

SEVILLA



**IDA: ADVANCED
DOCTORAL RESEARCH
IN ARCHITECTURE**

Antonio Tejedor Cabrera, Marta Molina Huelva (comp.)

IDA: Advanced Doctoral Research in Architecture
Sevilla: Universidad de Sevilla, 2017.

1.408 pp. 21 x 29,7 cm

ISBN: 978-84-16784-99-8

All right reserved. No part of this book may be reproduced stored in a retrieval system, or transmitted, in any form or any means without prior written permission from the Publisher.

EDITOR

Universidad de Sevilla

COMPILERS

Antonio Tejedor Cabrera

Marta Molina Huelva

DESIGN AND LAYOUT BY

Pablo Blázquez Jesús

María Carrascal Pérez

Daniel Longa García

Marina López Sánchez

Francisco Javier Navarro de Pablos

Gabriel Velasco Blanco

ADMINISTRATION AND SERVICES STAFF

Adoración Gavira Iglesias

Seville, november 2017

© 2017. IDA: ADVANCED DOCTORAL RESEARCH IN ARCHITECTURE

SEVILLA

IDE

ORGANIZED BY

iuacc
INSTITUTO UNIVERSITARIO
ARQUITECTURA Y CIENCIAS DE LA CONSTRUCCIÓN

 **uidus**
Escuela Internacional de Doctorado

arquitectura
Escuela Técnica Superior
Universidad de Sevilla

COLLABORATORS



Consejo Andaluz
de Colegios Oficiales
de Arquitectos



fundación **arquia**

All manuscripts have been submitted to blind peer review, all content in this publication has been strictly selected, the international scientific committee that participates in the selection of the works is of international character and of recognized prestige, an scrupulous method of content filtering has been followed in terms of its veracity, scientific definition and plot quality.

COMMITTEES

CONFERENCE CHAIRPERSONS

Antonio Tejedor Cabrera, *Coordinator of the PhD Program in Architecture and Director of the University Institute of Architecture and Construction Sciences, Professor Department of Architectural Design, University of Seville*

Marta Molina Huelva, *Secretary of the University Institute of Architecture and Construction Sciences, Professor of the Department of Building Structures and Geotechnical Engineering, University of Seville*

ORGANISING COMMITTEE

María Carrascal Pérez, *Department of History, Theory and Architectural Composition, University of Seville*

Mercedes Linares Gómez del Pulgar, *Department of Architectural Graphic Expression, University of Seville*

Ángel Martínez García-Posada, *Department of Architectural Design, University of Seville*

Pilar Mercader Moyano, *Department of Architectural Constructions I, University of Seville*

Domingo Sánchez Fuentes, *Department of Urban Planning and Spatial Planning, University of Seville*

Manuel Vázquez Boza, *Department of Building Structures and Land Engineering, University of Seville*

CONFERENCE SECRETARY

Pablo Blázquez Jesús, *Ph.D. student, Department of Architectural Design, University of Seville*

Marina López Sánchez, *Ph.D. student, Department of Architectural Design, University of Seville*

SCIENTIFIC COMMITTEE

José Aguiar-Universidade de Lisboa
Benno Albrecht-Università IUAV di Venezia
Francisco Javier Alejandro Sánchez-Universidad de Sevilla
Darío Álvarez Álvarez-Universidad de Valladolid
Antonio Ampliato Briones-Universidad de Sevilla
Joaquín Antuña-Universidad Politécnica de Madrid
Ángela Barrios Padura-Universidad de Sevilla
José María Cabeza Laínez-Universidad de Sevilla
Pilar Chías Navarro-Universidad de Alcalá
Juan Calatrava Escobar-Universidad de Granada
María Carrascal Pérez-Universidad de Sevilla
Helena Coch Roura-Universitat Politècnica de Catalunya
Jorge Cruz Pinto-Universidad de Lisboa
Carmen Díez Medina-Universidad de Zaragoza
Fernando Espuelas Cid-Universidad Europea
Alberto Ferlenga-Università IUAV di Venezia
Luz Fernández-Valderrama-Universidad de Sevilla
Vicente Flores Alés-Universidad de Sevilla
María del Carmen Galán Marín-Universidad de Sevilla
Jorge Filipe Ganhão da Cruz Pinto-Universidade de Lisboa
Carlos García Vázquez-Universidad de Sevilla
Sara Girón Borrero-Universidad de Sevilla
Francisco Gómez Díaz-Universidad de Sevilla
Amparo Graciani-Universidad de Sevilla
Francisco Granero Martín-Universidad de Sevilla
Francisco Hernández Olivares-Universidad P. de Madrid
Miguel Ángel de la Iglesia-Universidad de Valladolid
Paulo J.S. Cruz-Universidade do Minho
Francesc Sepulcre-Universitat Politècnica de Catalunya
Ángel Luis León Rodríguez-Universidad de Sevilla
Mercedes Linares Gómez del Pulgar-Universidad de Sevilla
María del Mar Loren Méndez-Universidad de Sevilla

Margarita de Luxán García de Diego-Universidad P. de Madrid
Madelyn Marrero-Universidad de Sevilla
Juan Jesús Martín del Río-Universidad de Sevilla
Luis Martínez-Santamaría-Universidad Politécnica de Madrid
Ángel Martínez García-Posada-Universidad de Sevilla
Mauro Marzo-Università IUAV di Venezia
Pilar Mercader Moyano-Universidad de Sevilla
Antonello Monaco-Università degli Studi di Reggio Calabria
Marta Molina Huelva-Universidad de Sevilla
José Morales Sánchez-Universidad de Sevilla
Eduardo Mosquera Adell-Universidad de Sevilla
María Teresa Muñoz Jiménez-Universidad Politécnica de Madrid
Jaime Navarro Casas-Universidad de Sevilla
José Joaquín Parra Bañón-Universidad de Sevilla
Víctor Pérez Escolano-Universidad de Sevilla
Francisco Pinto Puerto-Universidad de Sevilla
Mercedes Ponce Ortiz de Insagurbe-Universidad de Sevilla
Juan Luis de las Rivas Sanz-Universidad de Valladolid
Carmen Rodríguez Liñán-Universidad de Sevilla
Javier Ruiz Sánchez-Universidad Politécnica de Madrid
Joaquín Sabaté Bel-Universitat Politècnica de Catalunya
Victoriano Sáinz Gutiérrez-Universidad de Sevilla
Santiago Sánchez Beitia-Universidad del País Vasco
Domingo Sánchez Fuentes-Universidad de Sevilla
José Sánchez Sánchez-Universidad de Sevilla
Juan José Sendra Salas-Universidad de Sevilla
Julián Sobrino Simal-Universidad de Sevilla
Federico Soriano Peláez-Universidad Politécnica de Madrid
Rafael Suárez Medina-Universidad de Sevilla
Miguel Ángel Tabales Rodríguez-Universidad de Sevilla
Antonio Tejedor Cabrera-Universidad de Sevilla
Jorge Torres Cueco-Universidad Politécnica de Valencia
Elisa Valero Ramos-Universidad de Granada
Manuel Vázquez Boza-Universidad de Sevilla
Narciso Vázquez Carretero-Universidad de Sevilla
Teófilo Zamarreño García-Universidad de Sevilla

LT 3

PATRIMONIO Y
REHABILITACIÓN

HERITAGE AND REHABILITATION / PATRIMONIO Y REHABILITACIÓN

- p. 565-574: **NEW KNOWLEDGE ABOUT THE CHURCH OF SANTA MARÍA IN CARMONA** / p. 575-585: **NOVEDADES EN TORNO A LA IGLESIA DE SANTA MARÍA DE CARMONA**
Ojeda Barrera, Alfonso
- p. 587-596: **GEOMETRY AND CONSTRUCTION THROUGH THE SACRED SPACE OF ANDRÉS DE VANDELVIRA** / p. 597-607: **GEOMETRÍA Y CONSTRUCCIÓN A TRAVÉS DEL ESPACIO SACRO DE ANDRÉS DE VANDELVIRA**
Estepa Rubio, Antonio
- p. 609-619: **AN APPROACH TO THE IDEAL CONCEPT OF URBAN PLANNING IN THE 18TH CENTURY: COLONIAL SETTLEMENTS IN ANDALUSIA** / p. 620-630: **APROXIMACIÓN AL URBANISMO IDEAL EN EL S. XVIII: LAS NUEVAS POBLACIONES DE COLONIZACIÓN EN ANDALUCÍA**
Quevedo Rojas, Carlos
- p. 631-642: **POWER PLANT REUTILIZATION STRATEGIES ENEL POWER PLANTS AND PORT OF GENOA CASE-STUDY** / p. 643-655: **ESTRATEGIAS DE REÚSO DE LAS CENTRALES ELÉCTRICAS. LAS CENTRALES ENEL Y EL CASO ESTUDIO DEL PUERTO DE GÉNOVA**
Olivieri, Davide
- p. 657-664: **TECHNICAL-TECHNOLOGICAL AND MATERIALS COMPARATIVE ANALYSIS BETWEEN ITALIAN AND SPANISH MEDIEVAL SHIPYARD (THE CASE OF VENICE AND SEVILLE)** / p. 665-673: **ANÁLISIS COMPARATIVO TÉCNICO-TECNOLÓGICO Y DE MATERIALES ENTRE LOS ASTILLEROS MEDIEVALES ITALIANOS Y ESPAÑOLES (LOS CASOS DE VENECIA Y SEVILLA)**
Debenedictis, Domenico; Robador González, María Dolores; Pagliuca, Antonello
- p. 675-684: **STRATEGIES FOR CONSERVATION OF RELIGIOUS HERITAGE IN THE METROPOLITAN AREA OF LYON/SAINT-ÉTIENNE (FRANCE). SHORT RESEARCH STAY AND METHODOLOGICAL TRANSFER** / p. 685-695: **ESTRATEGIAS PARA LA CONSERVACIÓN DEL PATRIMONIO ECLESIAÍSTICO EN LA METRÓPOLIS LYON/SAINT-ÉTIENNE (FRANCIA). LA ESTANCIA BREVE INVESTIGADORA COMO VÍA DE TRANSFERENCIA METODOLÓGICA**
Mascort-Albea, Emilio J.; Meynier-Philip, Mélanie
- p. 697-709: **HYDRAULIC HERITAGE AND THE CONSTRUCTION OF THE TERRITORY: THE IRRIGATION COMMUNITIES** / p. 710-722: **EL PATRIMONIO HIDRÁULICO EN LA CONSTRUCCIÓN DEL TERRITORIO: LAS HEREDADES**
Delgado Quintana, Guacimara
- p. 723-731: **SUSTAINABILITY AND CONSERVATIVE REHABILITATION OF EXTREMADURAN PATRIMONIAL RURAL ARCHITECTURE AGAINST CLIMATE CHANGE. VEGAVIANA, CASE STUDY** / p. 732-741: **SOSTENIBILIDAD Y REHABILITACIÓN CONSERVADORA DE LA ARQUITECTURA RURAL PATRIMONIAL EXTREMEÑA CONTRA EL CAMBIO CLIMÁTICO. VEGAVIANA, CASO DE ESTUDIO**
Bote Alonso, Inmaculada
- p. 743-754: **TOWARDS A METHODOLOGY FOR THE ASSESSMENT OF VISUAL IMPACT CAUSED BY RENEWABLE ENERGY FACILITIES ON THE LANDSCAPE IN CULTURAL HERITAGE SITES** / p. 755-766: **HACIA UNA METODOLOGÍA DE VALORACIÓN DEL IMPACTO VISUAL CAUSADO POR INSTALACIONES DE ENERGÍA RENOVABLE EN EL PAISAJE EN EL ENTORNO DE LUGARES PATRIMONIO CULTURAL**
Diego Rodríguez, Jesús Carlos; Chías Navarro, Pilar
- p. 767-772: **THE URBAN RENOVATION IN PUEBLA, MEXICO. THE HISTORICAL CENTER AS EXPERIMENTAL SPACE. THIRTY YEARS OF CITY TRANSFORMATION** / p. 773-779: **LA RENOVACIÓN URBANA EN PUEBLA, MÉXICO. EL CENTRO HISTÓRICO COMO ESPACIO EXPERIMENTAL. TREINTA AÑOS DE TRANSFORMACIÓN DE LA CIUDAD**
Cortés Moreno, Jorge David
- p. 781-790: **THE ORNATE IN THE ARCHITECTURE OF TENERIFE AND GRAN CANARIA: 1865-1935** / p. 791-800: **EL ORNATO EN LA ARQUITECTURA DE TENERIFE Y GRAN CANARIA: 1865-1935**
Sabina González, José Antonio
- p. 801-807: **THE CONSERVATION OF THE CONSTRUCTIONS LOCATED ON PROTECTED NATURAL AREAS: RESEARCH EXPERIENCE IN DOÑANA** / p. 808-815: **LA CONSERVACIÓN DE LO CONSTRUIDO EN LOS ESPACIOS NATURALES PROTEGIDOS: EXPERIENCIA DE INVESTIGACIÓN EN DOÑANA**
Rincón Calderón, José María; Galán Marín, Carmen; Sanchez Fuentes, Domingo
- p. 817-827: **TRANSHUMANCE HERITAGE IN THE STRUCTURING OF THE LANDSCAPE, CITIES AND ARCHITECTURE** / p. 828-838: **EL PATRIMONIO DE LA TRASHUMANCIA EN LA VERTEBRACIÓN DEL TERRITORIO, LA CIUDAD Y LA ARQUITECTURA**
Gutiérrez Pérez, Nicolás
- p. 839-848: **INTERVENTION IN THE HERITAGE OF RURAL COLONIZATION ARCHITECTURE. THE VILLAGES OF LOS MONEGROS** / p. 849-859: **INTERVENCIÓN EN EL PATRIMONIO DE LA ARQUITECTURA RURAL DE COLONIZACIÓN. LOS POBLADOS DE LA COMARCA DE LOS MONEGROS**
Prieto Mochales, Luis
- p. 861-870: **MODERN ARCHITECTURE IN MANZANILLO, COLIMA, MEXICO 1930-1970 (TRANSFER AND ADAPTATION)** / p. 871-880: **ARQUITECTURA MODERNA EN MANZANILLO, COLIMA, MÉXICO 1930-1970 (TRANSFERENCIA Y ADAPTACIÓN)**
Yáñez Ventura, Marco Antonio; López García, J. Jesús
- p. 881-893: **FIRST INTERNATIONAL ARCHITECTURAL JOURNEY OF JUAN MADRAZO** / p. 894-906: **PRIMER VIAJE INTERNACIONAL ARQUITECTÓNICO DE JUAN MADRAZO**
Fernández Martínez, Margarita María
- p. 907-918: **HOUSES, COURTYARD TENEMENT HOUSING, INNS AND SHOPS IN 16TH SEVILLE. ARCHITECTURE, DRAWING AND GLOSSARY OF MASTER BUILDERS** / p. 919-930: **CASAS, CORRALES, MESONES Y TIENDAS EN LA SEVILLA DEL SIGLO XVI. ARQUITECTURA, DIBUJO Y LÉXICO DE ALARIFES**
Núñez González, María
- p. 931-939: **TOWARDS THE CONSTRUCTION OF ATLAS OF SURVIVING ARCHITECTURES** / p. 940-949: **HACIA LA CONSTRUCCIÓN DEL ATLAS DE ARQUITECTURAS SUPERVIVIENTES**
Tejera Mujica, Noemi
- p. 951-960: **TRANSFORMATIONS OF THE ALCÁZAR OF SEVILLE THROUGH ITS IMAGES (1902-1969)** / p. 961-971: **TRANSFORMACIONES DEL REAL ALCÁZAR DE SEVILLA A TRAVES DE SUS IMÁGENES (1902-1969)**
Bañasco Sánchez, Pablo
- p. 973-980: **THE ARCHITECTURE OF POWER. THE ISLAND INSTITUTIONS AND AUTONOMOUS BODIES. ANALYSIS OF THE CASES: GRAN CAÑARIA, TENERIFE AND MADEIRA** / p. 981-987: **LA ARQUITECTURA DEL PODER. LAS INSTITUCIONES INSULARES Y ORGANISMOS AUTÓNOMOS. ANÁLISIS DE LOS CASOS: GRAN CANARIA, TENERIFE Y MADEIRA**
Hernández Cruz, Ricardo Kevin
- p. 989-998: **PROPOSAL FOR AN INDICATORS SYSTEM OF URBAN INTEGRATION OF THE MARITIME PORTS HERITAGE** / p. 999-1009: **PROPUESTA PARA UN SISTEMA DE INDICADORES DE INTEGRACIÓN URBANA DEL PATRIMONIO PORTUARIO MARÍTIMO**
De las Peñas García, Jesús
- p. 1011-1020: **EMPIRICAL METHOD APPLIED IN RESEARCH ON RESIDENTIAL ENERGY RETROFITTING** / p. 1021-1031: **MÉTODO EXPERIMENTAL EN LA INVESTIGACIÓN SOBRE REHABILITACIÓN ENERGÉTICA RESIDENCIAL**
Escandón, Rocío; Blázquez, Teresa; Martínez-Hervás, Mónica; Suárez, Rafael; Sendra, Juan José
- p. 1033-1042: **AESTHETICS OF RUINS AND ETHICS OF ARCHITECTURAL DESIGN: NEW INTERVENTIONS ON ARCHAEOLOGICAL HERITAGE** / p. 1043-1053: **ESTÉTICA DE LAS RUINAS Y ÉTICA DEL PROYECTO ARQUITECTÓNICO: NUEVAS INTERVENCIONES EN EL PATRIMONIO ARQUEOLÓGICO**
Bagnato, Vincenzo Paolo

THE CONSERVATION OF THE CONSTRUCTIONS LOCATED ON PROTECTED NATURAL AREAS: RESEARCH EXPERIENCE IN DOÑANA

Rincón Calderón, José M^a (1); Galán Marín, Carmen⁽²⁾; Sanchez Fuentes, Domingo⁽³⁾

(1) Doctorando, Universidad de Sevilla, joserinconcalderon@gmail.com

(2) Profesor Titular, Universidad de Sevilla, cgalan@us.es

(3) Profesor Contratado Doctor, Universidad de Sevilla, dsanchez@us.es

Abstract: The existing constructions in the protected natural environments, as a remnant of the action and the passage of humans, have tended to be observed as an obstacle for the ecosystem's protection. However, some of the buildings in these spaces have heritage values and raise conservation and coexistence issues with the natural environment and therefore urgent solutions are required. The research proposes the study of the built heritage of the Espacio Natural Doñana, understanding it as an example of the relationship between humans and a unique natural space and a type of construction, of a lifestyle and of a connection with nature nowadays lost.

The small scale vernacular architecture in Doñana is proposed, as well as the impact it has undergone due to changes in history, usage, management, development and territorial planning. The territorial rooting of these constructions is analysed and how they have adapted their formal and constructive features to the natural extreme environment in which they are located. Several representative case studies are selected with the aim of establishing strategies that allow the guidance of the conservation interventions in such a sensible built and natural heritage.

Keywords: Doñana, Natural parks, vernacular architecture, efficiency, conservation.

1. Introduction

The scientific research in the protected natural areas has a long and heavily documented tradition. The development of the sciences linked to nature since the 18th and 19th century (zoology, biology and botany, in particular), definitely drove the interest in those spaces, which are assumed at this time and in certain scientific literature (Serveto 2014) as romantic strongholds of an idyllic life and natural order, closer to Earth and Man, opposite to the urban development derived from the Industrial Revolution, associated to the artificial and mechanical. The 19th and the 20th centuries definitely consolidate these natural spaces as common heritage to be preserved and as privileged scientific laboratories, with the appearance of the protective figures and regulatory structures and the encouragement of an ecological awareness, supported by the regimes of freedoms and democracy, which basically make their way in Europe and North America (Bolín 1960).

Nevertheless, due to various reasons, the research in these natural areas, usually formalised and regularised through different universities and scientific institutions, has been traditionally adhered to the field of natural science, reducing its inherited vision to the natural heritage and leaving aside from the scientific interest other values and fields of knowledge. This limited vision and almost objectual from nature has tended to understand man's intervention on these natural spaces as a negative motor in most occasions (Castrillo 2000), as a necessarily disturbing driving force in extreme sensible spaces because of the values they preserve. The human presence is seen, from this perspective, as a force capable of breaking the fragile natural balance maintained in these spaces with great effort and sometimes in precarious conditions.

The Doñana case is in this sense, paradigmatic. The scientific interest in these lands - which starts in the 19th century (Chapman et al. 1989) - and the protective environmental figures in its area, consolidated in 1963, with the creation of the Reserva Biológica de Doñana and six years later, with the creation of the Doñana National Park (Decree 2412/1969), currently covering 54.254 ha, and with the Law 91/1978 of the Doñana National Park. On the other hand, the declaration of the Parque Natural de Doñana is made in 1989 (Law 2/1989), a figure that currently protects 3.835 ha. from this territory. The protected area of the National Park has been recently enlarged (Decree 142/2016), so that the common administrative management of both protected areas, which is produced from the Espacio Natural Doñana (Law 8/1999), protects at present a total of 128.385,82 ha.

An ample scientific production with international reference has been gathered around Doñana (Ferrer 2016). The research developed from this geographical scope has been often pioneering in sustainability and in natural spaces conservation policies (Janss et al. 2014). The declaration as World Heritage by Unesco in 1994 tacitly recognizes this matter (Unesco 2016). Despite this fruitful research activity, it has not been until these last years that a certain interest, localised and still a minority, has appeared for the heritage values of Doñana, not explicitly associated to natural sciences: the social, anthropological, cultural and human factor, always recognized in this territory of Doñana, usually linked to popular manifestations and not to academic and research interests, starts to be understood as a value that is indissolubly linked to Doñana and as a contribution to a complex and necessary look to understand the past, the present and the future of these lands (Serveto 2014). The man and Doñana have maintained and still maintain a complex relationship: it has been enriching and supplementary throughout most historic periods, although at present there are more disagreements. The collective imagination does not associate the protected natural spaces to buildings; and it is however significant the amount of buildings that have existed and still exist nowadays in some of them. This is also the case of Doñana. Most of them are reflections (Granados y Ojeda 1994) of the historical and complex use of these lands: hunting, fishing, stockbreeding and forest uses. It is also remarkable the presence of a popular and domestic vernacular architecture as the closest to architecture's founding fact: to shelter from the environment (Agudo 1999). The construction here is the evidence of differentiating features and the construction of a local culture; it is also witness and trace of a unique relationship between man and nature.



Fig. 1 House Puntal de los González, House La Venta, House del Cerro del Trigo.

The group of buildings situated in Doñana, with various construction dates and states of conservation, are witnesses and physical traces of the relationship between their inhabitants and this particular physical environment. Besides the beacon towers, archeological rests such as the ones of the Cerro del Trigo or the palace constructions- whose oldest pre-existences derive from the 16th century-, the existing constructions among the small-scale residential construction, on which the research is focused, covers a period since the middle of the 19th century to the beginning of the 1970s. In the case of the huts, their own constructive system is based on the timelessness and the partial renovation of its vegetable elements every certain period of time, so it is difficult to date them in their present configuration. They have been constructed, renovated and modified on the remains of previous ones. Its study can offer information of this relationship and from the historical overview of the human being in this territory, how it has adapted its way of life to a present and unique nature and how the ecosystems have influenced in the physical configuration of the human environment. The constructive systems, the uses and the way of life associated with these constructions contribute to forge the singularity of this land from the moment in which they are the essential support for man in its habitation, exploitation, domestication and research in such a powerful natural environment.

Some of the constructions in Doñana are in a state of abandonment and disuse that raises serious conservation problems to their managers. Others have disappeared recently, barely remaining as debris on the ground, which means, in certain cases, the loss of heritage. The velocity of the natural changes that take place in Doñana and the dynamism inherent to the special features of this natural space, affect the constructions and the conservation of their constructive systems and they demand urgent answers to some situations, offering also real opportunity to rehearse construction conservation practices in protected natural areas.



Fig. 2 Hut en La Plancha, Pinar del Faro

On the other hand, the fact of looking back to the common history between man and nature through the constructions, provides useful arguments to the debates, questions and challenges confronted by society at a global level, in general regarding sustainability and in particular, regarding architecture and sustainable construction. At this time of environmental, social and economical crisis, in which it is necessary to redefine the relationship between society and the natural environment that supports it, the analysis of historical moments and particular cases in which this relationship has been rich and conciliatory- although not without tensions- can help to solve current specific questions. Man and nature, in places like Doñana, have configured at a certain time and situations a kind of circular economy, spontaneous and symbiotic, not programmed, opposite to the current linear processes and the tensions their generate (Riechmann 2006).

2. Objectives

Based on the positions laid out so far, the ongoing doctoral research –an independent research with an expected completion date in spring 2021- proposes the study of the buildings in Doñana, seeing them as some of the most remarkable witnesses of the passage of man through this territory, assuming their existence and the need for the managers of these spaces to integrate them in the currently applied environmental and sustainability policies.

The geographic scope of the proposed study is limited to the Natural Space, an environment where different buildings, constructive typologies and landscape units representative of the Doñana area can be found. All special building types found in Doñana, inasmuch as they are inexorably linked to its territory and its history, are present within the administrative boundaries of the protected area, that is, the Espacio Natural Doñana, where, in addition, the contextual conditions of these buildings (administrative, climatic, of use) can be largely found.

The rich presence of buildings within this territory also establishes the need to simplify and limit the scope of this study. Although there will be references to other buildings (fundamental in their capacity to support the settlements throughout Doñana's different historical periods) the research focuses on residential architecture (temporary and permanent), which, as will be shown, has partially kept its use or has adapted it to the new current life circumstances of the Park.

The main objective of this research is to consider all vernacular buildings in the Espacio Natural Doñana as a patrimonial fact that is indissoluble from the rest of its values, being a constitutive principle of its identity and exemplary as it is a witness of efficient life forms and ways of living together between man and the natural environment.

Based on this starting point, the research is aimed at the following objectives:

- To study the currently present constructions in the selected scope of study in Doñana: their conservation, occupation, formal and constructive status as well as their adaptation to the environment.



Fig. 3 Choza del Pastor, Marisma de Hinojos

- To analyse the structure of the territorial, temporal and functional implementation of the constructions in Doñana. The aim is to verify how the construction has evolved in this environment throughout history, when and in relation to which facts did each one of the common constructive types in Doñana appear, and in which status has it reached our time. As the construction is understood as a witness that allows us to approach the customs and traditions of the inhabitants of this area in each historical period, it will be of great interest to study how these buildings have been of use to and accompanied those who have lived in this territory, how and with which strategies have they carried out their basic functions of shelter and protection of human beings and how they have supported their productive activities.
- To study the impact of the regulatory framework and of the policies on the management of the existing heritage on the conservation of the constructions in Doñana. The aim is to analyse the regulatory, policy and management framework in force affecting the conservation of all constructions within the scope of this study, developing it in its different territorial, administrative and management scales.
- Based on the observations in the study, to provide arguments to the debate on the conservation of the constructions present in such special natural environments.



Fig. 4 Casa de la Cañada Mayor

3. Results

The main expected results are presented in this chapter as well as some of the already obtained ones. The information available on the constructions in Doñana is scarce, out-of-date and dispersed, and therefore it is strictly necessary to start compiling, updating and completing the available information on these constructions. In this sense, an exhaustive census of the existing buildings in the scope of the study of Doñana is being carried out, which, starting with the update of the existing bibliography and completed by the field work, will allow us to assess the number of buildings and to arrange them depending on their formal and constructive features, as well as those regarding their territorial implementation.

Analysing in depth the typology selected as central in this research, a catalogue of huts and small scale vernacular residential architecture will be carried out. These constructive types are the ones with more special features with regard to their adaptation to the territory, while at the same time they are more representative of certain ways of inhabiting and of the implementation of constructive techniques that continue being carried out and updated, and therefore their study can illustrate in a specific manner the different relationships of man with this precise nature. On the other hand, the formal conception of these types presents similar features to other vernacular buildings that have already been studied (regarding the constructive conception and the adaptation to the climate of the region, as well as the use of vegetal material as the main component of the building envelope), both in the Spanish and European geography (Neila, 2015), something that will allow the establishment of interesting relationships and comparisons.

On the other hand, the analysis of the legal framework and of the management policies affecting the constructions in Doñana provides, as a first result, the confirmation that there are degrees of freedom allowed by the norm and the approach in the conservation actions on the buildings in Doñana that are not being developed, omitting the due protection on buildings that have a level of urban protection or acting against the purpose established for each building in the planning and management documents of the Natural Space.

In this sense, the aim is to connect the situation obtained in the analysis carried out on Doñana with the legal framework of other similar parks, comparing heritage conservation guidelines in different

geographic and political scopes. Those natural spaces with the following features that will allow a connection with the situation of Doñana will be chosen:

- Located in Europe, ruled by common directives and rules in matters regarding the conservation of nature and heritage.
- Protected under the scope of the national parks, according to the regulations in the different European countries and the harmonisation guidelines for protection of the International Union for the Conservation of Nature (Perry Hilton, 1992).
- Recognised as World Heritage by Unesco (Unesco, 2017).

Under these conditions, the selected parks to be compared are Garajonay and Teide National Parks (Spain), Prin National Park (Bulgaria), Plitvice Lakes National Park (Croatia), The Wadden Sea (Germany, Netherlands, Denmark) and Durmitor National Park (Montenegro).

An initial number of representative cases of the buildings of the scope of work will be selected both in the Doñana Park, as well as in the selected comparison scopes. The selection of cases, in the scope of Doñana, will be carried out including the different ecosystems of the park, the various climatic situations found inside it, the diverse constructive types and historic periods of the settlement in the natural space, and always in accordance with the current managers of the Espacio Natural Doñana.

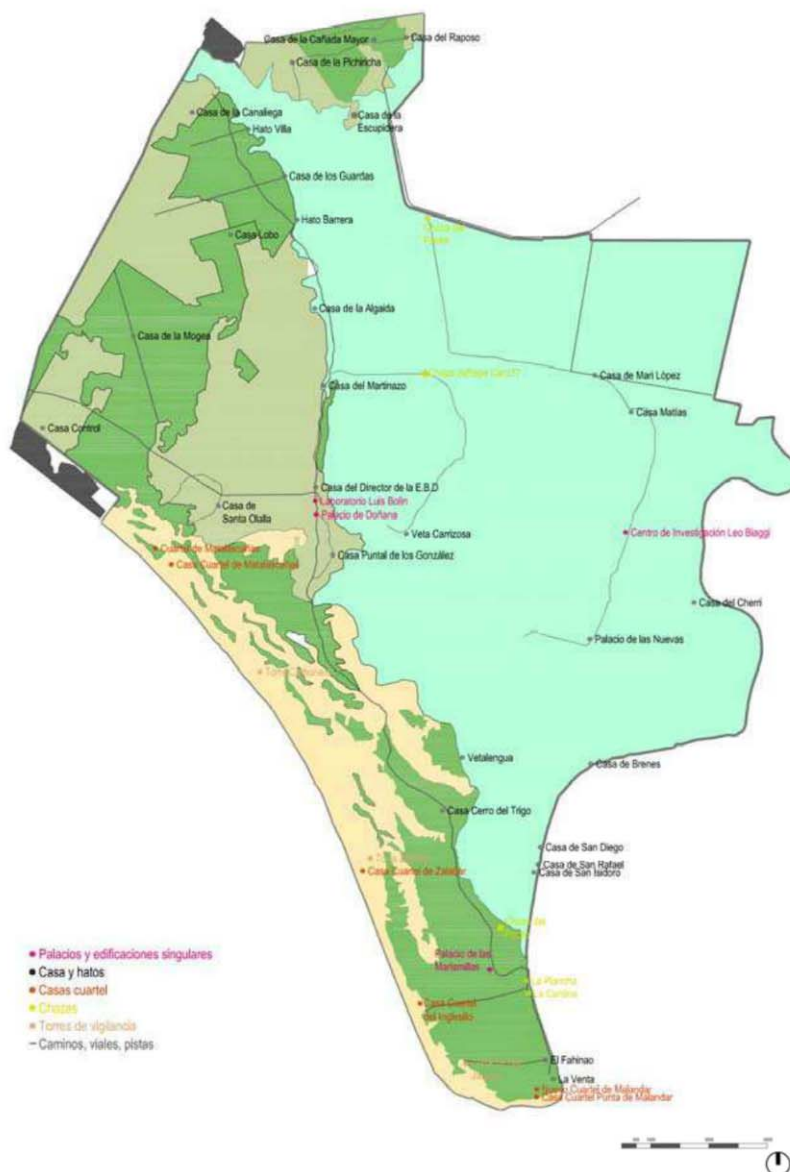


Fig. 5 Map of Doñana's buildings, types and situation

In this sense, a field work is being carried out for a first approach and direct observation of the constructions under study in Doñana and in other European natural spaces. Data on the buildings is being compiled, regarding their conservation status, current uses, legal status, formal configuration,

occupation regimes, etc. Likewise, qualified interviews are being carried out with current inhabitants of those constructions, with the aim of getting to know their experiences as users of these buildings, in some cases accumulated throughout decades, as well as their observations and life lessons. The amount of knowledge accumulated by some of these people (especially the rangers of the Natural Space) is of special interest, as it may provide specific data on buildings that no longer exist or those that are no longer in use and on the lifestyles related to them. This knowledge, orally transmitted, needs to be methodically collected and documented, in order to avoid the risk of losing unique and irretrievable testimonies. Interviews will also be carried out with the current managers of the Natural Space, addressing the problem of the conservation of all buildings within these protected areas, the management instruments and tools they use and the operating practice currently applied to the use, occupation, management and conservation of these buildings.



Fig. 6 Doñana's huts and houses interiors

The visit to the constructions includes an intensive data collection of the buildings, carrying out precise photographic and planimetric surveys and trying to constructively typify them in a comprehensive manner. As part of this constructive typification, the aim will be to investigate the adaptation of these buildings to the physical and climatic environment. To do so, temperature and humidity measuring probes will be installed in the selected most representative cases and thermographic analysis will be carried out.

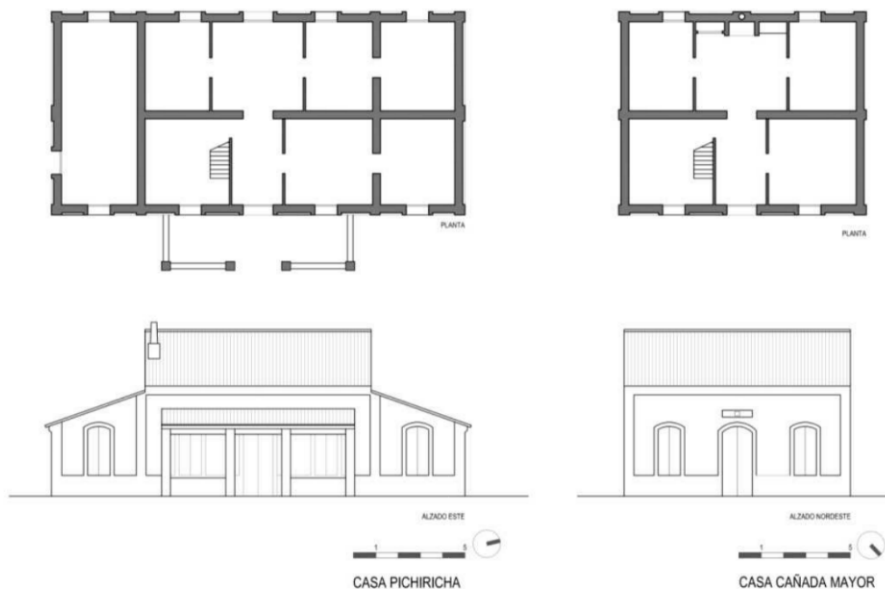


Fig. 7 Pichiricha House and Cañada Mayor House. Floor plans and elevations

Based on the collection of data obtained in the field work and on the conclusions obtained from the study of the selected constructions, a diagnosis on the current situation of the buildings under consideration will be established. The aim is to provide a still photo of the conservation status, use and management of the buildings of the Natural Space, valuing their physical and constructive situation and whether they are affected by management policies and planning documents that might support their conservation and usage possibilities in one sense or another.

4. Conclusions

The research presented will conclude by analysing how constructions will have to face the future, offering objective parameters as support for a possible intervention or conservation actions in a sensitive and natural built heritage.

Proposals and working lines will be laid out, capable of supporting the conservation policies affecting the constructions within the environment of Doñana. Criteria for the revaluation, adaptation and, when applicable, intervention in the built heritage of the Espacio Natural will be designed, from an eminently practical and instrumental point of view. They will work as a supporting guide for the decision-making by the park's management and also to enable technicians to design different types of interventions on the built heritage. The aim is to develop guides and general and specific intervention criteria, ranging from the territorial scale decisions to the general intervention criteria over the constructions. There will not be specific physical proposals for the recovery, rehabilitation and restoration of individual constructions. The result will be formalized in general strategic lines and in groups of specific and criteria adaptable to the general constructions in Doñana and to each specific case.

The research expects to define how the analysis of certain type of constructions, deeply rooted in the territory, can offer arguments and learnings for the current sustainability challenges in the field of architecture, from the reflexive and technological scope point of view. This way, the efficiency in these constructions appears in a wide way, not constrained by the definitions of the current regulatory framework: these constructions are efficient because they are designed and constructed with the materials of the territory itself, because they make the most of climate and geographical resources and make an ingenious use of them, because they integrate waste and materials in the same cycle; but they are also efficient because they are able to adapt themselves in more sensitive parameters, as the changes in terms of ownership, management and uses of the ground which have occurred in the hazardous history of Doñana.

Since Doñana has been always a pioneering experimental space on sustainability, the analysis and study of these constructions, as well as the formulation of proposals to upgrade the built heritage management in Doñana, can be an impulse and a step forward in the knowledge of viable and sustainable relations between man and nature.

5. References

- Agudo Torrico, J. (1999) *Arquitectura vernácula y patrimonio en Andalucía*. Fundación Machado, Sevilla
- Bolin, Luis (1960) *Parques Nacionales Norteamericanos*. Editora Nacional, Madrid
- Castrillo Díaz, Ma. Carmen (2000) *Doñana Nombre a Nombre : Estudio de La Toponimia Del Parque Nacional de Doñana*. Diputación Provincial de Huelva, Servicio de Publicaciones, Huelva
- Chapman, A. et al (1989) *La España inexplorada*, 2a edn. Junta de Andalucía, Dirección General de Ordenación del Territorio y Urbanismo, Sevilla.
- Ferrer, Miguel (ed) (2016) *Doñana : 50 años de investigaciones científicas*. ARBOR, anejos, Vol 11
- Janss, G.F.E. et al (eds.) (2014). *Jornadas de Investigación sobre la Conservación de Doñana*. Libro de resúmenes. 6-7 febrero 2014. Sevilla.
- Granados Corona, M. y Ojeda Rivera, J.F. (1994) *Doñana :paisaje y poblamiento : edificaciones en el Parque Nacional*. Consejería de Obras Públicas y Transportes, Sevilla
- Neila González, Francisco Javier (2015) *Miradas Bioclimáticas a La Arquitectura Popular Del Mundo*. García Maroto Editores, Madrid
- Perry Hylton C. Lucas et al. (1992) *Protected Landscapes : A Guide for Policy-Makers and Planners* . Chapman & Hall, London
- Riechmann, Jorge (2006) *Biomímesis : Ensayos Sobre Imitación de La Naturaleza, Ecosocialismo Y Autocontención*. Los Libros de la Catarata, Madrid.
- Serveto Aguiló, Patxi. (2014) *La gestión del patrimonio cultural en el espacio natural de Doñana*. PH: Boletín Del Instituto Andaluz Del Patrimonio Histórico 85:28-52
- United Nations Educational, Scientific And Cultural Organization (2016) *Operational Guidelines for the implementation of the World Heritage Convention*. UNESCO World Heritage Centre, Paris
- Unesco - National World Heritage List (2017) <http://whc.unesco.org/en/list/>. Accessed 10 Jun 2017