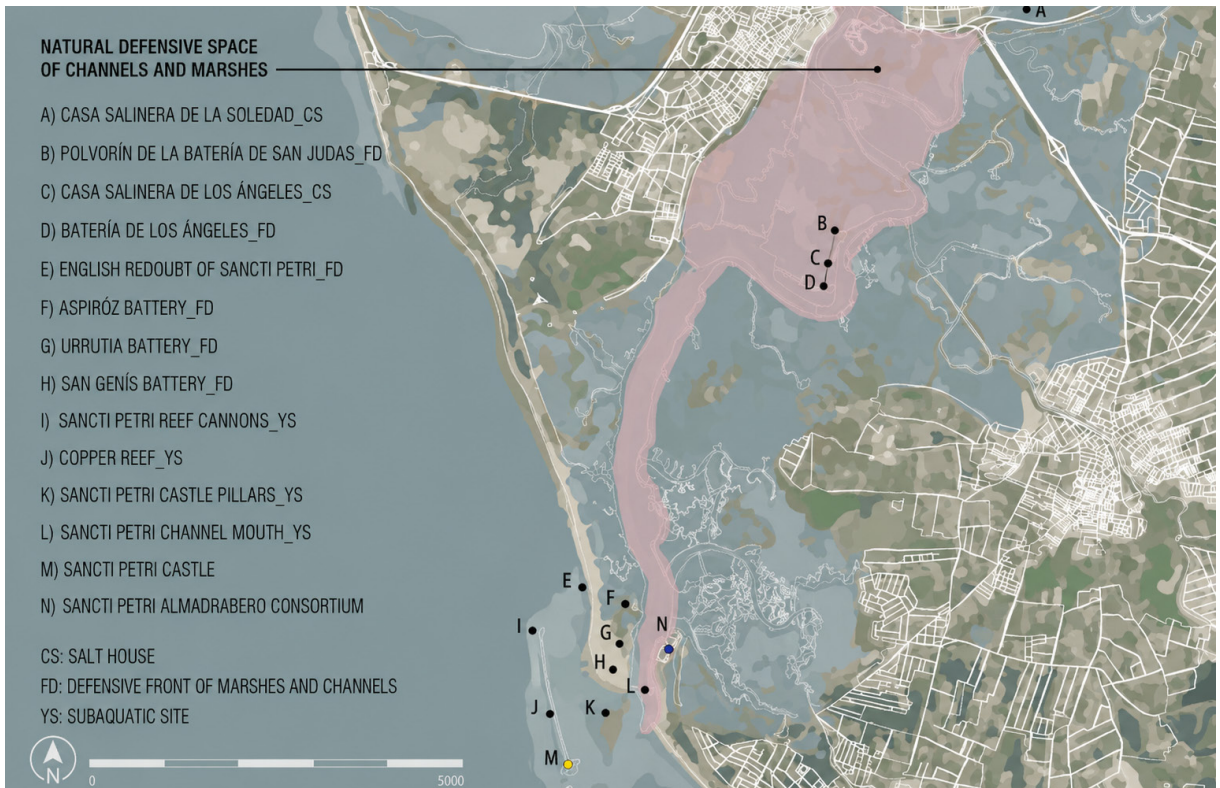


Figure 7: Location of attributes of the historical-cultural formation . Authors on a Google Earth map (2022)

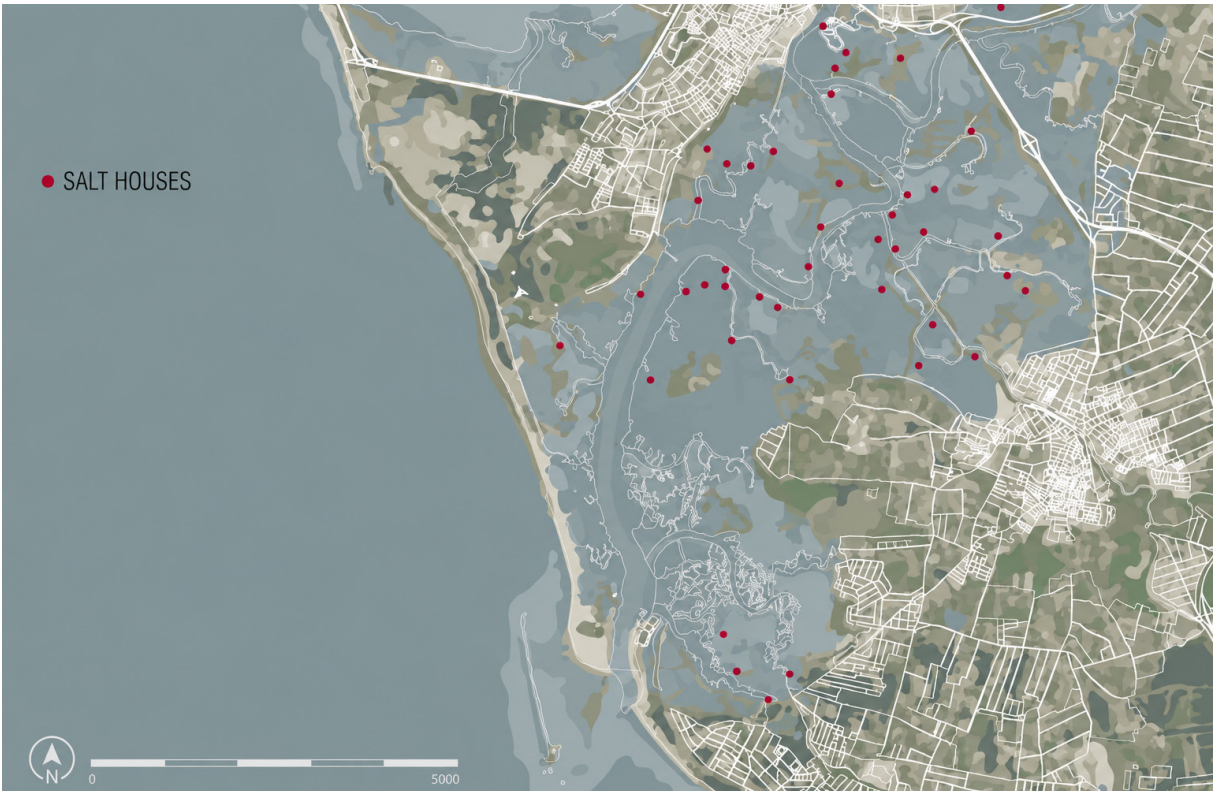


Figure 8: Location of abandoned salt-works houses. Authors on a Google Earth map (2022)

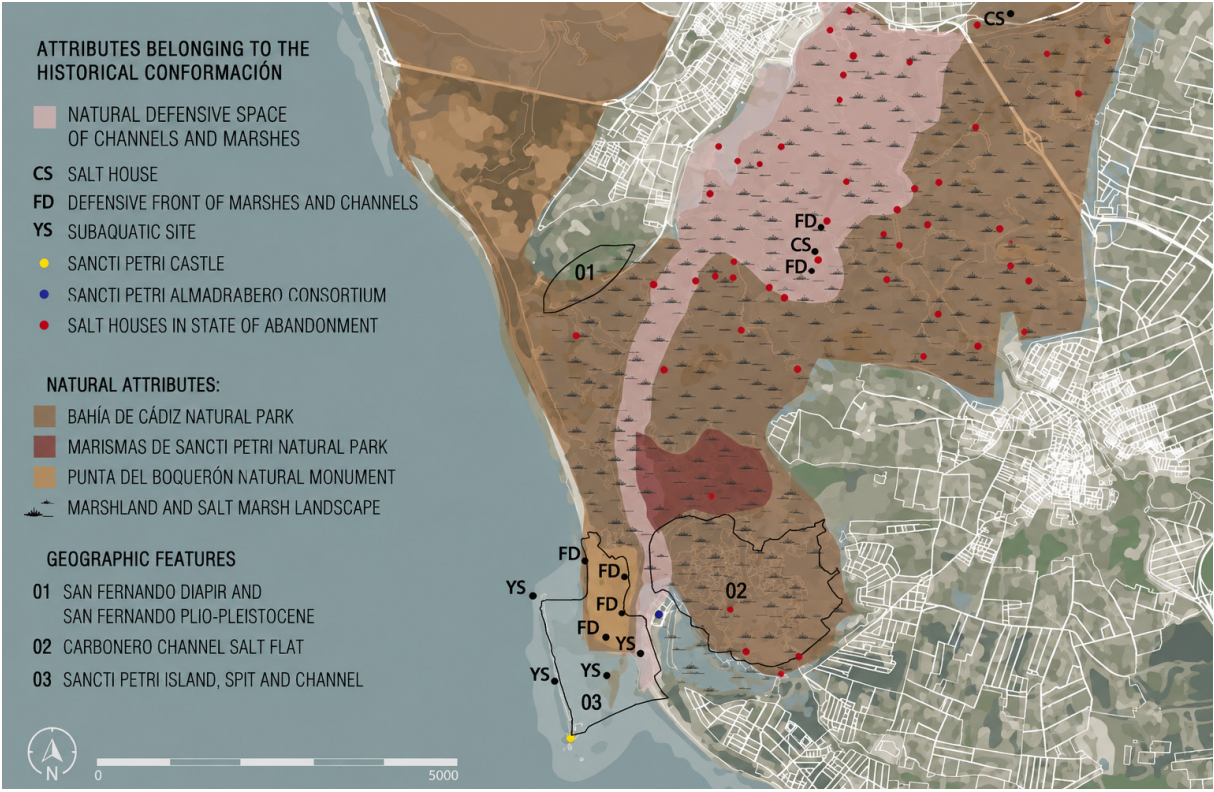


Figure 9: Overlay of the attributes shown in the previous maps. Authors on a Google Earth map (2022)

Attribute	Protected	Protection Category	Level
Bahía de Cádiz Natural Park		List of Ramsar Wetlands of International Importance	International
Sancti Petri Marshes Natural Area		List of Sites of Community Importance (SCI)	European
Punta del Boquerón Natural Monument		Special Area of Conservation (SAC)	European
San Fernando Diapir and Pliocene-Pleistocene	YES	Inventory of Protected Natural Areas in Andalusia	Regional
Caño Carbonero Salt Flats		Natural Resources Management Plan for the Bay of Cádiz	Regional
Sancti Petri Island, Spit, and Channel		Master Plan for the Use and Management of the Bay of Cádiz Natural Park	Regional
Landscape of Marshes and Salt Flats		Sustainable Development Plan for the Bahía de Cádiz Natural Park	Regional
Sancti Petri Traditional Tuna Trap	YES/NO	Legal and Economic Framework for the Ports of Andalusia	Regional
		Public Maritime-Terrestrial Domain	National
Underwater Area of the Bay of Cádiz	YES	Archaeological Easement Zone	Regional
Marismas and Caños Defensive Front	YES	Historical Heritage of Andalusia	Regional
		Decree of April 22, 1949, on the Protection of Spanish Castles	National
Sancti Petri Castle	YES	Spanish Historical Heritage	National
		Historical Heritage of Andalusia	Regional
		Site of Cultural Interest (Monument)	National
Saltworks Houses: La Soledad and Los Ángeles	YES	Cultural Heritage of Andalusia	Regional
Abandoned Saltworks Houses	NO		
A Reminder of Salt-Making and the Almadraba	NO		
Salt Flats	NO		
Patron Saint Festivals of the Virgin of Carmen, the Carmen Fair, and the Salt Fair	NO		

Table 4: Protective factors affecting the attributes used to measure the level of intensity. (2024)

bases since the 16th century. The area's strategic importance is linked to its proximity to Cádiz and the Strait of Gibraltar and is reflected in the bunkers scattered along the entire sandbar up to Punta del Boquerón, a natural monument.

On the other hand, as we have seen, the almadraba is a seasonal activity, and salt production is a part-time occupation. Other activities, such as estuary fishing, livestock raising, and small-scale supplementary farming, rounded out the annual cycle of its inhabitants. Salt production is a large-scale activity that, by necessity, takes on a territorial character and reshapes the landscape into a plain of canals and artificial ponds. It is extensive enough to create a biotope with specific flora and fauna, which become part of the area's natural heritage. The salt workers' houses provide a human perspective on this territory and bear witness to a way of life as harsh as it is unique; without the memory of this way of life, much of this coastline cannot be understood.

Identifying the relationships among the elements that make up this case study has made it possible to:

1. Reveal the unified heritage nature of the landscape organized around the place name Sancti Petri,
2. Verify the complexity of the relationships among its attributes,
3. Quantify the heritage density of the case, and
4. Demonstrate how the synergy among this territory's attributes enriches the meanings that each attribute holds in isolation, causing the value of the whole to far exceed that of the sum of its parts.

The positive outcome of these objectives confirms the hypothesis that we are dealing with a PPCBI as defined above. This is a case whose heritage characterization cannot result from the sum of the values of its attributes, but must instead be the result of a process that acknowledges complexity and broadens the perspective on the field of study, seeking a larger-scale whole.

7. Conclusions

The results of this study highlight the need to address these complex environments that lack a conspicuous heritage landmark, and for the relevant government agencies to approach the area holistically by forming transdisciplinary teams capable of comprehending its heritage dimension as a whole. It would also be important to involve other stakeholders, such as the general public and the private sector, for cultural and social reasons, as well as to manage this complexity. The future of these places remains uncertain, and the current approach is fragmented and insufficient for their heritage management.

There is a lack of specific tools for protecting these complex environments. Rather than a single protective designation, a regulatory management tool is needed to enable the cataloging and safeguarding of these PPCBI, since in such spaces the jurisdictions of various competent authorities overlap, depending on the case (culture, natural areas, coastlines, etc.). A strategic framework that views heritage as a resource and a social reality, particularly regarding intangible aspects. Rather than relying on a static and fragmented approach to protection, a system must be adopted that incorporates values and attributes through a holistic, flexible, and multiscale landscape-based approach. This objective goes beyond the scope of this phase of the research but is a consequence that must be developed in subsequent stages.

It is necessary to identify the values and attributes of these areas as a prerequisite for any management strategy and to design a tool that allows for the conservation of their heritage values, enhances them, connects them with the public, and contributes to local development. We have seen in Phase II that attributes fully recognized by protection regulations (Castillo, Natural Park) coexist with others that have been rendered invisible (almadraba, salt-works houses, bunkers), which are in an alarming state of disrepair. Only an approach that understands the relational nature of the complex landscape can sustain the uniqueness of seemingly less valuable elements. This research highlights the need for a shift in the approach to heritage protection. In the Andalusian context of the case study, the LPHA lacks any comparable tool beyond the designation of "Heritage Zone," which is insufficient for this type of management.

This article offers an initial look at this type of landscape, based on this case study in Andalusia, but with the potential for broader application. The research must continue to be expanded and develop a specific method of analysis for these landscapes that allows for their proper understanding and protection. This approach to heritage landscapes—where cultural assets, the landscape, the territory, and traditional trades are aligned—enables heritage to address one of its greatest challenges: becoming a driver of development and confronting current threats that stem not only from the destruction of heritage but also from the disruption caused by rapid urbanization and the loss of identity among the communities that inhabit these areas. Identifying territorial areas with special characteristics that make them worthy of protection is an essential task in landscape management. Only by considering the material and spiritual specificities of heritage assets can we identify those areas of the territory where the identity of local communities is forged.

Conflict of interest. The authors declares no conflicts of interest.

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