Modul. Arquit. CUC 32, pp. 49-81, Enero - Junio, 2024

Methodological Proposal for the Identification and Characterization of Industrial Heritage Landscapes*

Propuesta metodológica para la identificación y caracterización del paisaje del patrimonio industrial

DOI: 10.17981/mod.arq.cuc.32.1.2024.03

Article. Received: 20/02/2024. Accepted 10/05/2024. Published: 15/06/2024

María Isabel Alba-Dorado[1, 2]
[1]Universidad Antonio de Nebrija. Madrid (Spain),
[2]Universidad de Málaga. Málaga (Spain)
maribelalba@uma.es

Milena Meira da Silva[3, 4]
[3]Centro Estadual de Educação Tecnológica Paula Souza, Sao Paulo State University. Sao Paulo (Brazil)
[4]Universidade Estadual de Campinas. Campinas (Brazil)
milenameiras@gmail.com

Please cite this article as:
Alba-Dorado, M. I., & Meira da Silva, M. (2024). Methodological proposal for the identification and characterization of industrial heritage landscapes. *MODULO ARQUITECTURA CUC, 32*, 49–81. https://doi.org/10.17981/mod.arq.cuc.32.1.2024.03

Abstract

The industrial heritage landscape constitutes a complex phenomenon whose study has been addressed belatedly by the scientific community in general. This has given rise to a situation of conceptual and methodological insufficiency to undertake its study, which forces us to rethink the ways in which these have been approached until now and to develop a methodological framework that takes into account their specificity. In this sense, this article aims to design a methodology for the identification and characterization of these landscapes based on their heritage and cultural considerations. The method used contemplates a conceptual approach to the industrial heritage landscape, a study of the different dimensions that characterize it and the design of methodological keys for its identification and characterization. Based on the results obtained, an explicit methodological proposal has been made that addresses the study of these landscapes from a holistic, open, and integrative approach.

Keywords: Industrial heritage; industrial heritage landscape; landscape characterization; landscape identification; methodology; postindustrial landscape.

Resumen

El paisaje del patrimonio industrial configura un fenómeno complejo cuyo estudio ha sido abordado tardíamente por la actividad científica en general. Esto ha dado lugar a una situación de insuficiencia conceptual y metodológica para acometer su estudio que obliga a replantear los modos en los que hasta el momento éstos han sido abordados y elaborar un marco metodológico que contemple su especificidad. En este sentido, este artículo tiene como objetivo diseñar una metodología para la identificación y caracterización de estos paisajes a partir de su consideración patrimonial y cultural. El método empleado contempla una aproximación conceptual al paisaje del patrimonio industrial, un estudio de las distintas dimensiones que lo caracterizan y el diseño de unas claves metodológicas para su identificación y caracterización. En base a los resultados obtenidos, se ha explicitado una propuesta metodológica que aborda el estudio de estos paisajes a partir de un enfoque holístico, abierto e integrador.

Palabras clave: Caracterización paisajística; identificación paisajística; metodología; paisaje del patrimonio industrial; paisaje postindustrial; patrimonio industrial.

* This study has received support from the research project "Design of an interdisciplinary methodology for the identification, characterization, valuation and assessment of industrial heritage landscapes" (Ref. P20_01361), financed under the competitive submission of proposals of the call for proposals of the Andaluz Research, Development and Innovation Plan (PAIDI, by its acronym in Spanish, 2020) of the Board of Andalucía (Spain) and whose principal researcher is the first author of this article.

Introduction

The Industrial Revolution represented one of the most significant changes in the history of humanity (Andrei, 2010). The phenomenon of industrialization, with a wide presence worldwide, both in quantity and variety, has constituted a substantial part of the life of peoples, marking not only economic development, but also the evolution of society and culture (Leal del Ojo, 2021), introducing new values and identities related to the culture of work and the memory of the territories. It has also promoted significant changes in the landscape that have led cities to take on a new appearance and a new order (Aguilar, 1990).

In its natural evolution, industry has gone through different stages. A previous one, called proto-industry, has been linked to traditional industries prior to the eighteenth century. And another, the Industrial Revolution as such, whose starting point is generally placed between the second half of the eighteenth century and the first decades of the nineteenth century, which began when the steam engine was incorporated in key sectors of industrial development.

In the second half of the twentieth century, between the 1960s and 1980s, the effects of globalization, deindustrialization, economic restructuring, etc., produced the obsolescence of a wide range of industrial facilities throughout the world, leaving behind a legacy of abandoned and underutilized industrial landscapes (Antrop, 2000; Loures, Heuer, Horta, Santos & Silva, 2008). From the 1980s to the present, in the stage that has been called post-industrial, this industrial past has been defended for its cultural and heritage value.

Today, these remnants of industry, devoid of the function and use for which they were exclusively created, involuntarily take on new values that have nothing to do with those bestowed upon them by the modern age pioneers. If at first, the buildings, infrastructures, facilities, etc. that emerged during the industrial revolution were considered symbols of progress, of the future and the maximum expression of the modern spirit, these, once industrial activity ceased, stand as symbols of the past.

The landscapes generated during this industrial past acquire a physical, territorial, cultural, social, environmental, economic, productive, and heritage dimension, which reflects the territories and architectures that were created and manipulated during this past, as well as the history, culture and collective identity of that society.

In this article we will focus on those landscapes generated during the industrial revolution, and we will discuss them from a broad and comprehensive perspective that contemplates the various dimensions involved in these landscapes, and taking into consideration their heritage status, which is a relatively recent develop-

ment. This is set in the second half of the last century, at the time when the concept of heritage began to expand to include a past that is much closer to the present (Choay, F., 1992), and linking it not only to the idea of monument or to assets of historical-artistic value, but also to those that contribute to the identity of people, whether material or intangible, and that are associated with the concept of cultural property. As a result:

> The concept of heritage has evolved to contain the idea of landscape and has expanded to include a heritage that until recently had not been given adequate attention, such as industrial heritage. The legacy that industry has left us from the recent past is the most representative element of a rich culture of production that must be preserved and recovered as a heritage reality (Alba, 2010, p. 334).

Similarly, the evolution of the concept of landscape has a long history. It has been a subject of study and attention in Europe for a long time. The landscape, originally linked to a conceptualization of pictorial roots and a philosophical component that considered it mainly a visual phenomenon, over time has been incorporating various meanings depending on the prevailing social concerns and trends (Hunt, 1994; Watkins and Cowell, 2012).

The enactment over two decades ago of the *European Landscape Convention* (hereinafter CEP) (Council of Europe, 2000) has promoted an extensive field of work based on the expanded concept of landscape that it adopted, which contemplates not only the most outstanding or exceptional landscapes, but also those of everyday life. This has been a catalyst in the field of landscape studies, reviving the conceptual and methodological debate around the study and management of landscapes (Gómez & Riesco, 2010; Scazzosi, 2004). Although the CEP does not define a methodological procedure to address these actions, it does arouse interest in them. Its implementation, based on the understanding that the landscape is the entire territory, implies that these actions must be carried out in a general way.

However, the discussion on the heritage dimension of landscapes is very recent. While it is true that there is a certain track record in the social recognition and institutional protection of natural heritage sites, this is less true in the case of those of a cultural nature (Fernández, 2013), with little interest displayed in connection with the industrial heritage landscape. This new sensitivity towards industrial heritage has been slow to take shape and has done so with unequal recognition and acceptance in different countries. Thus, although the concept of heritage linked to the idea of monuments or sites with a certain historical-artistic value

may be easily accepted, when it comes to assets characterized by their pragmatic and functional aspect, and that, in addition, generally have austere aesthetic qualities in terms of forms and ornaments, this issue is more complex. And, if we add to this the negative image that the remains of this industrial past may have in the post-industrial society, because they represent the environmental impact that industry has had on the territory (Leal del Ojo, 2021), this issue becomes even more complex.

This has led to the study of the industrial heritage landscape being belatedly approached by the scientific community in general, with interest in them being relatively recent. Thus, these landscapes currently make up an emerging heritage that has not been sufficiently valued and studied to date (Álvarez, 2008; Benito et al., 2016; Sobrino & Sanz, 2019).

Starting in the 1960s, industrial heritage began to be a matter of concern for Europe and other territories such as the United States. An example of this is the *Venice Charter* (ICOMOS, 1964), which contemplates a broad concept of heritage that integrates those elements or groups that in a general way refer to the culture of a people, are linked to a territory, or are part of a landscape. However, industrial heritage did not have a document on its protection and conservation until the creation by the *International Committee for the Conservation of Industrial Heritage* (ICCIT) in 2003 of the *Nizhny Tagil Charter on Industrial Heritage*. This document is the first international reference text for the protection and conservation of this heritage. Another normative and practical instrument that in recent years has made it possible to establish guidelines or references for the protection of industrial heritage (sites, constructions, areas and landscapes), recognizing its particularity and the challenges and threats to which it is subject, is the *Dublin Principles*. These were approved in 2011 and include the joint criteria of the *International Council on Monuments and Sites* (ICOMOS) and TICCIH for the conservation of this type of heritage. In addition, the Council of Europe, in its efforts to draw up guidelines and recommendations for the protection of this heritage, specifically devotes two documents to industrial heritage, namely *Recommendation No. R (87) 24 on European Industrial Cities* (Council of Europe, 1987) and *Recommendation No. R (90) 20 on the protection and conservation of technical and industrial heritage and works of art in Europe* (Council of Europe, 1990). Similarly, in 2013 the Council of Europe drew up a series of recommendations for its study and protection, which are included in *Resolution 1924: Industrial Heritage in Europe* (Council of Europe, 2013).

However, despite the increasing importance that industrial heritage has acquired in recent years, the legal concern for its conservation and the fact that it has the recognition of institutions specialized in heritage and various practical instruments, regulations, recommen-

dations, etc. that recognize its value, the truth is that there are few and insufficient proposals that address the study and management of this heritage from a landscape perspective.

Thus, although these landscapes constitute a valuable resource for society, capable of providing economic, social and environmental benefits, promoting processes of economic growth and urban and landscape regeneration and having a historical and cultural role of great relevance as an integral part of the collective identity of a society, the truth is that many of them, once they have lost the functionality for which they were created, are abandoned, subjected to serious processes of deterioration and degradation, and facing significant difficulties in safeguarding them (Alba, 2016; Leal del Ojo, 2021).

This currently raises the need to study these landscapes, to assess their value and intervene in them, in order to reintegrate them into their current context. To this end, it is necessary to first define theoretical and methodological approaches that address questions related to their study and management that are capable of assessing the specificity of these landscapes and the numerous challenges they face, in terms of their recovery and use (Altena & Linden, 2002; Brebbia, Almorza & Klapperich, 2002; Mclean, 2020), compared to other types of landscapes, due to their extraordinary complexity.

The current state at the conceptual and methodological level is insufficient to address in depth the study and intervention of these landscapes. The profound changes that have taken place in recent decades around the concept of heritage and landscape have generated numerous uncertainties, new questions and challenges that imply conceptual and methodological redefinitions in the field of study, for the enhancement and protection of industrial heritage landscapes. Many of the traditional theoretical, conceptual and methodological principles used for the study of landscapes in general are of limited use for landscapes that have been heavily transformed by human action, as is the case of industrial heritage landscapes, since they are unsuitable for addressing their complexity and/or are insufficiently developed (Alba & Romero, 2022a, 2022b; Brady, 2008; Zoido, 2012). Likewise, there are few studies that directly address the specificity and identity of these landscapes and the multiplicity of dimensions in which they are involved.

So far, many of the studies that have addressed the matter have done so in a partial or tangential manner. Thus, it has traditionally been approached from a physical-material dimension by the natural sciences, or from a cognitive dimension by the social sciences and humanities. However, an integrative study model is needed that goes beyond these disciplinary limits and defines common frameworks to compile and synthesize knowledge. A transdisciplinary approach would facilitate the development of comparative and more systematic studies wi-

thin and between disciplines, as well as favor not only the production of new knowledge about the landscape through collaborative learning, but also identify new problems and challenges, and define more solid solutions (Ojeda, 2013; Wu, 2006; Naveh, 2007).

In this sense, this article aims to address existing methodological and conceptual insufficiencies regarding the study of industrial heritage landscapes, contributing to fill the void of the scarcity of research in this field, and the obsolescence of the methodologies used in their study, rethinking the ways in which they have been approached so far, often limited to traditional parameters, in order to advance in the design of a series of guidelines and indicators that will serve as a methodological basis for their identification and characterization. In this sense, the aim is to design a methodology for these landscapes that addresses their specificity and identity and that approaches their study through a holistic, open and integrative approach that operates between the multiple dimensions (physical, material, social, perceptive, temporal, cultural, etc.) attributable to them, and that advocates an approach that goes beyond any specific discipline, in a manner that contemplates their study in a unique and interdisciplinary manner, and furthermore, through transdisciplinary analytical approaches that can address the complexity of these landscapes, focus on their specific character, and approach their study based on their heritage and cultural features.

Methodology

In this study, firstly, we discuss the conceptual approach to industrial heritage from a landscape and heritage perspective. To this end, we review how these landscapes have been studied and reflect on the weak points and challenges involved in their identification and characterization, providing a summary of the theoretical approaches that have been used in this field, and of the practical and regulatory instruments and recommendations that discuss how to appraise and protect them. Secondly, we further elaborate on the various dimensions (physical, material, social, perceptive, temporal, cultural, etc.) that characterize these landscapes in order to highlight their complexity and unique identity as landscapes that have been deeply transformed by industrial activities in the past, and which incorporate high cultural and heritage value. Thirdly, we advance the design of methodological keys to identify and characterize these landscapes. These guidelines seek to address the existing methodological and conceptual insufficiencies regarding the study of these landscapes, to reassess the manner in which they have been approached until now. Lastly, we put forward a specific methodological proposal that has been designed seeking to remain consistent with currently existing documents at the international level on the subject of industrial heritage landscapes.

In this sense, the CEP and the Guidelines for its application, which are instruments sponsored by the Council of Europe, have been considered key documents insofar as they stand as a reference framework for the design of policies for the study, protection, management and planning of landscapes. Similarly, the standards, guidelines and recommendations drawn up by the Council of Europe for the identification, protection and dissemination of heritage have been taken into consideration, especially those that specifically address industrial heritage, such as *Recommendation No. R(87)24 on European industrial cities*, *Recommendation No. R(90)20 on the protection* and *conservation of the technical and industrial heritage and works of art in Europe,* and *Resolution 1924: Industrial Heritage in Europe.* Other instruments that have been considered are those of a normative and practical nature that in recent years have made it possible to establish guidelines, references or framework standards for the enhancement and intervention of such types of heritage at the international level, such as the *Nizhny Tagil Charter* on Industrial Heritage and the *Dublin Principles*.

The design of this methodological proposal is also based on the study of the conceptual and methodological advances made to date in the landscape field. Although this proposal constitutes a new methodological tool that has very few precedents at the international level, the truth is that numerous conceptual and methodological contributions have been made from various approaches and disciplines and whose theoretical and methodological aspects should not be ignored.

In this sense, in Europe we find extensive experience in the study of landscapes that has produced a substantial body of knowledge. Some of the most noteworthy landscape experiences carried out by public agencies from different countries and regions of Europe that propose new ways of analyzing and studying the landscape include the *Landscape Character Assessment methodology* (LCA), created by *The Countryside Agency* and *Scottish Natural Heritage* (currently *English Nature)* in the United Kingdom. This methodology focuses on the notion of *landscape character*, that is, that which consistently characterizes a landscape and makes it unique (Swanwick, 2002). Its prestige is backed by a well-proven scientific background, long experience and a large demonstration of results. This fact, together with the central importance that this methodology gives to the characterization of the landscape in order to obtain in-depth knowledge has led us to use this methodology as a frame of reference for the design of our methodological proposal.

In using this methodology, we have sought to go beyond a simple exercise of methodological mimesis. We have contemplated revisions and adaptations in order to offer a comprehensive response to the needs of industrial heritage landscapes. This involves some limitations,

but it also contributes enhancements and innovations that make it possible to advance in the design of a specific methodology for these landscapes. Some of the aspects we have worked on have been its adaptation to the diversity of scales of the industrial landscape in order to facilitate its study and analysis at different interrelated scales, as well as the incorporation of Geographic Information Systems (GIS) to support this study, in addition to collecting and presenting the data in map format. It has also been necessary to guide and adapt some of its considerations to the guidelines and recommendations proposed by the CEP (Gómez & Riesco, 2010).

We have also paid special attention to other methodologies that have emerged as an evolution of certain procedural aspects of the LCA methodology. This is the case of the *Townscape Character Assessment* and *Historic Landscape Assessment* methodologies, whose development is relevant for the study of landscapes located in urban environments, and the characterization of landscape elements of a heritage nature.

Other sources of inspiration have been the experiences in identifying and characterizing landscapes in countries such as Belgium, France, Slovenia and Spain and their respective landscape atlases; landscape projects such as PAYS.DOC and PAYS. MED. URBAN developed within the framework of the European Union's transnational cooperation program for the Mediterranean area; as well as the experience in Spain in the preparation of landscape catalogues and the promotion of various landscape work methodologies and analysis carried out by centers such as the *Center for Landscape Studies* with the *Landscape Catalogues of Andalusia* and the *Landscape Observatory* with the *Landscape Catalogues of Catalonia.*

However, the specificity of these industrial heritage landscapes has made it necessary to take a closer look at various landscape research studies or practices that, according to different interests and objectives, have approached the study of these landscapes in a partial or tangential manner or have approached the design of certain methodological aspects that address the study of these landscapes using a cultural landscape approach (Alba, 2017; Alba & Romero, 2022a).

Likewise, other experiences that have inspired the development of this proposal come from research that, although not focused specifically on the study of industrial heritage landscapes, does address issues closely related to these and which invite us to explore the incorporation of certain methodological aspects (Loren, Mata, Ruiz & Pinzón, 2016).

The design of this methodological proposal has also been based on the review of specific studies that have structured the characterization of these industrial landscapes based on their cultural and heritage components. Thus, examples in the field of urban planning have

been studied, such as the *Urban Master Plan of Colonias del Llobregat* and the *Urban Master Plan of the industrial heritage of Ter and Freser* (Sabaté, 2001, 2006), or projects such as *Emscher Landscape Park* (Pérez & Parra, 2004) and *The Blaenavon Industrial Landscape World Heritage Site* (Alba, Iranzo & Hermosilla 2018).

Once this methodological proposal was designed, its feasibility was tested and studied in the specific case of an industrial landscape, namely the mining landscape of Minas de La Réunion in Villanueva del Río y Minas, in Sevilla (Spain). This industrial landscape was selected due to the site's relevance, whose activity dates back to the seventeenth century. The breadth of its facilities and the variety of its typologies has allowed us to test a great diversity of casuistry and to test the methodology developed in a broad way. Likewise, its location in Sierra Norte de Sevilla, linked to a territory that has been highly anthropized since ancient times due to the development of extractive activities, the construction of infrastructures, the railway route, etc., leading to the participation of this landscape in various territorial scales, has allowed the proposed methodology to be tested at different representative scales, not only at a local scale, but also at other scales of a higher level (Figure 1).

Figure 1. Mining landscape of Minas de la Reunión in Villanueva del Río y Minas, Sevilla (Spain). View of the facilities of Well No. 5 and different scales of study -regional, subregional and local.
Source: Prepared by the authors.

Results

The dimensions of the industrial heritage landscape

The identification and characterization of an industrial heritage landscape requires a broad and integrated study that takes into consideration its complexity, using a multidimensional perspective that contemplates not only the elements that have been inserted in the territory as a result of an industrial activity, but also their relationship with the social, cultural, economic and historical context in which they have developed.

These landscapes participate in a multiplicity of dimensions, of which it is worth highlighting those that the CEP refers to in relation to the new expanded concept of landscape, which it defines as "any part of the territory (physical-material dimension) as perceived (perceptual dimension) by the population (social dimension), whose character is the result of the action and interaction of natural and/or human factors (temporal dimension) (nexus between nature and culture)" (Council of Europe, 2000, p. 2).

These five dimensions on which the CEP builds the concept of landscape, although they can be described separately, do not exist in isolation. The very conceptualization of landscape unites them all in a single synthesis. Below, for methodological reasons, each of these dimensions is detailed, one after the other, for the specific case of the industrial heritage landscape, although, as already mentioned, they do not exist separately.

Physical-material dimension

The landscape, as a spatial entity, has a physical-material dimension that refers to the territorial system in which it is formalized. It forms the basis and represents the measurable, singular and inherent characteristics of the territorial structure and process. In the case of an industrial landscape, the processes are highly complex as a result of the territorial relevance that these landscapes often acquire, given their size, logic of implantation and territorial occupation (Trachana, 2017; Sobrino, 1996). These landscapes are often linked to productive settlements that are located along riverways, port fronts, infrastructures or energy distribution networks, etc. As a result, in many cases they may cover a diversity of spatial scales, ranging from those of a more local nature, to others of a regional or provincial nature. In these landscapes, the interaction of elements at different spatial levels, such as infrastructures, communication routes, buildings, housing, equipment, facilities, machinery, etc., linked to the development of an industrial activity, whether it is exploitation, extraction, manufacture or transport, defines a territorial system that characterizes these landscapes.

Temporal dimension

The dynamic nature of these landscapes and their transformation over time define their temporal dimension. These landscapes are not static, but dynamic entities. They are subject to continuous changes intrinsically linked not only to the passage of time, but especially to transformations in production modes and systems as a result of the rapid evolution of technology, changes in labor and economic markets, etc., which produce the obsolescence of procedures, infrastructures, facilities, machinery, etc., forcing their continuous renewal or replacement to respond to new technological, functional, productive, economic and social needs and demands.

At present, these industrial landscapes, even when the industrial activity that generated them has ceased, are in continuous transformation as a result of a process of deterioration and ruin of the different elements, buildings and infrastructures that make them up.

Thus, the temporal dimension of the industrial landscape takes shape in times, rhythms, layers of experiences of past lives and memories, which give rise to a hidden and unexplored dimension, as well as a presence in the present. Consequently, its definition contemplates different historical moments, although they converge with the present moment.

Perceptive dimension

The perceptual dimension of the landscape represents the mental construct built by those who perceive a territory and interpret it based on their experience of the senses (Alba, 2021). "A landscape is not a reality in itself, separate from the gaze of those who contemplate it" (Kessler, 2000, p. 17). In its conceptual development, its creation is conditioned by the perception of an observer who constructs and qualifies it. It therefore has no identity outside of perception. This dimension is very similar to a sensorial conception of the landscape, as a sensory manifestation of the territory, capable of mobilizing all our perceptions. This is linked to the more widespread meaning of landscape, which considers it as "the perception of the environment by the individual through the senses, although most of this perception is produced by eyesight" (Gómez, 1989, p. 28).

However, this perception goes beyond the physical and integrates other perceptual and cognitive forms that give rise to a broader and deeper perception where ideas, feelings, sensations, emotions and experiences are an indivisible part of the landscape. Thus, the perceptual dimension of a landscape is not only referred to purely sensory issues. It is influenced by our culture, our way of thinking, of living and being in a world that is defined by a social and cultural context.

In the case of an industrial landscape, it may undergo significant changes in the way it is perceived over time. Thus, if at first the buildings, infrastructures, facilities, etc. that emerged during the industrial revolution were for decades considered symbols of progress, of the future and the maximum expression of the modern spirit, today, once the industrial activity has ceased, they stand as symbols of the past. These landscapes acquire a new meaning outside the context in which they were created that is far removed from the way they were originally conceived (Alba, 2016, 2018).

This situation forces us to look at and reflect on these landscapes in a new way and with a sensibility that has nothing to do with the way the modern pioneers approached them to exalt industrial aesthetics. These industrial remains, many of them abandoned and scattered throughout the territory, devoid of the function and use for which they were exclusively created, currently involuntarily acquire formal, spatial, aesthetic values, etc. for which they were not initially conceived, giving rise to unique and unrepeatable landscapes. These are, in the words of Peter Latz (1999), "the fantastic landscapes after the industrial age" (p. 199).

Socio-cultural dimension

The industrial landscape acquires meaning beyond its physical and objective identity as a social and cultural construct. The imprint that industrial activity and the processes linked to it have exerted on the territory throughout history has contributed decisively to the construction of new landscapes and the formation of cultural scenes, defining the hallmarks of a society, its ideals, beliefs, ways of life and work (Alba, 2010). These have been engraved in the landscape and in the collective memory over time.

These landscapes currently take on a heritage character, as they are bearers of values related to the culture of work, related to the definition of the identity of generations of workers, the history of a people and the scientific and technological culture of a very recent period in the history of humanity that must be preserved and recovered as a heritage reality. The marked or erased traces of the action of industry on the territory make these landscapes an expression of the culture of a people and possessors of great cultural significance.

Landscape as a link between nature and culture

In its definition of landscape, the CEP states that what characterizes it is "the result of the action and interaction of natural and/or human factors" (Council of Europe, 2000, p. 2). The two are deliberately linked in this definition, so that it is these mutual relations between the natural and cultural features that define the core of its conceptualization.

In the case of the industrial landscape, this relationship has been built over time, through

the development of different industrial activities that have modified the environment, in which the exploitation of existing natural resources, both raw materials and energy resources, have played a role in the definition of these landscapes. In the same way, these landscapes have influenced the construction of the signs of the cultural identity of a society.

Systemic dimension

The definition of industrial landscape acquires a broader and more complex meaning that goes beyond each of the dimensions described above. It is not possible to simplify the industrial landscape to only one of these dimensions, as they do not exist separately. Only when all of them are combined, interrelated or intertwined with each other, is it possible to speak of an industrial landscape. It defines a physical, material, temporal, perceptual, social and cultural reality that contemplates both objective and subjective, natural and cultural, ideal and material, individual and social aspects, etc. The very concept of industrial landscape provides a broad and all-encompassing vision that integrates and articulates all these dimensions and their interrelations, which leads to it being perceived in a context of synthesis as a coherent whole.

Methodological keys for the analysis and identification of the industrial heritage landscape

The epistemological debate on the new paradigm of industrial heritage from the perspective of the landscape must be approached not only from a conceptual outlook, but also through the definition of methodological approaches that facilitate the implementation of its axioms in the territory as a prior and unavoidable step for the identification and characterization of these landscapes, as well as for the advancement of actions that aim to assign value, protect and plan them.

The complexity of these industrial heritage landscapes, which involve a large number of structures, facilities and social systems related to the culture of work, have marked not only economic development, but also the evolution of a society and culture itself. Likewise, its link to technological changes, the use of new materials and production and communication systems has had an impact in one way or another on all areas of life. That is why their study must go beyond the assessment of industrial structures and processes themselves.

The definition of a specific methodological proposal for the identification and characterization of these landscapes makes it necessary to contemplate a new approach with frameworks that transcend the conventional approaches, often linked to specific disciplines, to

instead contemplate a holistic and integrative approach that operates between the multiple physical, material, temporal, perceptual, cultural, and heritage dimensions, etc. attributable to these landscapes, and advocate for an inter- and trans-disciplinary approach for their study (Romero, 2017), in a manner that addresses both the objective and subjective, natural and cultural, ideal and material, individual and social characteristics that broadly define these landscapes, focusing attention on those aspects that over time have been decisive in defining their inherent qualities and configuring their distinctive character. Therefore, it is necessary to advance in the contribution of methodological enhancements and innovations that contemplate the nuances and singularities that characterize these landscapes based on their cultural and heritage considerations (Alba & Romero, 2022a, 2022b).

Below we define a series of methodological keys for the identification, systematization and description of the industrial heritage landscapes:

Determination of the territorial scale of the industrial heritage landscape survey

For the analysis and interpretation of an industrial landscape, it is necessary to reflect, first of all, on what is, or are, the scales of territorial approximation to be considered for the effects of the heritage survey. This definition constitutes a decisive preliminary step for the study of these landscapes, given the implications that this aspect has on the work methodology. Thus, the analysis of the spatial and material aspects of the physical environment in which these landscapes are formalized, the identification of the historical keys, the uses and activities that have marked their character and the heritage resources that define them must be carried out on the basis of data and information sources that are adequate and relevant at the scale and level of detail that has been previously defined.

In this sense, given that the study of these landscapes is approached from their heritage and cultural dimension, it is the characteristics of their heritage and cultural values that condition the scale(s) at which their study must be approached. Initially, two scales could be considered. On the one hand, a subregional scale that is consistent with the scale of the landscape boundaries. This offers a broader view of the landscape that provides the context of the study to achieve a heritage reading of the territory as a whole. On the other hand, a more local or regional scale linked to smaller extensions of territory in which the heritage dimension of these landscapes is developed requires specific study strategies.

In each of these scales of study, certain aspects become more or less relevant. Thus, on a subregional scale, the physical and material aspects of the landscape display realities and rhythms that should not be underestimated in

the heritage analysis of the territory, while in the closer scales of a local or regional nature, which correspond to more limited places, cultural characteristics acquire greater relevance.

Delimitation of territorial areas featuring homogeneous heritage invariants

In each of the scales of study of these landscapes, it is necessary to identify and delimit those spaces where homogeneous features are present from the perspective of cultural heritage, due to the presence of a significant form of certain industrial elements (infrastructures, factories, workshops, facilities, etc.), traces of the action exercised by the industry in the territory (mining spaces, etc.), or by a character of recognized historical trajectory that defines its identity.

This delimitation is a complex task, since the landscape features are continuously manifested throughout the territory. Although landscapes in which the physical and biological dimension predominate this delimitation is more evident, in those where both historical processes and the industrial activities carried out have shaped their heritage, their delimitation is more complex, since this heritage dimension rarely has a clear spatial delimitation (IKT and Paisaia, 2005; Tévar, 1996).

Summary of the historical processes

A multiplicity of time periods converges in the industrial landscape that define its character. The temporal dimension of these landscapes takes shape in times, rhythms, layers of experiences that define different historical processes. It is crucial to include these in the identification and characterization of these landscapes in order to assess their heritage dimension. However, as in the case of the spatial dimension, where it is necessary to take into account the diversity of spatial scales in which these landscapes participate, a similar problem arises in the choice of the different time scales.

In this sense, the treatment of time, understood as historical time, for the effects of the identification and characterization of these landscapes, should go beyond the descriptive or documentation aspects of the territory, to offer a coordinated framework of integration between the temporal scale and the chosen spatial scale, which constitutes a purely analytical exercise. The analysis and presentation of time and space must be coordinated in order to transmit a coherent story, in which the effect of certain historical processes in the definition of the character of these landscapes can be recognized (Fernández et al., 2013).

Identification of uses and industrial activities that define the heritage character of these landscapes

It is impossible to conceive the industrial landscape without considering the action of human beings on the environment, through the exploitation of natural resources, raw materials and energy resources. This has given rise to landscapes that were shaped by the industrial activities carried out, their historical contexts and the social needs they addressed. These industrial activities make it possible to outline in broad strokes, suitable for each scale, the main processes that have shaped the character of a territory.

The imprint that industrial activity and the processes linked to it have exerted on the territory throughout history has contributed decisively to the construction of new cultural landscapes. The action of industry on the territory has left a material imprint, but also an immaterial dimension that defines the identity symbols of a society, its ways of life and work that over time have been engraved in the landscape and in the collective memory (Alba, 2010). These industrial landscapes acquire a heritage dimension as bearers of values related to the culture of work, the definition of the identity of generations of workers, the history of a people, and the scientific and technological culture of a very recent period in the history of humanity. Hence, the importance of considering the analysis of the industrial activities carried out in the territory over time.

This analysis must be carried out according to the spatial scale in which the study is approached, since depending on the scale the activities may be multiple or limited, heterogeneous or homogeneous. A synthesis exercise must be carried out to delimit the activities that characterize these landscapes, taking into account those that have had the greatest impact on the configuration and functional articulation of the territories.

Analysis of the perceptual and discursive dimension of the industrial landscape

In the identification and characterization of these landscapes, it is considered relevant to assess the different ways in which they have been perceived over time. Such perceptions have undergone significant changes. Thus, if at first the buildings, infrastructures, facilities, etc. that emerged during the industrial revolution were considered a symbol of progress and future, today they acquire, outside the context in which they emerged, a new meaning as symbols of the past (Alba, 2016).

In this sense, their study must take into account both the perceptions and interpretations built around these landscapes throughout history with the aim of building a heritage image that avoids stereotypes and over-simplifications. The way in which a landscape is understood and signified is linked to a perceptual dimension, based on experiences in the environment, and to a discursive dimension, which represents a social construct (Fernández et al. 2013).

Thus, it is essential to analyze both the images projected of these landscapes over time in literature, painting, photography, music, etc., and the interpretations made by those who live and inhabit these landscapes. To this end, it is necessary to implement techniques that manage all this diversity of perceptions through processes of identification of the elements that give it a unique character, but also through participatory social processes that help to make visible its most idealized or symbolic elements (Rodrigo et al., 2012).

Methodological proposal

The proposed methodology involves the performance of a series of descriptive and analytical actions for the identification and characterization of the industrial heritage landscape, aimed at advancing in the contribution of methodological enhancements and innovations. Its objective is to obtain extensive knowledge about the landscape under study, to identify it throughout its territory, to establish a census or inventory of the different clearly defined and delimited landscape units that make it up, based on the elements that characterize it (natural, cultural, heritage, perceptive, symbolic, etc.), in order to build its identity and configure its distinctive character.

The specific methodological proposal is explained below. Its design has contemplated the methodological keys set out in the previous section, as well as the specific features of these landscapes that were previously discussed in greater detail when addressing the dimensions that characterize them. Figure 2 shows in a simplified way the structure of this methodological proposal.

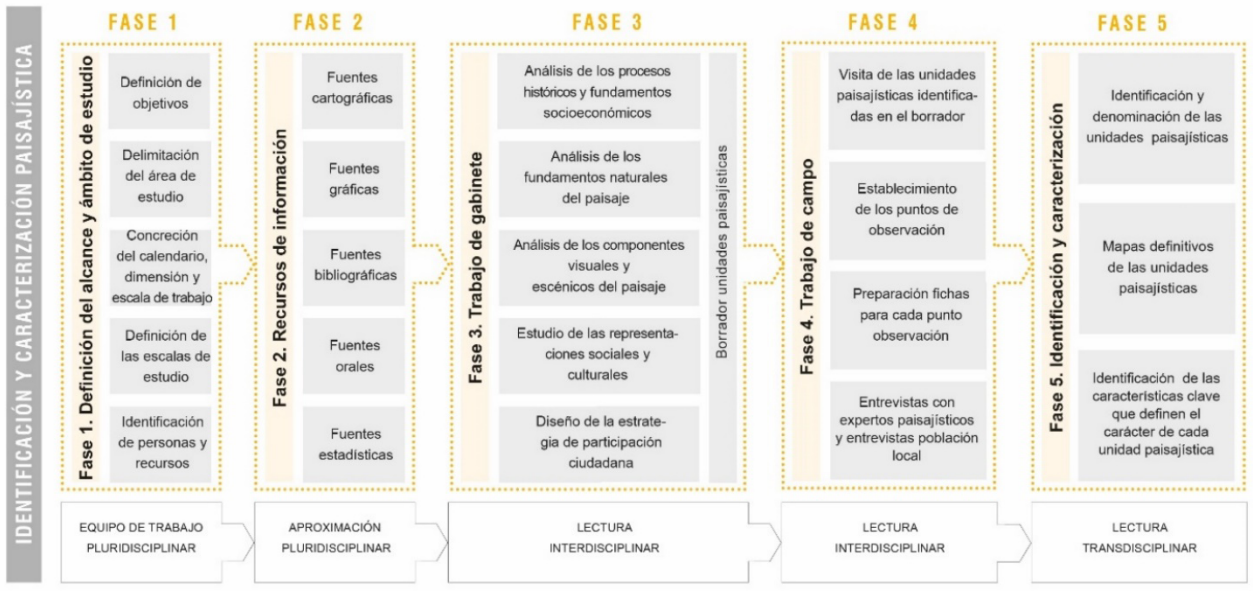

Figure 2. Structure of the designed methodological proposal.
Source: Prepared by the authors.

The identification of the landscape is the first step in the characterization process. It involves the performance of a series of descriptive actions aimed at identifying a landscape, such as the delimitation of the different landscape units that make it up, based on those elements that build its identity and distinctive character, producing a particular, differentiated and differentiable physiognomy.

The identification and characterization work does not seek to define a hierarchy of landscape units according to their quality, but rather to obtain a general overview of the landscape, not only with a description of its character, but also its individualization, focusing on that which allows the landscape studied to be placed in a context, to show its extension and to confront it with others through the detection of its differentiating features (Mata, 2002).

Each landscape unit defines a homogeneous territory that is clearly delimited and differentiated from neighboring territories, and which has its own dynamics. It is the set of qualities inherent to a landscape that over time has defined and configured it, as well as the meanings and values that society has assigned to it, which defines its character and differentiates it from the rest.

In the development of this methodology, it has been considered relevant to adopt the landscape identification and characterization process proposed by the British agencies *Countryside Agency* and *Scottish Natural Heritage*. In this sense, and in line with the approaches included in the LCA methodology, a landscape study procedure is established that contemplates the identification not only of those aspects that are distinctive and that individualize some landscape units from others, but also those of a more general nature that are shared by different units with separate distributions (Lipsky & Romportl, 2007).

Thus, it is proposed, on the one hand, to identify and map out those landscape areas that have an unequivocal landscape and territorial identity and are internally homogeneous and, on the other hand, at a more abstract level, to define the different landscape types, each of which results from the grouping at a certain scale of areas with common features distributed throughout the territory. This work of segregating into areas and grouping into landscape types is flexible, and repeated iterations may be performed to achieve more detailed classifications, which enables studying the landscape at various related scales.

This constitutes a key parameter in the study of industrial heritage landscapes, since they may involve a diversity of scales, and an in-depth study may require their hierarchical systematization for their analysis at different scales. Each of them will direct the study of the landscape in a certain direction. Thus, the use of small scales for large territorial areas will provide an overview of the landscape's diversity and serve as a framework for more detailed identification studies. However, as the scale of study expands, the data to be taken into account in the landscape study vary, so that from

a strictly perceptual description we give way to integrated concepts of a cognitive nature in which social participation is necessary. Hence the need to facilitate the involvement and participation of citizens and other social agents related to landscape policy in this process of landscape identification and characterization.

Given the difficulty of these landscapes and the number of different variables involved in their characterization, the development of a methodology based on the definition of a simple procedure is proposed, which maximizes the use of the available information, and which is structured in the phases detailed below:

Phase 1.1. Definition of the scope and coverage of the study

The objective of this phase is to frame the different study areas according to the parameters used for their delimitation. Thus, prior to the identification and characterization of the landscape, it is advisable to carry out a series of tasks that allow the definition of the scope of the landscape study, such as the definition of the objectives pursued, the delimitation of the study area, the establishment of a work plan and schedule, the definition of the different scales of study, and the identification of the professionals and social agents who will participate, as well as the resources necessary for their adequate execution.

It is recommended that the work team be made up of professionals from different disciplines such as architects, urban planners, archaeologists, geographers, historians, sociologists, anthropologists, etc. It is also advisable to draw up a map of social agents that includes a list of potential participants (local population, associations, town councils, etc.) in the identification and characterization process.

Phase 1.1.1. Definition of objectives

This first section consists in defining the objectives, both general and specific, in a precise, clear, concise and realistic manner, that the landscape study seeks to achieve during the planned execution period.

Phase 1.1.2. Delimitation of the area of the study

The objective of this section is the delimitation and basic description (written and cartographic) of the study area(s). This first identification of the landscape to be studied should cover the entire territory.

Phase 1.1.3. Define the procedure, size and scale of the study

Firstly, a work timetable will be set out in a schedule that includes the activities to be carried out and their expected execution periods. Subsequently, guidelines on the extent of both the report and the planimetry to be carried out will be defined, depending on the features of the landscape to be studied, and the different scales of the landscape study will be established depending on whether it refers to a local, regional or subregional area.

Likewise, this section will briefly discuss the basic methodological principles on which the landscape study is based, and will identify the professionals who will participate in the work, as well as the resources required for its adequate execution, and a map of social agents will be drawn up that includes a list of potential participants.

Phase 1.2. Information resources

When undertaking the study of these landscapes, it is convenient to be aware of the starting point offered by the available information. To this end, it is necessary to previously gather information based on the meticulous search, compilation and restructuring of the existing information from various sources (bibliographic, graphic, cartographic, oral, statistical, etc.) and from a diversity of perspectives. This search must be carried out systematically in libraries, archives, institutions, etc. that may contain information related to the landscape under study. Generally, much of this material is available and accessible electronically. Likewise, new spatial analysis tools based on geographic information systems, remote sensing systems, etc., tend to enrich the available information base.

The formation of a multidisciplinary team aims to collect the information available to each member from the perspective of their respective disciplines. This will allow the creation of a sum of multidisciplinary approaches to the physical, material, spatial, temporal, perceptive, social, cultural, economic, etc. keys of the landscape under study that, through dialogue and consensus, will help reveal the different dimensions of the landscape under study, producing an expert and interdisciplinary reading.

Phase 1.3. Desktop work

The objective of this phase is to perform an analysis and synthesis, in an integrated way, of the structures and variables that make up the foundations of the landscape under study, on which each team member obtained information from their respective discipline in the previous phase. This analysis will take into account the diversity of dimensions that define it, highlighting its specific features. Thus, this study will refer both to those elements, processes or structures that define the homogeneity, boundaries and properties of the different areas (historical processes and socio-economic foundations, natural foundations of the landscape, etc.) and to those that contribute to their individuality with respect to the rest of the territory, in reference to their visual and scenic structure or that show the links that society maintains with these landscapes (cultural, social, perceptive, traditional, etc.) (Figure 3).

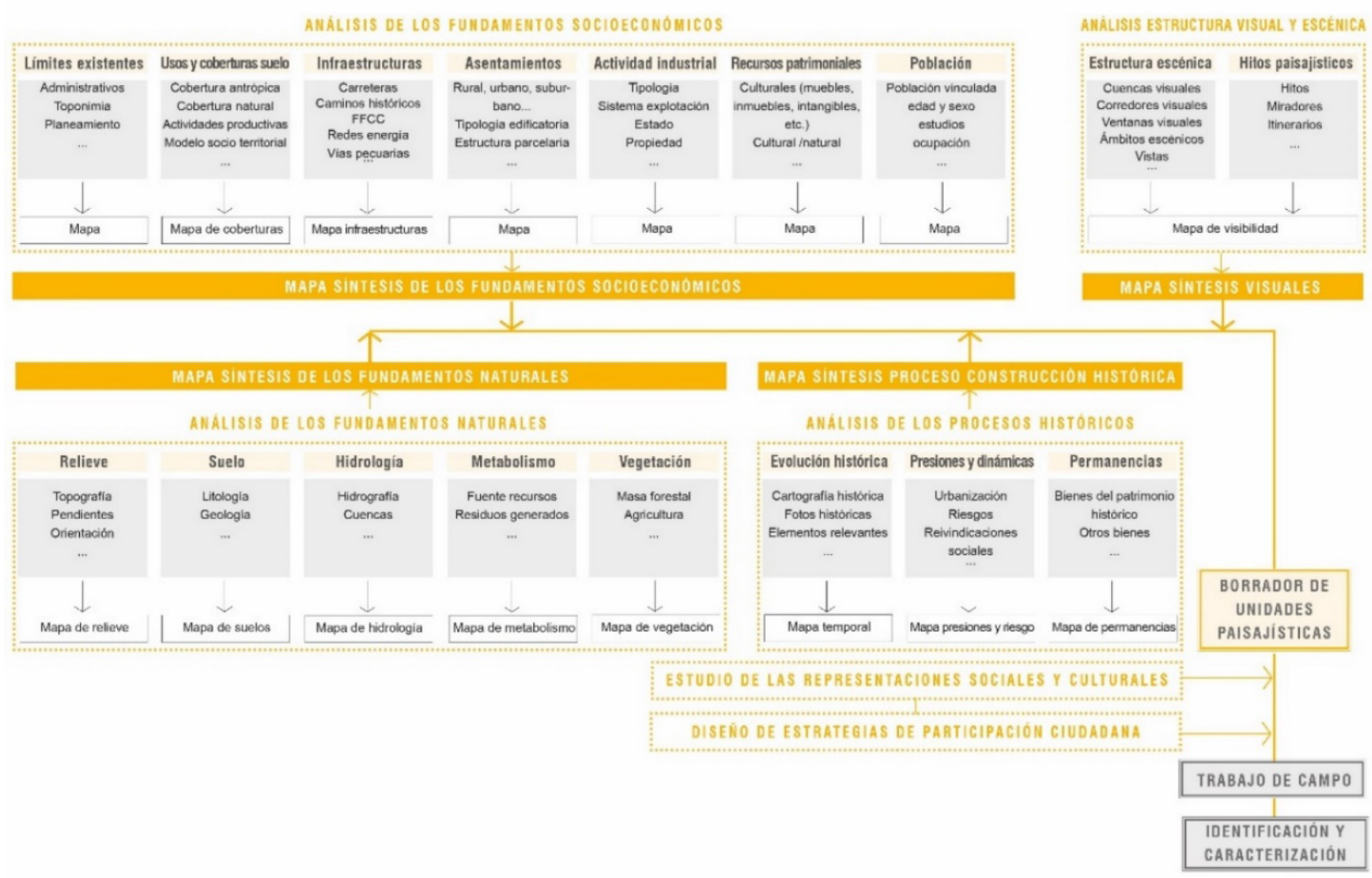

Figure 3. Conceptual scheme of Phase 1.3 Desktop Work.
Source: Prepared by the authors.

Special attention will be paid to the dynamics and interrelations between the different components that define each landscape, identifying in each case the most noticeable discontinuities that allow the definition of different landscape units. This analysis must be carried out based on an integrated procedure that brings together the diversity of considerations associated with these landscapes and available studies. To this end, the disciplinary approaches contributed by each researcher must be oriented towards the landscape under study, understood as a reality in which a diversity of spatial, territorial, perceptive, temporal, cultural, social, etc. aspects converge. Consequently, the teamwork must move from a multi-disciplinary to inter-disciplinary effort, and from partial disciplinary analyses to a consensual and comprehensive understanding of the landscape.

This study must also consider the different scales of the landscape and be referred to the territory as a whole, so that it contemplates not only those parts or elements considered significant or exceptional, but also those parts that are more everyday and degraded.

Likewise, it must contemplate the evolutionary processes of these landscapes by verifying both past and present temporal dynamics and those that are foreseeable, derived from human or natural factors or from the existence or absence of pressures exerted on the territory of study, bringing together the historical view and the prospective outlook (dynamics and threats).

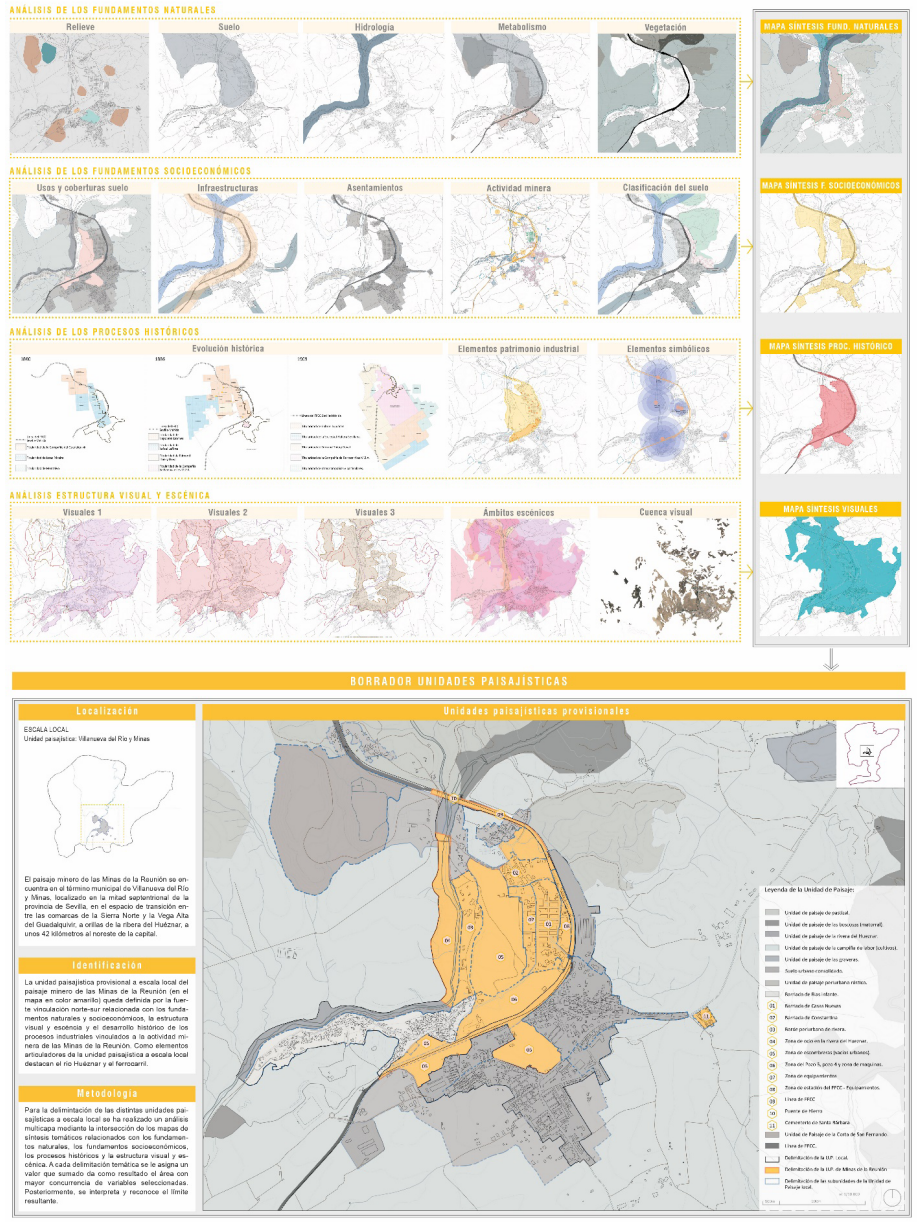

Figure 4. Application of Phase 1.3 Desktop Work for the study of the mining landscape of Minas de la Reunión at a local scale.

Source: Prepared by the authors.

In this phase it is also essential to include the participation of the population and social actors who establish a daily relationship with this landscape, in order to identify the different landscape units through the study of social representations and cultural patterns.

From this study, a first draft of landscape areas and types at different scales will be prepared, which will include the partial results of the analyses carried out. The landscape units will be delimited, mapped and characterized with a brief text that describes their main features. The description will be accompanied by an explanatory sheet that should be stored in a database where all its components appear in summarized form. Likewise, it will be essential to identify and assign names or codes to the different areas identified and to define their articulation, hierarchical relationships, delimitation and boundaries.

The treatment of these first results by means of geographic information systems will yield a preliminary proposal for the delimitation of landscape units. This first delimitation must be contrasted and verified through fieldwork and subjected to a process of successive rectification until its definitive definition is reached.

This process of delimitation is not an easy task, since the landscape is configured as a continuous whole. Although this delimitation may be straightforward in landscapes where the physical and biological dimensions predominate, it becomes more complex in landscapes that have been highly transformed by man, as is the case of the landscapes arising from industrial decline, where we find social and cultural parameters, especially those linked to perception (Boira, 1992; Bofarull, 1982). Hence the importance of paying special attention to the elements that constitute transition areas or boundaries between adjacent landscape areas. Additionally, it will also be necessary to take into account that this delimitation must be carried out in a manner that is consistent with the instruments of territorial and urban planning.

Once the different landscape units have been delimited, they will be named and codified at different scales in order to facilitate their identification and georeferencing.

Phase 1.4. Field work

During this phase, the team will carry out an on-site survey of the landscape in order to get to know it in depth, since there are elements and dynamics that cannot be perceived in any other way. The appreciation of features of an aesthetic and perceptual nature, their assessment and the detection of recent dynamics and trends not recorded so far will allow us to check, complement, contrast and update the data obtained in the previous phase, validating or correcting as necessary the definition and delimitation of the identified landscape units, thus contributing to

orient the different views and attentions towards certain aspects and themes, and specific and significant places of these landscapes. The convergence of the different researchers' direct and shared views on very specific and representative aspects of the landscape will allow making progress in the delimitation, identification and characterization of the different landscape units that make up the overall landscape.

To this end, it is advisable to carry out a first campaign once the general scope of study has been defined, in order to make a first contact to directly observe the landscape elements, the relationships that have made its structure possible, and to start building a photographic catalogue. A second campaign will be carried out once the different landscape units have been identified and delimited. This will consist of visiting each and every one of the landscape units in order to confirm or correct their delimitation and evaluate them directly (Figure 5). Finally, a third campaign will be carried out to collect information through citizen participation. This will be carried out through interviews with landscape experts and surveys of the local population.

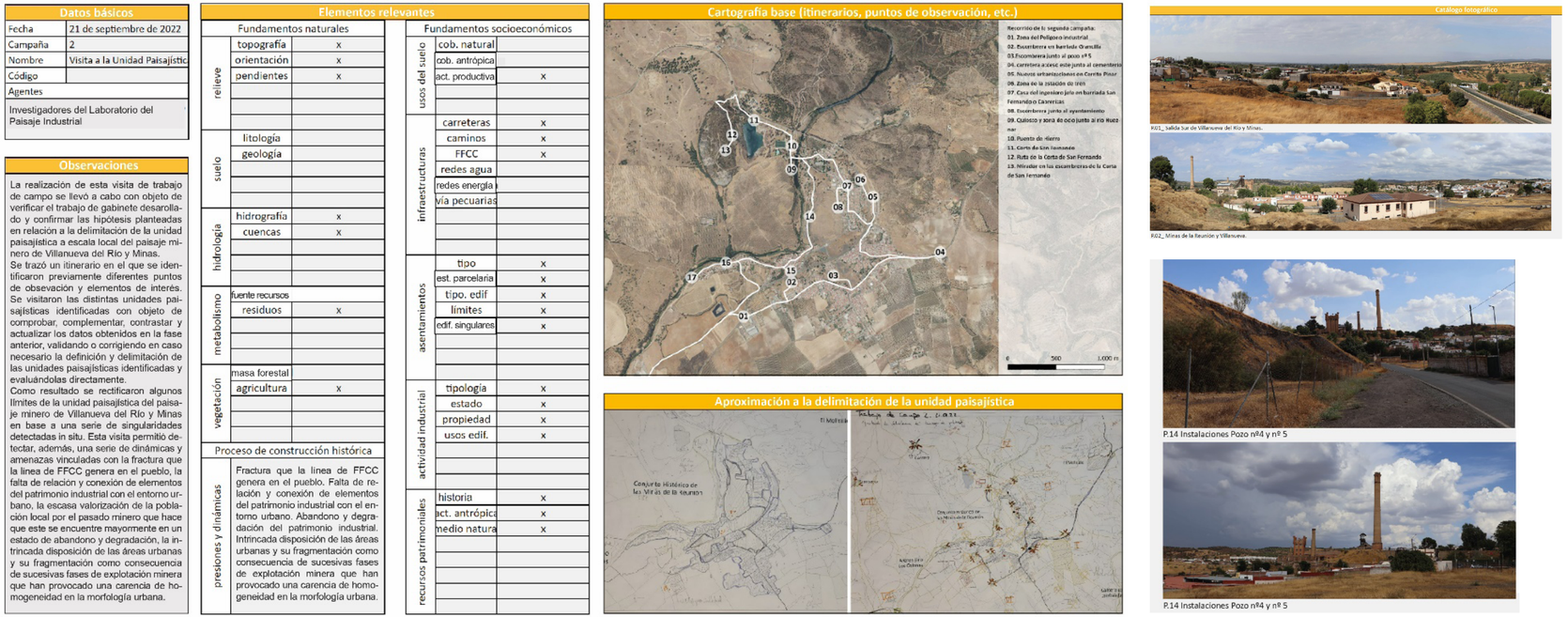

Figure 5. Application of Phase 1.4 Field Work of the study of the mining landscape of Minas de la Reunión at a local scale.
Source: Prepared by the authors.

Phase 1.5. Identification and characterization

The objective of this phase is to perform the final identification and characterization of the different areas and landscape types outlined above. To this end, based on the information and reflections collected so far, synthesis documents will be prepared that contemplate the following aspects:

- Identification and general description of the key characteristics that define its landscape character.
- Analysis of the pressures, factors and evolutionary processes that currently affect its characterization, as well as the dynamics responsible over time for its current structure and physiognomy.
- Preparation of a definitive map that contemplates the spatial delimitation and final characterization of the different areas and landscape types and integrates the diversity of elements that compose them.
- Name of the different landscape units. They must be brief, clear, descriptive, understandable and representative of the identity of each territory.
- Preparation of a broad and complete characterization sheet for each of the areas and types identified that incorporates the results of this phase (Figure 6).

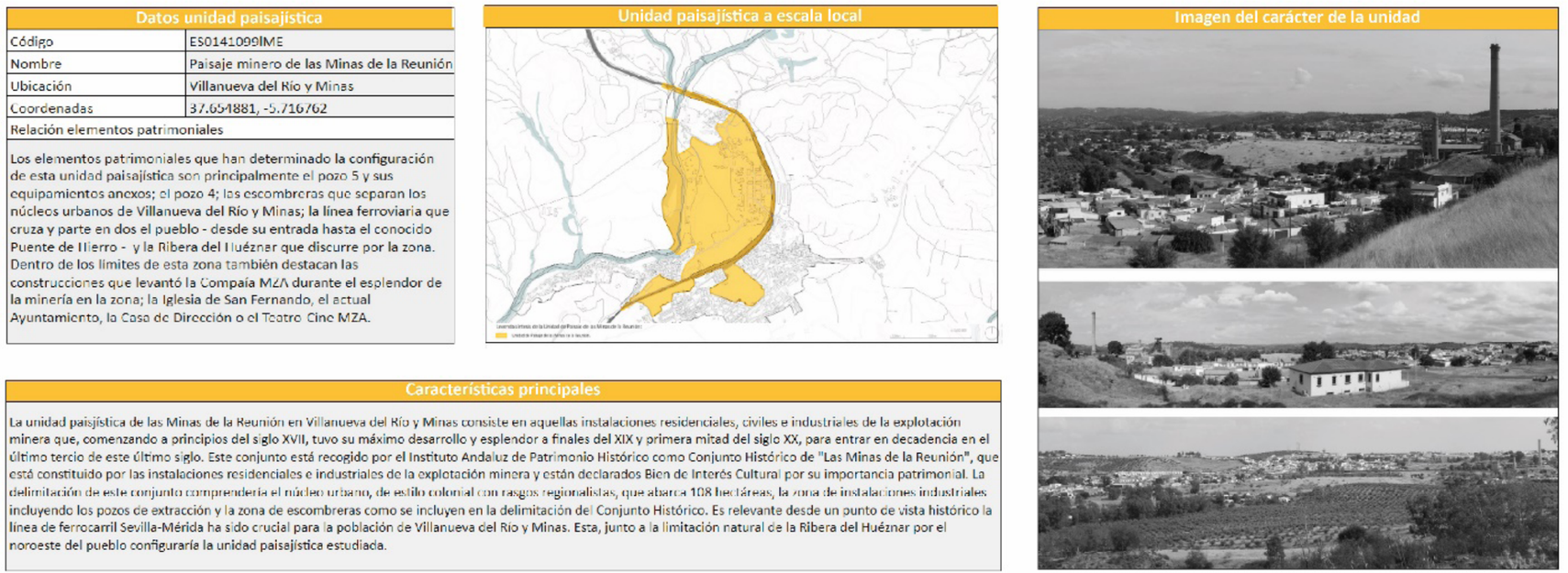

Figure 6. Application of Phase 1.5 Identification and characterization of the study of the mining landscape of Minas de la Reunión at a local scale.
Source: Prepared by the authors.

This documentation must reflect a transdisciplinary approach that contemplates new specific approaches, both creative and disciplinary, that are determined by the new keys offered by an interdisciplinary reading, but also by the need to overcome disciplinary limits through cooperation, collaboration and communication between experts from different disciplines that make it possible to study these landscapes from a diversity of perspectives (territorial, social, environmental, economic, urbanistic, geographical, archaeological, historical-functional, perceptual-visual, etc.), so as to ensure new comprehensive and interpretative readings that address the study in all its complexity. It is also advisable that this information be updated regularly, especially when the landscapes are affected by rapid transformations.

The incorporation of citizen participation in the work of landscape identification and characterization is relevant to the extent that it allows the incorporation of the local population's symbolic and perceptive perspective, which enables highlighting non-material aspects of the landscape that are important for understanding its complexity and the relevance of certain spaces. Likewise, the use of a database that includes the use of GIS systems will facilitate the development of this work, allowing to link the information generated in the study to a specific landscape, serving as support for the application of the methodology in each of its phases, but also favoring the effective coordination of the different disciplines and agents involved in its study.

Discussion and conclusions

The methodological proposal that was developed is intended to address the challenges faced in the study of industrial heritage landscapes, which contributes in part to solve the current scarcity and/or embryonic state of research on industrial heritage from a landscape perspective, as well as the obsolescence of the instruments and methodologies used in such studies. The extraordinary complexity of industrial heritage landscapes represents a new paradigm that incorporates new assets and new actors, which therefore requires the development of new and renewed concepts, methods and instruments. This is a priority for their protection and for the implementation of the CEP.

Thus, this methodological proposal contributes enhancements and innovations that address, among other matters, the complexity that characterizes these landscapes through a global and comprehensive study that specifically takes into consideration the multiple dimensions that define them (physical, material, temporal, cultural, social, heritage, etc.). Likewise, it addresses the diversity of spatial scales in which these landscapes participate, taking as a reference the entire territory in which they are formalized; it addresses their dynamic nature of continuous change and transformation, contemplating in its study the convergence of times that occur in these landscapes and the

coexistence of historical and contemporary dimensions, and it addresses their highly anthropized character, incorporating social agents in their study.

Likewise, this methodology proposes the development of a holistic, broader and more integrated approach, which aims to bring together multidisciplinary perspectives that offer a more complex reading through an inter- and transdisciplinary exercise that contemplates the dissolution and transgression of the boundaries between disciplines to define common frameworks that allow the compilation and synthesis of knowledge (Ostrom, 2009). Thus, the identification and characterization of these landscapes has been structured through different phases that move from a multi-disciplinarity to inter-disciplinarity approach, to end up being transdisciplinary. The complexity of these landscapes and the convergence of historical, heritage, social, economic, perceptive, symbolic, identity, memory, etc. components within them requires that their detailed analysis, as well as their subsequent and necessary understanding, be carried out through a multidisciplinary work team in which each expert analyzes the landscape under study from their own discipline. Progressively, this multidisciplinary work team must move towards an interdisciplinary approach in which all experts seek to converge in a unitary reading of the landscape and, finally, develop a transdisciplinary reading in which they transgress the limits of their various disciplines. To this end, it is important to define strategies for cooperation, collaboration and communication between experts from different disciplines aiming for the convergence of disciplinary perspectives in order to approach the study of these landscapes from a diversity of perspectives that guarantees their analysis in all its complexity.

This transdisciplinary approach of the proposed methodology constitutes an opportunity for the production of innovative knowledge in the study of these landscapes. As Liu et al. (2007) point out, the integrated study of the landscape helps reveal patterns and new and complex processes that are not evident when they are studied separately. Although each discipline independently makes valuable contributions to the understanding of the landscape, they face limitations, since they fail to capture its complex and complete reality. Only a broader vision based on the exchange of knowledge between disciplines allows a deeper and more comprehensive reading capable of addressing its complexity. In this sense, the use of digital tools such as GIS favors the effective coordination between the different disciplines, supporting the development of inter- and transdisciplinary readings, but also the coherent representation and analysis of the diversity of data and information that these landscapes contain.

Even though this article defines a methodological procedure for the identification and characterization of industrial heritage landscapes, this methodological proposal must be further

supplemented in future research, in order to develop a specific method for these landscapes that not only focuses on gathering adequate information, but also on their enhancement and, especially, their integrated management in a manner that supports their protection based on their heritage and cultural considerations.

With regard to the valuation of these landscapes, there is still much to be done, not only in terms of identifying their heritage values, but also in their dissemination and promotion. With regard to their protection, many of these landscapes, once they have lost their functionality, are subject to serious processes of deterioration and degradation, which makes them a particularly fragile heritage that is at risk of disappearing. This has awakened the need not only to study and value these landscapes, but also to protect them in order to recover them as a valuable resource for society and/or to reintegrate them into their current context. However, interest in these landscapes is relatively recent. The development of landscape-specific policies and the definition of policy, legal and planning frameworks relating to landscape in general is still very limited. Hence, those dedicated to the industrial landscape are even much less frequent.

In this sense, further institutional, normative and technical reflection on these landscapes is currently necessary, not only in terms of their theoretical conceptualization, but also their methodological treatment from a systemic perspective of cultural heritage. This should lead to making progress in the scale of consideration of this heritage, until recently ignored or little treated, which points to more complex analysis methodologies that address the specificity and identity of these landscapes with respect to other types of cultural landscapes, and that from a systemic approach interprets industrial heritage and contributes to its critical analysis from a landscape perspective.

References

Aguilar, I. (1990). El orden industrial de la ciudad. Valencia en la segunda mitad del siglo XIX. Valencia, España: Diputación de Valencia.

Alba, M. I. (2010). Nuevas miradas sobre nuevos paisajes. Un acercamiento al paisaje industrial en su consideración como paisaje cultural. En C. Cornejo, J. Morán y J. Prada (Eds.), Ciudad, territorio y paisaje. Reflexiones para un debate multidisciplinar (pp. 333-342). Madrid, España: CSIC.

Alba, M. I. (2016). Paisajes industriales: utopías del pasado, recuerdos del futuro. Revista 180, 38, 1-8. DOI:10.32995/rev180.Num-38.(2016).art-314

Alba, M. I. (2017). Principios metodológicos en el estudio del paisaje industrial desde su consideración como paisaje cultural. En: M. A. Álvarez (Ed.), Pensar y actuar sobre el patrimonio industrial en el territorio (pp. 185-189). Gijón, Spain: CICEES.

Alba, M. I. (2018). Nuevos enfoques en la intervención de aquellos paisajes del patrimonio industrial. En II Congreso Internacional de Patrimonio Industrial y de la Obra Pública. Patrimonio industrial: pasado, presente y futuro (pp. 300-306). Sevilla, España: Junta de Andalucía, FUPIA.

Alba, M. I. (2021). Hacia un concepto ampliado de paisaje. La construcción del paisaje contemporáneo. Arte y Ciudad. Revista de Investigación, 20, 7-32. DOI: 10.22530/ayc.2021.20.592

Alba, M. I., Iranzo, E. y Hermosilla, J. (2018). El paisaje industrial de Blaenavon: un estudio de caso. En M. A. Álvarez (Ed.), Resiliencia, Innovación y Sostenibilidad en el patrimonio industrial (pp. 105-112). Gijón, España: CICEES.

Alba, M. I., y Romero, E. (2022a). El paisaje industrial. Aproximación al diseño de unas bases metodológicas para su estudio, puesta en valor e intervención. Architecture, City and Environment, 16 (48), 10501. DOI:10.5821/ace.16.48.10501

Alba, M. I., y Romero, E. (2022b). Advances in the design of a methodology for the identification, characterization, and assessment of and intervention in the industrial landscape. City, Territory and Architecture, 9, 1-21. DOI:10.1186/s40410-022-00180-3

Altena, B. y Linden, M. (2002). De-Industrialization: Social, Cultural and Political Aspects. Cambridge, Reino Unido: University Press.

Álvarez, M. A. (2008). Patrimonio industrial. Un futuro para el pasado desde la visión europea. Apuntes. Revista de Estudios sobre Patrimonio Cultural, 21 (1), 6-25. Recuperado de http://www.scielo.org.co/pdf/apun/v21n1/v21n1a02.pdf

Andrei, R. (2010). Industrial building conversion the poaching of an already poached reality. Bulletin of the Polytechnic Institute of Jassy, 52, 157-164.

Antrop, M. (2000). Background concepts for integrated landscape analysis. Agriculture Ecosystems and Environment, 77, 17-28.

Benito, P., Calderón, B., y Ruiz, H. P. (2016). La gestión territorial del patrimonio industrial en Castilla y León (España): fábricas y paisajes. Investigaciones Geográficas, Boletín del Instituto de Geografía, UNAM, 90, 136-154. DOI: 10.14350/rig.52802

Brady, E. (2008). La estética de los entornos modificados. En F. Pérez (Ed.), Estética del entorno, obra pública y paisaje (pp. 4-22). Madrid, España: Centro de Estudios de la Obra Pública y Urbanismo.

Brebbia, A., Almorza, D. y Klapperich, H. (2002). Brownfield Sites: Assessment, Rehabilitation & Development. Southampton, Reino Unido: WIT Press.

Bofarull, J. (1982). Esbozo metodológico para el estudio de la influencia antrópica en los estudios de paisaje integrado. Notas de Geografía Física, 7, 9-12.

Boira, J. V. (1992). El estudio del espacio subjetivo (Geografía de la Percepción y del Comportamiento): Una contribución al estado de la cuestión. Estudios geográficos, LIII(209), 573-592.

Choay, F. (1992). L'allégorie du patrimoine. Paris, Francia: Seuil.

Consejo de Europa (1987). Recommendation No. R (87) 24 on European industrial towns. Recuperado de https://rm.coe.int/09000016804d434a

Consejo de Europa (1990). Recommendation No. R (90) 20 on the protection and conservation of the industrial, technical and civil engineering heritage in Europe. Recuperado de https://rm.coe.int/09000016804e1d18

Consejo de Europa (2013). Resolution 1924: Industrial Heritage in Europe. Recuperado de http://www.e-faith.org/documents/2015/COE20130215_EN.pdf

Consejo de Europa (2000). European Landscape Convention. https://rm.coe.int/1680080621

Fernández, S., Fernández, V., Hernández, E., López, E., Quintero, V. y Rodrigo, J. M. (2013). El paisaje y la dimensión patrimonial del territorio. Valores culturales de los paisajes andaluces. En S. Sánchez (Ed.), Actas del VI Congreso Internacional de musealización de yacimientos y patrimonio: Arqueología, patrimonio y paisajes históricos para el siglo XXI (pp. 59-72). Toledo, España: Consorcio de la Ciudad de Toledo, D. L.

Fernández, V. M. (2013). Los paisajes de interés cultural de Asturias. Ería, 91, 129–149.

Gómez J. y Riesco P. (coords) (2010). Marco conceptual y metodológico para los paisajes españoles: aplicación a tres escalas espaciales. Sevilla, España: Centro de Estudios Paisaje y Territorio.

Gómez, D. (1989). Aspectos metodológicos. En: Seminario sobre el Paisaje (pp. 28-29). Málaga, España: Junta de Andalucía.

Gómez, J. y Riesco, P. (2010). Marco conceptual y metodológico para los paisajes españoles: aplicación a tres escalas espaciales. Sevilla, España: Consejería de Obras Públicas y Vivienda, Centro de Estudios Paisaje y Territorio.

Hunt, J. D. (1994). Gardens and the picturesque: studies in the history of landscape architecture. Massachussets, Estados Unidos: MIT Press.

ICOMOS (1964). International Charter for the Conservation and Restoration of Monuments and Sites. Recuperado de https://www.icomos.org/en/participer/179-articles-en-francais/ressources/charters-and-standards/157-thevenice-charter

IKT y Paisaia (2005). Catálogo abierto de paisajes singulares y sobresalientes de la CAPV. Vitoria, España: Departamento de Medio Ambiente y Ordenación del Territorio del Gobierno Vasco.

Kessler, M. (2000). El paisaje y su sombra. Barcelona, España: Idea Books,

Latz, P. (1999). Los extraordinarios paisajes posteriores a era de la industria. En Actas del II Seminario DOCOMOMO Ibérico. Arquitectura e industria modernas 1900-1965 (pp. 199-210). Barcelona, España: Fundación DOCOMOMO Ibérico.

Leal del Ojo, Y. (2021). El paisaje en la interpretación del patrimonio industrial. Los puertos. ZARCH, 16, 78-89. DOI:10.26754/ojs_zarch/zarch.2021165690

Lipsky, D. y Romportl, Z. (2007). Classification and typology of cultural landscapes: methods and applications. En K. Ostaszewska, I. Szumacher, S. Kulczyk y S. Malinowska (Eds.), The Role of Landscape Studies for Sustainable Development (pp. 519-535). Polonia: University of Warsaw.

Liu, J., Dietz, T., Carpenter, S. R., Alberti, M., Folke, C., Moran, E., Pell, A. N., Deadman, P., Kratz, T., Lubchenco, J., Ostrom, E., Ouyang, Z., Provencher, W., Redman, C. L., Schneider, S. H., Taylor, W. W. (2007). Complexity of coupled human and natural systems. Science, 317, 1513–1516. DOI: 10.1126/science.1144004

Loren, M., Mata, R., Ruiz, R., y Pinzón, D. (2016). An interdisciplinary methodology for the characterization and visualization of the heritage of roadway corridors. Geographical Review, 106 (4), 489–515. DOI:10.1111/j.1931-0846.2016.12203.x

Loures, L., Heuer, T., Horta, D., Santos, R., y Silva, S. (2008). Multifunctional clusters in Post-industrial Landscapes: rising from what's left. WSEAS Transactions on environment and development 8 (4), 619-628.

Mata, R. (2002). Paisajes españoles. Cuestiones sobre su conocimiento, caracterización e identificación. En F. Zoido y C. Venegas (Coord.), Paisaje y ordenación del territorio (pp. 33-46). Sevilla, España: Consejería de Obras Públicas y Transportes, Junta de Andalucía.

Mclean, R. (2020). Transformative Ground. A field guide to the post-industrial landscape. Londres, Reino Unido: Routledge.

Naveh, Z. (2007). Transdisciplinary challenges in landscape ecology and restoration ecology. An anthology. Dordrecht, Países Bajos: Springer.

Ojeda, J. F. (2013). Lectura transdisciplinar de paisajes cotidianos, hacia una valoración patrimonial. Método de aproximación. Revista INVI, 28 (78), 27–75. https://revistainvi.uchile.cl/index.php/INVI/article/view/62563

Ostrom, E. (2009). A general framework for analyzing sustainability of social–ecological systems. Science, 325, 419–422.

Pérez L., y Parra C. (2004). Paisajes culturales. El parque patrimonial como instrumento de revalorización y revitalización del territorio. Theoría, 13 (1), 9-24.

Rodrigo, J. M., Díaz, J. M., Fernández, S., Fernández, V., Hernández, E., Quintero, V., González, B., y López, E. (2012). Registro de paisajes de interés cultural de Andalucía. Criterios y metodología. Revista PH, 81, 64-75. DOI:10.33349/2012.81.3280

Romero, E. (2017). Memória Ferroviária e Cultura do Trabalho: Perspectivas, Métodos e Preguntas Interdisciplinares sobre o Registro, Preservação e Ativação de Bens Ferroviários. São Paulo, Brasil: Alameda.

Sabaté J. (2001). Proyectando el eje del Llobregat. Paisajes culturales y desarrollo regional. Barcelona, España: Universidad Politécnica de Cataluña and Massachusetts Institute of Technology.

Sabaté J. (2006). Paisajes culturales en Cataluña: el eje patrimonial del río Llobregat. En: R. Mata y A. Tarroja (Coords.), El paisaje y la gestión del territorio. Criterios paisajísticos en la ordenación del territorio y el urbanismo (pp. 531-548). Barcelona, España: Diputación de Barcelona.

Scazzosi, L. (2004). Reading and assessing the landscape as cultural and historical heritage. Landscape Research, 29 (4), 335-355. DOI:10.1080/0142639042000288993

Sobrino, J. (1996). Arquitectura Industrial en España 1830-1990. Madrid, España: Cátedra.

Sobrino, J., y Sanz, M. (2019). Pensando el patrimonio industrial. Los retos del siglo XXI. Periférica Internacional. Revista para el análisis de la cultura y el territorio, 20, 88-99. DOI: 10.25267/Periferica.2019.i20.11

Swanwick C. (2002). Landscape character assessment: Guidance for England and Scotland. Reino Unido: Countryside Agency.

Tévar, G. (1996). La cuenca visual en el análisis del paisaje. Serie Geográfica, 6, 99-113.

TICCIH (2003). Carta de Nizhny Tagil sobre el Patrimonio Industrial. Recuperado de https://ticcih.org/wp-content/uploads/2013/04/NTagilSpanish.pdf

Trachana, A. (2017). La recuperación de los paisajes industriales como paisajes culturales. Ciudades, 14, 189-212. DOI: 10.24197/ciudades.14.2011.189-212

Watkins, C. y Cowell, B. (2012). Uvedale Price. Woodbridge, Estados Unidos: Boydell & Brewer-USA.

Wu, J. (2006). Landscape ecology, cross-disciplinarity, and sustainability science. Landscape Ecology, 21, 1–4.

Zoido, F. (2012). Paisaje urbano. Aportaciones para la definición de un marco teórico conceptual y metodológico. En J. Juaristi y S. Tomé (Eds.), Ciudades y paisajes urbanos en el siglo XXI *(*pp. 13-92). Santander, España: Ediciones Estudio.

BioData

María Isabel Alba Dorado. Doctor in Architecture from Universidad de Sevilla (Spain). Official Master's in Architecture and Historical Heritage, and Master's in Appraisal, Repair and Intervention of Buildings, both from Universidad de Sevilla. Architect from Universidad de Sevilla. She currently serves as researcher and professor as tenured professor in the Area of Architectural Projects at the Higher Technical School of Architecture at Universidad de Málaga (Spain). Principal researcher of the research group of the *Industrial Landscape Laboratory* and member of the research group *Contemporary City, Architecture and Heritage. Em*ail: maribelalba@uma.es. ORCID: https://orcid.org/0000-0001-5343-8901.

Milena Meira da Silva. Doctor in Geography from Universidade de Campinas (Unicamp/Brazil). Master's in Architecture and Urbanism and degree in Tourism, both from Universidade Estadual Paulista (Unesp/Brazil). Researcher of the research groups *Geography, Tourism and Cultural Heritage* (Unicamp) and *Railway Memory* (Unesp). During her master's and doctorate programs she has participated in several research internships at the Higher Technical School of Architecture at Universidad de Málaga (Spain). Her research focuses on the study of industrial landscapes. Email: milenameiras@gmail.com. ORCID: https://orcid.org/0000-0001-9864-3239.