



ARRÁBIDA
BIOSPHERE

BIOSPHERE RESERVE NOMINATION
FORM





ARRÁBIDA
BIOSPHERE

BIOSPHERE RESERVE NOMINATION FORM



It's no coincidence that the occupation of the territories we now generally refer to as 'Arrábida' dates back to the Paleolithic era. During this time, communities already found refuge and abundance in this area, preserved within an environment of extraordinary convergence of orographic and climate factors that brought together the mountain and the sea, creating unique biomes and habitats of immeasurable richness.

The long process of humanisation of these mountains, hills, and valleys, their forests and woodlands, ultimately resulted not in their devastation, but in the centuries-old construction of a geography rich in biodiversity, upon a substrate of splendid landscape and geodiversity. In this setting, the most varied human activities not only coexist with these values but also interact with them, mutually enhancing each other.

Arrábida and the seas that border it to the south are the material and immaterial source of resources for the populations, and the populations reciprocate by recognising and culturally incorporating the surrounding nature and by actively protecting - a process that involves both institutions and people of all ages - the wealth of values that the region holds.

The promoters of this application, aware of their present and future responsibility as a Biosphere Reserve, believe that this area is a natural treasure in itself. They understand that human intervention in the territory is conditioned, regulated, and perfectly harmonised with its characteristics. Therefore, they consider it their obligation to elevate the level of demand and commitment they have towards the vast richness of biodiversity found here, which depends on these specific conditions. From the cliffs of Espichel to Serra de São Luís and the Mata do Solitário and Mata do Vidal woodlands - which are entirely wild - and the Professor Luiz Saldanha Marine Park - a breeding ground for species of fish, molluscs, and other marine animals - the area proposed here for recognition as a Biosphere Reserve is a living and millennia-old laboratory of sustainable development. It is entirely at the service of its occupants and capable of setting an example on a global scale. Moreover, it can enrich itself on that scale with the experience and integration into a network like the World Network of Biosphere Reserves.

This application, stemming from the aspirations of the communities themselves and leveraging the wealth of scientific knowledge acquired over decades that supported previous applications, is entrusted to its promoters, seeking to illustrate to the extent possible the global treasure lying in the slopes of a unique mountain range, trusting that its richness and the management thereof deserve its classification as a Biosphere Reserve.



André Martins

André Martins
Mayor of Setúbal City Council
and Chairperson of the Board of Directors of the
Associação de Municípios da Região de Setúbal
(Association of Municipalities of the Setúbal Region)



Nuno Banza

Nuno Banza
Chairperson of the Board of
Directors of the Instituto da Conservação da Natureza
e das Florestas (Institute for the Conservation of
Nature and Forests)



Álvaro Amaro

Álvaro Amaro
Mayor of Palmela City Council



Francisco Jesus

Francisco Jesus
Mayor of Sesimbra City Council

TECHNICAL SPECIFICATIONS

GENERAL COORDINATION

AMRS - Associação de Municípios da Região de Setúbal (Association of Municipalities of the Setúbal Region)

Palmela City Council

Sesimbra City Council

Setúbal City Council

ICNF - Instituto da Conservação da Natureza e das Florestas (Institute for the Conservation of Nature and Forests)

TECHNICAL TEAM

Marta Franco | **Miguel Rosado** - Municipality of Sesimbra

Cláudia Silva - Municipality of Palmela

Rute Vieira - Municipality of Setúbal

Sofia Martins | **Filipa Bonita** - AMRS

Ana Falcão | **Ana Sofia Palma** - ICNF

DESIGN AND LAYOUT

Dina Teles - AMRS

TRANSLATION

AP | Portugal

CONTRIBUTORS

Andreia Conceição - Sesimbra City Council

Jonas Cardoso - Sesimbra City Council

Pedro Coelho - Sesimbra City Council

Teresa Sampaio - Palmela City Council

Michelle Santos - Palmela City Council

Cláudia Romba - Palmela City Council

Miguel Correia - Palmela City Council

Daniel Rodrigues - Palmela City Council

Liliana Nascimento - Palmela City Council

Teresa Rosendo - Palmela City Council

Wieslaw Bodziony - AMRS

João Afonso Luz - AMRS

Nuno Marques - Setúbal City Council

Filipa Fernandes - Setúbal City Council

Maria João Cândido - Setúbal City Council

Jorge Humberto Silva - ERT LVT

Eduardo Carqueijeiro - ICNF

João Martins - ICNF

Miguel Henriques - ICNF

Romana Rocha - RRPlanning

Margarida Silva - RRPlanning

Sérgio Barroso - CEDRU

Luís Carvalho - CEDRU

Lilia Martins - SIG

PHOTOGRAPHS

By the promoters, except the ones identified as follows:

AC - Adelino Chapa | **AR** - Armando Ribeiro | **FR** - Francisco Rasteiro | **DP** - Diogo Paulo |

ES - Ester Serrão | **LQ** - Luís Quinta | **JPS** - João Pedro Silva | **VN** - Vertente Natural

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PROMOTERS



CÂMARA MUNICIPAL DE SETÚBAL

The Municipality of Setúbal is a local authority with competencies set out in the Legal Framework for Local Authorities, established by Law no. 75/2013, of 12 September, and in accordance with Article 235 of the Constitution of the Portuguese Republic. It is a collective organisation that aims to pursue the public interest. It is responsible for the municipality's strategy, promoting careful management of its own resources. In addition to being the administrative and financial authority in various areas within its remit, it outlines, within the scope of its mission, policies that promote sustainable development and implements concrete measures aimed at improving the quality of life of its populations.



CÂMARA MUNICIPAL DE PALMELA

The Municipality of Palmela is a local authority with competencies set out in the Legal Framework for Local Authorities, established by Law no. 75/2013, of 12 September, and in accordance with Article 235 of the Constitution of the Portuguese Republic. It is a collective organisation that aims to pursue the public interest. It is responsible for the municipality's strategy, promoting careful management of its own resources. In addition to being the administrative and financial authority in various areas within its remit, it outlines, within the scope of its mission, policies that promote sustainable development and implements concrete measures aimed at improving the quality of life of its populations.



CÂMARA MUNICIPAL DE SESIMBRA

The Municipality of Sesimbra is a local authority with competencies set out in the Legal Framework for Local Authorities, established by Law no. 75/2013, of 12 September, and in accordance with Article 235 of the Constitution of the Portuguese Republic. It is a collective organisation that aims to pursue the public interest. It is responsible for the municipality's strategy, promoting careful management of its own resources. In addition to being the administrative and financial authority in various areas within its remit, it outlines, within the scope of its mission, policies that promote sustainable development and implements concrete measures aimed at improving the quality of life of its populations.



ASSOCIAÇÃO DE MUNICÍPIOS DA REGIÃO DE SETÚBAL

The Associação de Municípios da Região de Setúbal, abbreviated as AMRS, comprising the municipalities of Alcácer do Sal, Alcochete, Grândola, Montijo, Palmela, Santiago do Cacém, Seixal, Sesimbra, and Setúbal, is a special-purpose association governed by the Legal Framework for Local Authorities - Law no. 75/2013. It is a legal person governed by public law and its purpose is to pursue specific interests common to the municipalities it encompasses, namely the coordination and promotion of studies, projects, plans, and actions in various domains as set out in its statutes. Key areas include Culture and Heritage (natural, built, and environmental) and Environment and Natural Resources.



INSTITUTO DA CONSERVAÇÃO DA NATUREZA E DAS FLORESTAS

The Instituto da Conservação da Natureza e das Florestas, abbreviated as ICNF, is a body of the Portuguese state's indirect administration with the mission of contributing to the valorisation and conservation of aspects relating to forest resources, nature, and biodiversity in Portugal. It serves as the national authority for nature conservation and biodiversity and the national forestry authority. Its competencies are set out in Decree-Law no. 43/2019, of 29 March, revised by Decree-Law no. 46/2021, of 11 June, and include the conservation and active management of species, natural habitats of wild flora and fauna, geosites, as well as the sustainable management of forestry production, forest and natural spaces, hunting resources, silvopastoral resources, beekeeping, inland waters aquaculture resources, and other resources and services provided by ecosystems.

ACRONYMS

ABAE - Associação Bandeira Azul da Europa (European Blue Flag Association)

ADREPES - Associação de Desenvolvimento Regional da Península de Setúbal (Association for the Regional Development of the Setúbal Peninsula)

AMRS - Associação de Municípios da Região de Setúbal (Association of Municipalities of the Setúbal Region)

APLM - Associação Portuguesa de Lixo Marinho (Portuguese Marine Litter Association)

ARCOLSA - Associação Regional de Criadores de Ovinos Leiteiros da Serra da Arrábida (Regional Association of Dairy Sheep Breeders of Serra da Arrábida)

ASPEA - Associação Portuguesa de Educação Ambiental (Portuguese Association for Environmental Education)

DGPM - Direção-Geral

de Política do Mar (Directorate-General for Maritime Policy)

DL - Decree-Law

DR - Official Gazette

ENA - Agência de Energia e Ambiente da Arrábida (Arrábida Energy and Environment Agency)

ICNF - Instituto da Conservação da Natureza e das Florestas (Institute for the Conservation of Nature and Forests)

IGT - Territorial Management Instrument

IPS - Instituto Politécnico de Setúbal (Polytechnic Institute of Setúbal)

LPN - Liga para a Proteção da Natureza (League for the Protection of Nature)

NECA - Núcleo de Espeleologia Costa Azul (Costa Azul Speleology Group)

NGO - Non-Governmental Organisation

ENGO - Environmental Non-Governmental Organisation

MS - Meteorological Station

MA - Millennium Ecosystem Assessment Framework

IUCN - International Union for Conservation of Nature

ETS - European Emissions Trading Scheme

ERT-RL - Entidade Regional de Turismo da Região de Lisboa (Regional Tourism Authority of the Lisbon Region)

FCSH/NOVA - Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa (School of Social and Human Sciences of the Nova University of Lisbon)

MAB - Man and the Biosphere

PDM - Municipal Master Plans

PNA - Arrábida Natural Park

POC - Coastline Programmes

PROT AML - Regional Spatial Planning Plan for the Lisbon Metropolitan Area

PSOEM - Maritime Spatial Planning Situation Plan

RCM - Resolution of the Council of Ministers

TEEB - The Economics of Ecosystems and Biodiversity

UNEP - United Nations Environment Programme

UNESCO - United Nations Educational, Scientific and Cultural Organisation

ZEC - Special Conservation Area

ZPE - Special Protection Area

ABBREVIATIONS

km - Kilometre

Mya - Millions of years

ha - Hectare inh - Inhabitant

no. - Number

subsp. - Subspecies

var. - Variety

m - Metre

spp. - Several species of the same genus

non aedificandi - Latin expression meaning 'space where building is not allowed'.

BP - Before present

cent. - Century

BC - Before Christ

AD - Anno Domini

BCE - Before Common Era

°C - Degrees centigrade

mm – Millimetre

N - North

W - West

NW - North-West

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Part I Summary



1

PROPOSED NAME FOR THE BIOSPHERE RESERVE

Arrábida Biosphere Reserve

2

NAME OF THE COUNTRY

Portugal



Figure 2.1 - Geographic context of Portugal and the Arrábida Biosphere Reserve

3

FULFILMENT OF THE THREE FUNCTIONS OF BIOSPHERE RESERVES

Between the Mountains and the Sea, Arrábida rises majestically, shaping the landscape and the experience of the Setúbal Peninsula region. More than just a 'mountain' - as it is affectionately known by local populations - Arrábida is an extensive mountain range that stretches across the territories of the municipalities of Palmela, Sesimbra and Setúbal, hand in hand with the River Sado.

As a site of exceptional and unparalleled natural value, appreciated for its beauty, Arrábida is also an important witness to geological processes that illustrate the history of life on Earth. It is home to remarkable and unique flora, presenting a singular landscape rich in geological, ecological, and cultural heritage. It is an organic, interdependent unit where natural and cultural, tangible and intangible heritage are indissolubly linked—a unique and exceptional geographical identity.

Inhabited since time immemorial, Arrábida has been the stage for various economic activities, the most characteristic ones being fishing, agriculture, livestock farming, beekeeping, wine production, cheese making, and other regionally certified quality products, not to mention tourism.

In this context, the uniqueness of the territory comprising the proposed Biosphere Reserve is supported by the richness and diversity of its natural heritage, as well as by the relational mosaic and harmonious coexistence it establishes with human communities and traditional economic activities that have developed here over the centuries, contributing to its identity and differentiation.

The aim of this Application is to combine the conservation function (of ecosystems, landscapes, habitats, and species) with the economic function (socially and culturally sustainable) and the logistic function (capacity-building, awareness-raising, knowledge production and dissemination), composing a consolidated and complementary mosaic of representative systems that enhance the Arrábida territory while simultaneously taking on a distinctive and enriching role within the Biosphere Reserves on a global scale.

3.1

CONSERVATION

CONTRIBUTE TO THE CONSERVATION OF LANDSCAPES, ECOSYSTEMS, SPECIES AND GENETIC DIVERSITY

The proposed Biosphere Reserve is located in the Lisbon Metropolitan Area, approximately 40 km south of the Portuguese capital. It stretches over a territory dominated by the Arrábida mountain range, which is an important substrate of the valuable Arrábida Natural Park. The proposed area extends across the pre-Arrábida reliefs and covers the entirety of the southernmost mountain range, encompassing a diversity of landscapes, habitats, and ecosystems that justified its protection through the creation of the Arrábida Natural Park (Decree-Law no. 622/76, of 28 July). The creation of the Park was crucial to ensure, over the past decades, the protection of the local geological, floral, faunal, and landscape values, as well as the material evidence of cultural and historical significance.

As a conservation area with a long history of legal protection and environmental intervention, as well as a reference space for many of the activities and intangible and cultural expressions of its populations, the proposed Reserve is a wealth at the local, national, and international scales. It is a sanctuary and reservoir of biodiversity of remarkable size and importance.

The diversity of slope orientations, controlling exposure to elements in various ways, such as sunlight and prevailing winds, the presence of plains, cliffs, slopes, and various karstic structures, as well as its general orientation from NNW to SSE, combined with the proximity of the Atlantic Ocean and the Mediterranean influence, form a unique combination within the Portuguese territory. The way how humans and populations interact with these values and riches gives them significance - both as an example and as an area to study and develop innovative solutions - on a global scale.

Bordered to the west and south by the Atlantic Ocean, and including part of it, the proposed Biosphere Reserve is also characterised by this sea-mountain interface, which is manifested in abrupt cliffs, towering cliffs, or soft beaches with white sands. These sands are largely fed by the sands mobilised by the Sado estuary from nearby sources, partly brought by the dominant waves or by the river itself. This proposal includes, due to its richness and importance for biodiversity conservation, as well as

its example of success, harmony, and balance, the area of the seabeds of the Risco Escarpment, protected by the Professor Luiz Saldanha Marine Park. This area serves as a breeding ground for various marine species and is a sanctuary of significant biodiversity.

The size of the Reserve, as well as the proposed zoning, fully responds to the conservation and protection efforts and policies already consolidated in the territory, as well as to the practices developed in the region. It also ensures that conditions are in place for deepening and enhancing conservation, protection, and valorisation actions, namely through the measures set out in the action plan for the Arrábida Biosphere Reserve.

With economic activities such as grazing, agriculture, fishing and wine-growing, honey production, cheese production, and others rooted in traditional and regional practices, as well as the exploitation of mineral resources, the proposed zoning advocates for different intensities of anthropogenic intervention in the Reserve. The three Terrestrial Core Areas and the Marine Core Area correspond to ecosystems and habitats in a wild state, with no activity present other than monitoring, cleaning, and other regularisation operations, with low-intensity visitation and subject to rules established within the framework of national law and supervised by the Instituto da Conservação da Natureza e das Florestas (ICNF). The Buffer Zones, both marine and terrestrial, which surround all perimeters of the core areas, correspond to regions with very limited human presence, with a reduced number of permitted activities, and also under the supervision of the ICNF.

The Transition Area, where the most significant economic, social, and cultural activities are located, corresponds to areas of human occupation, urbanisation, and economic use. It encompasses communities that are intimately connected to these values and live with them. It also establishes a perimeter with a high diversity of uses, where the main criterion is the interaction and relationship between development and conservation. This zone constitutes an important part of the territory that makes up this living laboratory of sustainability.

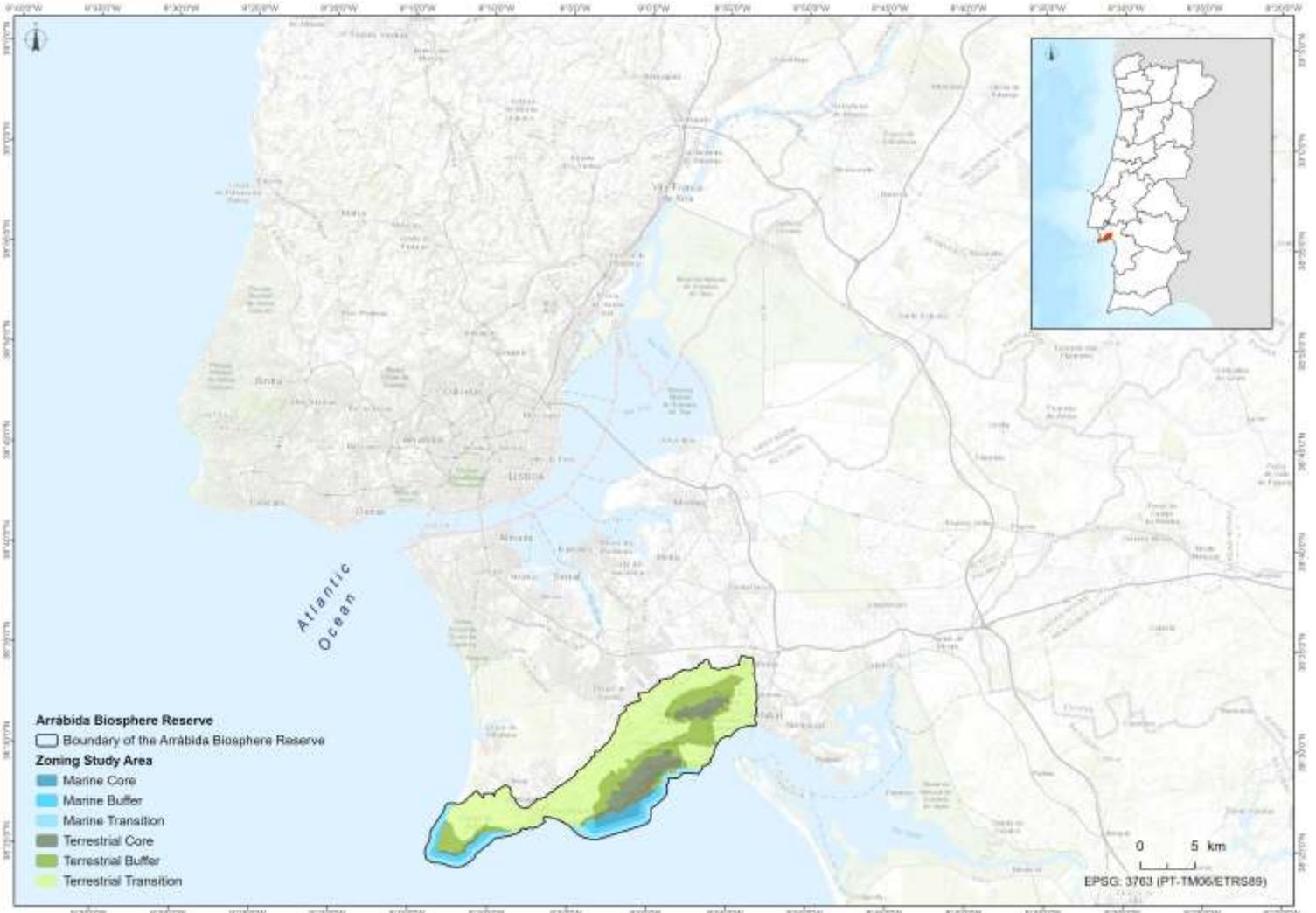


Figure 3.1 - Context of the Arrábida Biosphere Reserve, indicating the zoning.

Biodiversity and Habitats

The scientific relevance of the species and habitats present in this territory contributes to the existence of a set of ecosystems and landscapes that give this region the classification of an international biodiversity hotspot, making it an important receptacle of unique values, duly identified and protected, which can generate valuable contributions to the World Network of Biosphere Reserves.

The area proposed for the Biosphere Reserve presents a high level of botanical interest in the composition of its vegetation, where three floristic elements converge: the Euro-Atlantic (dominant in exposures to the north quadrant, cooler, moister, and shadier), the Mediterranean (dominant in exposures to the south quadrant, warmer, drier, and brighter), and the Macaronesian (prevailing in the most markedly maritime situations, such as cliffs).

Arrábida has vegetation of extraordinary evolutionary and biogeographical importance. Around 1,400 plant species have been identified in the region, which corresponds to around 40% of the species in the Portuguese flora. Its botanical diversity is due, among other factors, to the rugged terrain, which provides different microclimates and a peculiar characteristic, the so-called mosaic effect: small surfaces of each plant formation. The markedly Atlantic and Mediterranean floras are often contiguous, and their transition sometimes occurs abruptly, crossing a line of heights or the boundary of edaphically distinct geological formations.

Among the enormous diversity of species present, those listed in Annex II of Directive 92/43/EEC, concerning the conservation of natural habitats and wild fauna and flora, are particularly relevant: *Pseudarrhenatherum pallens*, *Iberis procumbens* subsp. *Microcarpa*, *Euphorbia transtagana*, *Juncus valvatus*, *Thymus camphoratus*, *Thymus carnosus*, *Armeria rouyana*, *Jonopsidium acaule*, *Arabis sadina*, *Silene longicilia*).

Additionally, in a very small area we can observe ecological situations that are sometimes radically different, as is the case with Arrábida endemisms such as *Convolvus fernadessi* and *Euphorbia pedroi*), which only occur in the world under the particular conditions of Arrábida, belonging to habitats close to desert-like conditions, which appear alongside sub-humid habitats with also remarkable plants such as *Narcissus calcicola* or *Quercus coccifera*).

There are also some relic plant formations in good conservation status. For various reasons relating to their rarity and/or endemism, 72 species have been identified, whose populations in Arrábida are considered important in the regional and/or national context for the conservation of the species. Thus, in the sheltered areas of the mountain, there are oak forests dominated by the Portuguese oak (*Quercus faginea*) and a maquis of kermes oaks, green olive trees, arbutus, pepper trees, and tree heathers, authentic relics from other geological times. In the Arrábida/Espichel Special Conservation Area (ZEC), one can find the only national occurrence of habitat 5320 - Low formations of *Euphorbia* close to cliffs, which consists of scrublands dominated by *Euphorbia pedroi*. The *Olea* and *Ceratonia* forests (habitat 9320) found here occur only in three relevant Special Conservation Areas in the country, with the other two located in the Algarve region (southern Portugal). The territory proposed for the Biosphere Reserve is also considered one of the most relevant sites in the country for the conservation of flora species dependent on limestone and plant communities on 'terra rossa'.

The evergreen forests dominated by kermes oaks (*Quercus coccifera*) and green olive trees or mock privets (*Phillyrea latifolia*), commonly known as Mediterranean maquis, are considered of exceptional value. These forests constitute the endemic vegetation of Arrábida, including the Mata do Vidal, Mata do Solitário, Mata Coberta Nascente, and Mata Coberta Poente woodlands. The scrublands or maquis and the 'garrigue' are formations of high botanical value, variety of colours and aromas, with some of the species present (rosemary, thyme, lavender, *Coronilla valentina* ssp. *glauca*, *Viburnum tinus*, heather) being representative examples of the Mediterranean aromatic flora.

On the other hand, it is also worth noting the following as priority habitats: the calcareous or basophilic rocky grasslands of *Alysso-Sedion albi* in areas of relief; the dry semi-natural grasslands and scrubland facies on calcareous substrate of (*Festuco-Brometalian*), dry herbaceous formations and shrub facies, rich in orchids; grassy sub-steppes and annuals of the *Thero-Brachypodietea* class; and alluvial forests of alders (*Alnus glutinosa*) and ashes (*Fraxinus excelsior*).

The Core Area of the proposed Biosphere Reserve includes small areas of oak forests which are pre-climactic formations and correspond to woodland consisting of trees of the following species: *Quercus faginea subsp. broteroi*, kermes oak (*Quercus coccifera*), green olive tree (*Phillyrea latifolia*), mastic tree (*Pistacia lentiscus*), Mediterranean buckthorn (*Rhamnus alaternus*), and other large shrubs. In the oak forests on the northern slope of the mountain or in sheltered valleys, there are also Montpellier maples (*Acer monspessulanum*), corresponding to the southern limit of their distribution in mainland Portugal.

It is also possible to identify patches of arborescent kermes oaks, which, due to their relatively stable morphological characteristics and differences from the characteristic scrublands of this tree, have led some authors to consider a new subspecies (*Q. coccifera L. subsp. Rivasmartinezii*) and subsequently to propose the classification of the *Quercus rivasmartinezii* species, commonly known as arborescent kermes oak.

The portion defined as the Core Area is also occupied by semi-natural grasslands consisting of grasses, along with a wide variety of other herbaceous species. These habitats are very rich in orchids (both in number of species and abundance), mainly from the *Orchis*, *Ophrys*, *Barlia* and *Anacamptis* genera.

In the case of the marine area proposed for the Core Area, marine prairies are predominant, generally dominated by *Zostera*.

The fauna present in the applicant area is extremely rich and diverse, resulting from the interaction between a set of complex environmental factors and human activities (whose greatest expression was felt after the end of the last glacial period (Wurm), approximately 10,000 years ago).

Deforestation and the increase in agriculture and pastoralism over the centuries have transformed the original morphology and landscape of Mediterranean ecosystems, leaving them with a high degree of structural heterogeneity, characterised by an intricate agroforestry mosaic, with natural habitats persisting in the interstices of this landscape. Indeed, in few places in the Portuguese territory can one find such a remarkable example of the combination of natural and human aspects, with such a high level of faunal diversity.

Around 200 species of vertebrates have been inventoried in the region, including 12 species of amphibians; 17 reptiles; 34 mammals, and 136 birds. The diversity of invertebrates is also quite significant, with 106 species of spiders, 445 species of beetles, 61 species of butterflies, 37 species of ants, and 4 species of lace bugs identified. Among the invertebrates, there are 6 species that occur exclusively within the area of the Reserve.

It should also be noted that the *Geocharis boeiroi*, the pink emerald weevil *Cneorhinus serranoi*, and *Candidula setubalensis* occur exclusively in the Arrábida mountains, the latter being a snail on the IUCN Red List.



Pink emerald weevil
(*Cneorhinus serranoi*)



Portuguese Dappled White (*Euchloe tagis*)



Provence Orange Tip (*Antocharis euphenoides*)



JPS

Marine Area

More than 2000 species have been registered in the marine area, including several of high economic importance, which develop crucial parts of their life cycle here. The area is considered a breeding ground for many species, and its protection through the creation and operation of the Professor Luiz Saldanha Marine Park, the first protected marine area on a national scale, has meant a revitalisation of the breeding capacity of species with evident results in their abundance and the restoration of threatened or previously destabilised trophic chains.

The pressures exerted on the marine area are essentially controlled, and there are currently no disruptive impacts on the ecosystems that could be of significant importance. The creation of Partial Protection and Total Protection areas (under the Arrábida Natural Park Management Plan) has ensured the integrity of vast regions of the seabed, particularly the seabed south of Risco, which is part of the Total Protection area.

With regard to marine mammals, there is a resident population of bottlenose dolphins (*Tursiops truncatus*), which uses and depends on part of the marine area included in the proposed Biosphere Reserve. The resident population of bottlenose dolphins in the River Sado is protected at international, national, and EU level. Considering its structure (number of individuals and age groups), we can consider it a fragile population dependent on strong protection measures. Currently, these measures are applied through intervention, monitoring, and enforcement by the ICNF and law enforcement agencies, ensuring maximum visitation rules and volumes.

The occurrence of specimens of important species such as the spiny lobster (*Panulirus argus*), the spider crab (*Maja squinado*), the slipper lobster (*Scyllarides latus*), and various species of crabs and razor clams highlights the area's importance for crustaceans. The same can be said for various species of molluscs and shellfish. Within the perimeter of the proposed Reserve, activities such as catching or exploiting these species are not permitted under the terms of the Regulations of the Arrábida Natural Park Management Plan, which also helps to protect their communities, despite the fact that they are not covered by any conservation status.

The diversity of marine fish reveals that many of those occurring off the coast of Arrábida are considered threatened in mainland Portugal and are listed in the Red Book of Vertebrates of Portugal (LVVP), contributing to the classification of this territory as an ecologically important niche.

Landscape

The interest and scenic qualities of the Arrábida mountain range derive from the exceptional beauty conferred by the unique character of a mosaic of landscapes where the contrast between the mountains and the sea is striking, the juxtaposition of rocky cliffs and crystalline water, of impressive slopes and welcoming beaches, the combination of dense woodlands and tranquil valleys, the impact of the visible morphology, and the surprise of existing karstic caves. In this proposed Biosphere Reserve area one can observe a truly remarkable variety of landscapes, combined with meteorological phenomena and atmospheric conditions that contribute to an exceptional scenic setting.

Arrábida borders with the ocean to the south, for most of its extension through steep cliffs, from the vicinity of Cape Espichel to Setúbal. The mountains, very close to the coast, drop abruptly into it, forming imposing cliffs or, a little further to the east, small bays with beaches. The cliffs are profusely embedded by various levels of Quaternary flattening, as well as intersected by numerous watercourses, suspended over the sea.

The marine area proposed to be included in the Core Area is unique. Mainly facing south, protected from the prevailing swell and wind, and showing some of the most beautiful sandy beaches and cliffs by the sea, it offers ideal conditions for a wide range of species to develop an important part of their life cycles there. Its rocky bottom results from the breakdown and fragmentation of the limestone cliffs and constitutes a transition strip to the surrounding sandy bottoms, also forming habitats with unique scenic and ecological characteristics.

Recognised nationally and internationally through different environmental classifications, this valuable natural heritage is a factor of positive differentiation, recognition, and an example due to the conservation carried out, ensuring present and future sustainability.



Geology

From a geological perspective, Arrábida is a key region for a better knowledge and understanding of the three fundamental stages of evolution (post-Paleozoic) of the western margin of the Iberian sub-plate, namely: the opening of the North Atlantic; magmatism, and consequent crustal uplift, late Cretaceous-Palaeogene; and the collision with the African plate.

The Arrábida mountain range, covered by the proposed area, is formed almost exclusively by sedimentary rocks. It is located at the southern end of the Setúbal Peninsula and outcrops in a strip with an average width of about 7 km and stretching for 35 km in a WSW-ENE direction. It is a peripheral mountain range of the Alpine belt, resulting from the collision between the Eurasian and African lithospheric plates. It is of relatively recent age, having evolved during the Miocene, from the Upper Burdigalian to the Tortonian, i.e. over a period of around 10 Mya.

The deformation particularly affects the sediments of the regional cover, deposited in the so-called Lusitanian Basin, located on the western Iberian margin during the Mesozoic. The tectonic inversion of the basin, resulting from the aforementioned collision, brings this 3 to 4 km thick sedimentary package to the surface. Thus, the entire sedimentary succession deposited in the southern sector of the Lusitanian Basin is exposed in Arrábida, and only here, as well as a series of structures that highlight the tectonic style associated with the opening of the North Atlantic.

The sedimentary record in Arrábida is not limited to Mesozoic units. Indeed, it exposes the most complete and continuous sedimentary succession of the Cenozoic in the country, particularly from the Miocene, which is related to the evolution of the Tagus river basin. The formation of the mountain range profoundly altered the original course of that river, being largely responsible for the location of its current vestibular section. In contrast to the Mesozoic sedimentary package, which is predominantly carbonate, the Cenozoic one is mainly composed of detrital rocks.

The sedimentary record in Arrábida, as well as along the entire southern and western Iberian margin, during the Upper Cretaceous/Lower Miocene interval, is scarce and difficult to date, as these are deposits of continental facies. Recent research suggests that this is likely due to significant magmatic activity occurring between 100 and 60 Mya.

Arrábida has hundreds of karstic cavities, some of which stand out for their rarity, uniqueness, diversity, and the beauty of their speleothems, and are classified as geosites.

The proposed Reserve includes several geosites¹ as identified by the Portuguese section of the ProGEO Association and by the Laboratório Nacional de Energia e Geologia (National Laboratory of Energy and Geology) (LNEG).

Thus, the LNEG identifies the following as geosites: **i.** the geological section of the cliff from Foz da Fonte to Foz da Ribeira da Lage; **ii.** the dinosaur footprints deposit at Pedra da Mua; **iii.** the dinosaur footprints deposit at Pedreira do Avelino; **iv.** the geological section of the cliffs from Cabo Espichel to Foz; **v.** the dinosaur footprints deposit at Baía dos Lagosteiros; **vi.** the Santana gypsum caves.

ProGEO lists the following as geosites: **i.** the cliffs between Foz da Fonte and Ribeira das Lages; **ii.** the sill at Foz da Fonte and the host rock deformation; **iii.** Espichel; **iv.** the Forte da Baralha Platform; **v.** Gruta do Frade; **vi.** Pedreira do Avelino; **vii.** the Santana gypsum caves; **viii.** the intraformational conglomerates at Alto da Califórnia;

ix. the Formosinho Anticlinal; **x.** the Arrábida Breccia at Pedreira do Jaspe; **xi.** the 'Lapas' at Santa Margarida and Figueira Brava; **xii.** the Creiro Cracks; **xiii.** the structural reliefs of the Arrábida Chain; **xiv.** the normal growth fault at Figueirinha Beach; **xv.** the Portinho da Arrábida unconformity; **xvi.** the Portinho da Arrábida Beach; **xvii.** the active margin alluvial fans of the São Luís Mountain Basin.

Geosites, which can also include other sites of geological interest, constitute a set of features that are of great interest in various disciplines and areas of geology, ranging from mineralogy to tectonics, including structural geology, geomorphology, and palaeontology.

The specific geological and geomorphological aspects of Arrábida, included in the proposed Reserve, represent an attractive and fundamental natural value in structuring the set of associated ecosystems and landscapes.

¹ <https://geossitios.progeo.pt/geosites>
<https://geoportal.lneg.pt/pt/bds/geossitios/#!/pesquisas>

3.2 DEVELOPMENT

The proposed Biosphere Reserve has a long history of human intervention, following a path of development in balance with present values. The very protection of biodiversity and geodiversity values, landscape, and biological resources results from their high demand and the awareness of the need for their conservation, not only to maintain their intrinsic value but also to enhance their cultural, social, and economic value.

The geographical, environmental, historical, and cultural characteristics of the region, particularly the area within the proposed Reserve, as well as its surroundings, provide a vast and diversified array of resources for the economic and social development of the region. They also enhance its capacity to attract new activities and businesses, residents, workers, and visitors.

Such resources are primarily related to the presence of: **i.** water in estuarine, marine, and aquifer areas; **ii.** agroforestry areas; **iii.** historical and cultural heritage; **iv.** a dense network of road, rail, and river transport; **v.** the Arrábida Natural Park, the Luiz Saldanha Marine Park, the Sado Estuary Nature Reserve and other areas of special environmental and scenic interest (such as riverfronts and beaches).

These conditions foster the development of economic activities associated with the use and management of natural resources, enhancing the 'blue economy', focusing on agriculture, forestry, and agro-industries, and geared towards the development of tourism.

The various fields of activity associated with these resources enable the proposed area to assert its specificities, deepen complementarities within the Lisbon Metropolitan Area, and develop synergies among them, with particular emphasis on the 'cross-cutting' role of tourism.

As mentioned, the proposed Biosphere Reserve area encompasses part of the territory of the municipalities of Palmela, Sesimbra, and Setúbal, as well as a strip of sea around it, classified as a Marine Park. All of these municipalities have their own effective Municipal Master Plans, which set out the main lines of the development

and spatial occupation strategy for the municipal area, coordinating the objectives, challenges, and conservation actions contained in the Arrábida Natural Park Management Plan. These territorial management instruments contribute to a close coordination and complementarity between the values and interests at stake, fostering a harmonious complicity of elements to be protected and activities to be developed.

Fishing, now perfectly integrated into a strategy of nature conservation and economic revitalisation and development, results not only in the economic empowerment of the populations directly involved, but also in the creation of a fully developed value chain within the Reserve and its surrounding areas. Moreover, fishing itself enhances hospitality and catering activities while integrating the culture and traditions of the populations, particularly at the two extremes of the Reserve, the town of Sesimbra and the city of Setúbal.

Agriculture, developed throughout the Transition Area and in some areas of the proposed Buffer Zone, in its various expressions, is an important source of wealth for the region. The local population benefits from the presence of a regional production capacity, minimising transportation costs and improving the quality of agricultural and livestock products. In addition, viticulture and wine production benefit the region economically and culturally, by harmoniously occupying sensitive agricultural areas, attracting new audiences, and spreading the region's name.

These activities result in locally sourced products that not only assert the Arrábida Biosphere Reserve area regionally, nationally, and even internationally, but are also closely linked to the habits and economy of the local populations: Azeitão cheese and Azóia cheese, Moscatel de Setúbal wine, Arrábida honey, and countless traditional fish dishes. Throughout the proposed Reserve area and in each of the municipalities that make up the application, there are regular fairs and exhibitions of traditional products, along with reference locations with this purpose. Casa da Baía and Casa do Turismo in Setúbal, the Sampaio Mill in Sesimbra, and the Palmela Tourist Office.

Silviculture plays an important role in land use planning, fire protection through land occupation and cleaning, and the production of raw materials and food.

The extractive industry - of non-metallic mineral resources and in quarries, present in locations included in the proposed Transition Area, represents a small area of the territory. These operations are regulated at both the national and local levels, integrated into land use planning instruments, and implementing the best techniques for the environmental framing and recovery of quarries. The region, including the area within the Reserve and its surroundings, benefits from the use and development of such activities. More than that, it benefits from the ability to extract its own material resources for most construction activities and export a significant portion of the extracted and processed material.

The economic fabric consists essentially of micro, small, and medium-sized enterprises, which allows for a widespread distribution of wealth, generating an economy with fewer losses and greater wealth integration. This organisation results in benefits for local populations, both in terms of job creation and in improving social, economic, and cultural living conditions.

3.3

LOGISTIC SUPPORT

Being promoted by the municipalities of Palmela, Sesimbra, and Setúbal, together with the Associação de Municípios da Região de Setúbal and the Instituto da Conservação da Natureza e das Florestas, this application is the result of an in-depth process of discussion, consultation, and involvement of institutions and populations. These will be the permanent support structures for the scientific research and monitoring processes to be carried out in the Reserve.

Currently, efforts are underway to consolidate and deepen the knowledge and study of the logistical, educational, research, and monitoring resources already implemented in the territory (various ongoing initiatives by the entities operating in the region). The promoters of the application are already working in a coordinated manner on a wide range of key dimensions in these processes.

In addition to the presence of the ICNF and the local authorities as permanent authorities in the territory, the contributions and presence of a wide range of other organisations working, cooperating, and liaising with the former should be highlighted. These organisations have been playing a crucial role in nature conservation and biodiversity protection, combining that work with monitoring and studying the values at stake.

From the creation of infrastructure for the proper use of spaces and resources, to the planning of those uses and the conduction of studies, both scientific and economic, to the various protocols with associations, schools, and universities, there are countless examples of the work, coordination, and cooperation between entities established in this territory.

Some highlights include: **i.** the work of the Agência de Energia Arrábida (Arrábida Energy Agency), a non-profit association that develops activities in the field of environment and energy, aiming for the sustainable development of the community, both permanent and seasonal, in its relationship with the surrounding area; **ii.** the presence of the Setúbal Bay Association, which focuses its work on protecting the values and development of Setúbal Bay, in coordination with various non-governmental organisations and associations such as Ocean Alive, the Associação

Portuguesa de Lixo Marinho (Portuguese Marine Litter Association), the Liga para a Proteção da Natureza (League for the Protection of Nature), the Sociedade Portuguesa para o Estudo das Aves (Portuguese Society for the Study of Birds), among others. Museums, especially the Michel Giacometti Work Museum in Setúbal, the Maritime Museum in Sesimbra, the Professor Luiz Saldanha Oceanographic Museum, and the Palmela Municipal Museum, also form an important network of structures to promote knowledge and research in the region.

Specifically in the field of conservation, in terms of logistic support, there have been various programmes whose results support a strategy of ongoing study and monitoring, namely: **i.** the Biomares and InforBiomares project, coordinated by the Centro de Ciências do Mar (Centre for Marine Sciences), the Instituto Superior de Psicologia Aplicada (Higher Institute of Applied Psychology), and ICNF; **ii.** the 'MESCLA - Improving and complementing the criteria for classifying the status of inland surface water bodies' project, funded by the Agência Portuguesa do Ambiente (Portuguese Environment Agency); **iii.** a wide range of projects aimed at maintaining, restoring, and conserving biodiversity and the ecological quality of water resources, serving as a tool for the preservation of ichthyofauna and the sustainability of the fishing activity in the region.

With regard to climate change and with a view to adapting this territory to the possible risks in the different scenarios envisaged, the PLAAC - Local Plan for Adaptation to Climate Change - is underway, coordinated by the ENA with the technical support of the IGOT Instituto de Geografia e Ordenamento do Território [Institute of Geography and Spatial Planning] of Universidade Nova de Lisboa and with the contribution of the municipalities of Setúbal, Palmela, and Sesimbra, and the civil society within the Arrábida territory, which is presenting its application to become a Biosphere Reserve. Also in the context of climate change, part of the territory proposed for the Reserve (the municipality of Setúbal) is part of an international project for modelling climate change risks, known as CLIMAAX.

In another dimension, the 'Study to Assess the Carrying Capacity of the Arrábida Natural Park' was developed, under the responsibility of the Association of Municipalities of the Setúbal Region, with the aim of quantifying and characterising the use of sites subject to tourist pressure in order to propose management measures and a monitoring protocol.

In addition to those initiatives, many others are carried out in cooperation with schools, higher education institutions, research centres, and local/regional associations.

It is also important to mention the existence of interpretive centres and memory centres, including the Bottlenose Dolphin Interpretive Centre in Setúbal, the Arrábida Interpretive Centre (under development), and the Coastal Cultural Centre in Sesimbra, as well as the memory centres at the Palmela Municipal Museum and the Sesimbra Maritime Museum.

With regard to the development of educational initiatives, which is one of the main objectives of a Biosphere Reserve, besides schools, there are associations and NGOs in the area with protocols signed with the municipalities, including the Liga para a Proteção da Natureza, the Sociedade Portuguesa para o Estudo das Aves, the Associação Portuguesa de Lixo Marinho, the Núcleo de Espeleologia Costa Azul (Costa Azul Speleology Group), and Ocean Alive, among others, as well as the educational services provided by museums. Continuous awareness-raising, together with the monitoring of their work by local authorities and the ICNF, by economic, associative, and sports organisations, also creates a community with an educational role, both among residents and seasonal visitors.

At the school level, programs like 'Eco-Escolas' (Eco-Schools) and 'Escola Azul' (Blue School), supported by the municipalities, provide a foundation for environment-related activities, in addition to numerous awareness-raising initiatives by the local authorities open to the community, such as tree planting, the development of community vegetable gardens, and the implementation of EcoFamily and EcoBusiness projects.

Arrábida's unique characteristics have contributed to numerous research projects being carried out in this region in various areas, from anthropology (human occupation of the territory) to vegetation recovery and regeneration and marine ecology (Biomares project), as well as the preservation and conservation of biodiversity in the Professor Luiz Saldanha Marine Park, included in the Arrábida Natural Park (LIFE project).

Territorial monitoring is primarily carried out by the ICNF services in the Core Areas. In the remaining area, monitoring is carried out in coordination with ICNF services and local authorities, with the contribution of associations and in partnership with higher education institutions, research centres, and state laboratories.

The unique characteristics of the habitats, along with the fauna and flora they comprise, make Arrábida a unique ecological laboratory and therefore the preferred subject of academic studies and scientific research, which also serve as tools for monitoring the territory.

The Action Plan of the Arrábida Biosphere Reserve focuses on various objectives and actions aimed at enhancing and revitalising, supporting, compiling, organising, and making available resources, as well as producing academic work related to the mission and objectives of the Reserve. Publications, research projects, dissertations or theses, as well as monitoring programmes focused on the Reserve, will be systematically supported and made available.



DP

4

CRITERIA FOR DESIGNATION AS A BIOSPHERE RESERVE

4.1

ENCOMPASS A MOSAIC OF ECOLOGICAL SYSTEMS REPRESENTATIVE OF MAJOR BIOGEOGRAPHIC REGION(S), INCLUDING A GRADATION OF HUMAN INTERVENTIONS

Arrábida is a biogeographical unit with a high level of internal diversity. Despite its dominant characteristics - the alpine orography and karstic landforms with Mediterranean vegetation cover on land, and the south-facing coastline with sandy bottoms that serve as breeding grounds for countless species at sea - the region holds a vast array of other riches and distinctive elements resulting from its nature and human intervention over the centuries.

Udvardy's classification places Arrábida within the Palaearctic realm, bordering the biogeographical provinces 'Iberian Highlands' and 'Mediterranean Sclerophyll'. The biogeographical typology for Mainland Portugal², indicates a climate with scarce rainfall in the summer, although there may be excess of water in other seasons. In this region, there are woodlands and shrublands consisting of trees and shrubs with small, leathery, and persistent flat leaves. A notable feature is the limestone 'island' formed by the Arrábida mountain range, which creates the conditions for the dominance of characteristic plant formations such as the endemic oak groves and the associated forest series.

From a geological perspective, the karstic landforms create a unique landscape, both on the surface and in depth, in the endocarst, providing a perfect environment for the enjoyment of the environmental values present. Those values have long been the subject of contemplation and enjoyment by local communities. The existence of archaeological sites demonstrates how important it has been for human groups since the Lower Palaeolithic, from a cultural, spiritual, and economic point of view. Even

² Developed by Costa *et al.* (1998) based on the work by Rivaz-Martínez and colleagues (1990)

today, a significant portion of local tourism is attributable to the scenic and natural values of this territory.

The southern slope, bordered by a protected marine area in the Atlantic Ocean, is characterised by escarpments and bays, alternating between rugged scenery and white sand beaches, some accessible by land. Essentially, that slope represents an unusual interface on the Portuguese mainland between a mountain range and the sea. That interface, besides its scenic value, also serves as the substrate for the development of many native species.

The central region of the mountain range and the proposed area has a diverse geomorphology accompanied by a varied Mediterranean vegetation cover. In the plateaus, there are usually forestry activities, with cork oak and holm oak, as well as pasture. On the peaks and valleys, native vegetation is practically intact.

The three main urban centres, home to around 68,000 people (within the context of the proposed area) and diverse economic activities thrive, are located on the edge of the Buffer Zones, with a graduated economic intensity, increasing from the Core Area towards the periphery. The Core Areas remain intact and without human intervention. They are legally protected and have their own intervention mechanisms, including the presence and jurisdiction of the ICNF, through the Arrábida Natural Park. Around them, there are various activities despite low human occupation.

Agriculture, pastoralism, viticulture, fishing, and forestry are the predominant activities, occupying a significant portion of the Buffer Zones. In the Transition Area, there are also significant activities alongside other less significant ones, such as extractive and manufacturing industries.

The proximity to the three main urban centres - Sesimbra, Setúbal, and Palmela - and the integration of two other important urban clusters in the proposed area - Azeitão and Quinta do Anjo - add very specific characteristics to the region, linking human activity and presence with nature and its conservation.

The social, cultural, and economic development of those centres is closely related, if not dependent, on the protection of the heritage and natural values present in this territory.

The proposed marine component, an integral part of the Professor Luiz Saldanha Marine Park and containing its area of Total Protection - according to Portuguese legislation - corresponds to a sandy seabed environment with some rocks, serving as a breeding ground for numerous pelagic and benthic species, crucial for the integrity of marine food chains. Centuries-old artisanal fishing activities are present in this

environment, with a special focus on Sesimbra and Setúbal, keeping alive and developing gastronomic and cultural traditions around the communal use of the sea and its resources.

Tourism-related activities, notably seasonal ones such as sports and other outdoor activities, are also in perfect harmony - the result of continuous efforts in tourism management and planning, traffic control, and identification of common spaces - with the values that are subject to local and legal protection. Those efforts and their outcomes serve as an example of harmonious development management. In this context, as an example and laboratory of sustainability, its recognition as a Biosphere Reserve will enrich the World Network of Biosphere Reserves, in particular by reinforcing learning and differentiated practices for the protection and enhancement of nature within metropolitan territories.



4.2

BE OF SIGNIFICANCE FOR BIOLOGICAL DIVERSITY CONSERVATION

Arrábida, located on the Setúbal Peninsula, hosts within its territory an interesting and rich biological diversity, constituting a recognised biodiversity hotspot, with more than 1,400 plant taxa, of which around 70 have populations in Arrábida that, due to their rarity or endemism, are considered important in the regional and/or national context for species conservation. Faunal communities are also represented in expressive diversity, with around 200 vertebrate taxa, hosting around 30 species with national and international protection status, including more than 20 species of birds, 5 species of protected cave-dwelling bats, 2 species of carnivorous predators, and 2 prey species (lagomorphs). In addition, there are over 650 invertebrate taxa, of which 6 species occur exclusively in the proposed Reserve area. In the marine area, more than 1,400 species develop crucial parts of their life cycle here, including several of high economic importance.

Terrestrial biodiversity is distributed across various ecosystems, from sea level to higher altitudes, from more natural environments to humanised areas. Of particular note is the Mediterranean Forest of Arrábida, which is one of the best examples of Tertiary vegetation in Portugal, reflecting the Mediterranean environment unaffected by glaciations, characterised by climatic plant formations (the mature and potentially stable stage of plant succession). It is thought that these remnants correspond to potential formations of the original forest that persist here due to bioclimatic conditions.

There are ecologically important plant species in this area. In habitats dominated by kermes oaks, species such as *Ulex densus* and kerub trees (*Ceratonia siliqua*) are commonly found. In very dense oak groves, diversity tends to be lower, but clearings and edges are home to several important species, including *Iberis procumbens subsp. microcarpa*, *Erucastrum nasturtiifolium*, *Arabis sadina*, valerian (*Valeriana tuberosa*), and *Nothobartsia asperrima*, among others. In the rocky outcrops within the oak grove matrix, one can find daffodils (*Narcissus calcicola*), *Silene longicilia*, and *Linaria aeruginea*. In very restricted niches, in limestone crevices with some humidity, the rare and small (*Asplenium petrarchae* appears).

There are also sparsely intervened pine forests, where some of the rare species occur, namely the *Centaurea africana* and the *Drosophyllum lusitanicum*. These species also occur in the region's heathlands and scrublands, where there is also *Thymus villosus* and *Thymus capitellatus*.

In semi-natural grasslands, which are quite rich in orchids (both in number of species and abundance), we find the *Ophrys sphegodes*, a very rare species in Portugal that has a fairly isolated population here.

The maritime slopes are the most unique habitats in the Arrábida and where most of the plants of the highest conservation value are located, including the two exclusive endemic ones. From Cape Ares to Cape Espichel, in addition to *Euphorbia pedroi* and *Convolvulus fernandesii*, there is also *Lavatera maritima*, the *Withania frutescens*, *Orobancherosmarina*, *Galium lucidum subsp. corrudifolium*, *Piptatherum coerulescens*, *Fumana laevipes*, and *Helianthemum apenninum subsp. apenninum*, among other plants that are extremely rare in Portugal. East of Sesimbra, in the Outão area, the floristic inventory now includes other extremely rare species, such as *Stipa offneri*, *Volutaria crupinoides*, *Patellifolia patellaris*, *Fagonia cretica*, *Crambe hispanica*, *Hesperis laciniata*, among others.

In the oak forests of the mountain, dense and shady woods with tall and thick tree and shrub layers, but relatively open lower layers, it is common to find the western peony (*Paeonia broteri*). On the northern slope of the mountain or in sheltered valleys where there have been no fires for many decades, we can find the Montpellier maple (*Acer monspessulanum*), a tree species, whose southernmost distribution in Portugal is in Arrábida.

Sea cliffs are home to some of the flora most specialised in inhabiting vertical rocks, namely the aforementioned *Convolvulus fernandesii* and the sea mallow (*Lavatera marítima*), but also the *Galium lucidum subsp. corrudifolium* and the *Piptatherum coerulescens*, present in the western sector of Sesimbra, and to the east the *Stipa offneri* and the *Piptatherum coerulescens*.

Closer to sea level, we should highlight the occurrence of *Asplenium marinum*, one of the very few ferns that tolerates salinity, growing in rock crevices under the effect of salt spray, and very localised along the Portuguese coast.

The absence of coastal dune complexes greatly restricts the presence of typical dune vegetation. It is still possible to find some important species in these habitats, such as *Herniaria marítima*. The different nature of the substrate also allows for the occurrence of other extremely rare species, such as *Limonium echioides* and *Chaenorhinum serpyllifolia subsp. lusitanicum*.

In grasslands and scrublands on permanently waterlogged soils with oligotrophic waters, the dominant species are *Genista ancistrocarpa*, the Irish heath (*Erica erigena*), and the dwarf furze (*Ulex minor*). As far as herbaceous plants are concerned, there are some that occur in Arrábida, such as *Pinguicula lusitanica*, *Cheirolophus uliginosus* and *Teucrium scordium*.

As far as marine flora is concerned, it is particularly notable for its usually very lush populations of algae. Some of them should be a conservation priority at national level, such as the phaeophyceean algae of the kelp group (whose most significant representative on the region's coast is *Saccorhiza polyschides*). Marine plants of the *Zostera* genus are common in inland waters such as estuaries and coastal lagoons, but the *Zostera marina* species is the only one capable of inhabiting greater depths and truly marine waters. In Portugal, sheltered sea conditions, such as those found in the Arrábida area, are very rare, making the marine prairies of this plant true relics.

The red algae *Mesophillum lichenoides*, whose appearance and growth are reminiscent of animals such as corals and provide habitat for many other species, are very important values in numerous marine reserves and parks in the Mediterranean and are present in the Luiz Saldanha Marine Park. On the other hand, the brown algae *Saccorhiza polyschides* and *Cystoseira usneoides* are in sharp decline in Portugal due to the gradual warming of the waters. However, in the Arrábida area they still show, particularly in colder years, very significant growth and intermittent extinction and recolonisation dynamics.

Both algae and marine plants, when they are especially well-developed, are particularly important because of the special habitat they create, as they give rise to exceptional refuge and breeding areas for juveniles of numerous species of fish and crustaceans, such as the lobster (*Panulirus argus*) and the spider crab (*Maja squinado*). Many of the marine fish occurring off the coast of Arrábida are considered threatened in mainland Portugal and are listed in Portugal's Red Book of Vertebrates, highlighting the importance of the proposed Reserve as an important ecological laboratory. Some of those fish include the conger eel (*Conger conger*), the pouting (*Trisopterus luscus*), the forkbeard (*Phycis phycis*), the sea bass (*Dicentrarchus labrax*), the red mullet (*Mullus surmuletus*), the white sea bream (*Diplodus sargus*), the silver sea bream (*Sparus aurata*), the two-banded sea bream (*Diplodus vulgaris*), the annular sea bream (*Diplodus annularis*), the axillary sea bream (*Pagellus acarne*), and the common sea bream (*Pagrus pagrus*). In terms of marine mammals, the resident population of bottlenose dolphins (*Tursiops truncatus*) stands out, which uses and depends on part of the marine area included in the proposed Biosphere Reserve.

It is important to mention that this coastline stretch is the distribution limit for some species. In addition to some fish from the blenniid family (already included in the LVVP), some wrasse species from the labridae family should be considered - the ocellated wrasse (*Symphodus ocellatus*), the pointed-snout wrasse (*Symphodus rostratus*), the axillary wrasse (*Symphodus mediterraneus*), and the five-spotted wrasse (*Symphodus roissali*) - because they may find their northern distribution limit in Arrábida or a little further north, while the *Centrolabrus exoletus* is expected to be quite rare south of the Arrábida coasts. These species have been prioritised and their regular occurrence gives the marine area national importance in conservation efforts.

The proposed Biosphere Reserve thus serves as a natural incubator for various threatened species, acting as a refuge for their conservation and protection. The following species are also regarded as priorities: **i.** All marine mammals and reptiles occurring in the area (even if occasionally); **ii.** species of shellfish and cephalopods, as well as economically significant crustaceans; **iii.** All fish listed as threatened in the LVVP, as well as those reaching their distribution limit in the region; **iv.** marine kelp and seagrass.

4.3

PROVIDE AN OPPORTUNITY TO EXPLORE AND DEMONSTRATE APPROACHES TO SUSTAINABLE DEVELOPMENT

The proposed Biosphere Reserve, especially due to its classification as a protected area, has been the subject of successive interventions by the municipalities and the ICNF, aimed at harmonising and virtuously reconciling human, economic, social, and cultural activities with the natural values present, whether biological or geological.

Considering the prevalence of activities dependent on natural resources, much of that balance has been naturally achieved through the practices themselves and the way they have developed here. That ongoing effort to continually adapt activities to the environment and its characteristics is a constant concern of the proponents of this application. Taking into account the Management Plan for the Arrábida/Espichel Special Conservation Area (currently under public consultation, pending approval³) and the development strategies of the three municipalities, as outlined in the Municipal Master Plans and strategic development plans, there is a perspective to maintain and deepen this approach.

The various industries, both on land and at sea, and the agricultural land use within the Biosphere Reserve area are rich in adaptation experiences, which can be communicated and disseminated. They simultaneously offer new use opportunities and new frameworks for local and regional investment.

The actions of the application promoters have been demonstrating that it is possible to protect a region's environmental and natural values without totally isolating it from the populations. On the contrary, regulated and balanced occupation and uses, accompanied by effective, vigilant, and active oversight, as seen here, are the keys not only to more efficient conservation but also to the cultural appropriation and awareness of visitors, residents, and other users of the spaces, of their richness, and their need for protection.

Maritime tourism activities have been developing within the framework of the limitations imposed by the Regulations of the Management Plan of the ANP, allowing for visitation and the development of various leisure activities, operated by local companies, respecting the enjoyment of scenic values, but without disturbing the seabed and marine fauna species.

³ Management Plan for the Arrábida/Espichel ZEC available at: <https://participa.pt/pt/consulta/plano-de-gestao-da-zec-arrabida-espichel-repeticao>

Artisanal fishing, developed with respect for the sensitive breeding grounds for various marine species; viticulture, pastoralism, and livestock farming, accompanied by their respective industrial chains, where sustainable development is a clear concern; and tourism, closely linked to the natural and cultural values present, are differentiating elements of the Biosphere Reserve that thus also stands out as a paradigmatic example to be defended and disseminated.

Regional gastronomy, with its regional products, from confectionery to cheese, fish, and mollusc, is the result of the sustainable exploitation of natural resources and their local transformation, allowing them to be used - both in local markets and in restaurants - to benefit the communities.

The extractive industry, the only activity with industrial transformation present, in addition to being strongly conditioned by land-use planning instruments, has been developing practices to harmonise with resources, especially biodiversity, and to return part of the financial return to the communities, while ensuring that previously existing conditions are restored in areas that are no longer being exploited.

The practice of various organised sports is common and growing, with the participation of clubs and companies (most of which subscribe to charters of commitment to this application), take place on designated and marked trails and paths, integrated into routes - such as the E9 Great European Route and a coordinated network of small routes that cross the Reserve area.

Sports activities in the marine area are also popular, especially through organised activities involving local associations and companies, which operate in a monitored and regulated manner (coaststeering, climbing, stand-up paddle, diving, paragliding, canoeing). These activities contribute to a healthy use of the areas within the proposed Biosphere Reserve, with the exception of the marine Core Area.

There are two fish markets (Sesimbra and Setúbal) within the terrestrial Transition Areas, whose openings and fishing ports are outside the marine Transition Areas of the proposed Reserve. However, they also contribute to integrating the fishing industry into the Reserve, despite the fact that much of the catch is obtained outside the proposed boundaries.

All of these activities, among others, are interconnected with tourism - one of the most important economic activities in the Reserve area and its surroundings, with distinctive features. Currently, the proposed Reserve has a significant inflow of visitors and related services, largely due precisely to the way various sectors of activity interact and intersect here, fostering an economic network that contributes to employment, improving quality of life and infrastructure. Simultaneously, it offers visitors a genuine and authentic experience, truly connected to the lives of the local populations, without alienating them from natural values, but rather channelling those values back to the benefit of local communities.

Regardless of the level achieved in local strategies and the value represented by exploitation practices already present and used, current efforts are geared towards continuous improvement. Therefore, the classification of the area as a Biosphere Reserve will serve not only as recognition of the work done so far, but also as a stimulus for further development on a local, regional, and global scale.

4.4

HAVE AN APPROPRIATE SIZE TO SERVE THE THREE FUNCTIONS OF BIOSPHERE RESERVES

The proposed zoning combines the legal status of the various portions of the territory with local and regional practices and traditions, resulting from millennia of human occupation and a combination of economic, cultural, and social activities with the natural wealth, geodiversity, and biodiversity, which are equally ancient.

ZONING	LAND (ha)	MARINE (ha)	TOTAL(ha)	% AREA
CORE AREA	2 247,22	440,94	2 688,16	13,34
BUFFER ZONE	3 771,40	953,76	4 725,16	23,45
TRANSITION AREA	11 177,55	1 562,06	12 739,61	63,21
TOTAL (ha)	17 196,17	2 956,76	20 152,92	100,00

The area corresponding to **Core Areas** (2688 ha - corresponding to 13.34% of the total) is of sufficient size to include the safeguarded and protected values and habitats. The **Buffer Zones** (4725 ha - corresponding to 23.45% of the total), which surround the Core Areas, not only correspond to regions protected under national legislation, but also represent a sufficiently extensive territory to fully fulfil their role as a buffer between fully protected areas and the transition regions covered by the **Transition Area** (12739 ha - occupying 63.21% of the total Biosphere Reserve).

In addition to their size and legal protection, the Areas reflect the organisation of activities within the Reserve. They encompass areas that remain untouched and free from modifications introduced by external pressures, as well as areas with compatible uses, especially artisanal fishing in the marine and transition Buffer Zones, and low-intensity agriculture and livestock farming, tourism, and nature sports in the terrestrial Buffer Zone. The Transition Zone, despite its diversity throughout the Reserve, is also an area for harmonising human occupation and activities with the natural values present, both geological and biological. With predominantly low-density buildings scattered along the northern edge of the Reserve, residential hubs are equipped with public services, shops, and services integrated into the urban and natural fabric. There is a wide range of commercial and tourist offer based on regional products, notably Azóia cheese, Azeitão cheese, honey, wines, Moscatel wine, agricultural products, and fish.

The proposed Reserve is entirely covered by various spatial land use planning instruments, including three municipal Master Plans (Palmela, Sesimbra, and Setúbal) and the Arrábida Natural Park Management Plan, as well as the Management Plan for the Arrábida/Espichel Special Conservation Area⁴. The Sectoral Plan for the Natura 2000 Network includes the Cape Espichel Special Protection Area (PTZPE0050), which also translates territorially into a Core Area of the Arrábida Biosphere Reserve.

Within this framework, the appropriate conditions and size are in place to comply with the three functions of the Reserve with the three types of zoning proposed. In an integrated and coordinated manner, the Reserve functions as a whole and can be understood as a system in which conservation, being central, serves as the gravitational centre of local and regional development. It is provided with logistic support that is continuously being enriched and adapted, based on research, knowledge, and communication.

In more specific terms, as mentioned above, the applicant Biosphere Reserve covers a total area of 20,152.92 ha, comprising:

Four Core Areas - areas dedicated to nature conservation, research, and the monitoring of less altered ecosystems, covering 2,688.16 ha, of which 440.94 ha are marine. In the terrestrial area, these areas are legally protected under 'Total Protection Area' and 'Type I and Type II Partial Protection Area' and 'Type I and Type II Complementary Protection Area'. In the marine area, the Core Area coincides with the Total Protection Area. Additionally, the Cape Espichel region is also classified as a Special Protection Zone⁵. Three Core Areas are located in the terrestrial component of the Reserve and one Core Area in the marine component.

Four Buffer Zones - areas where activities compatible with the conservation of natural values (education, recreation and leisure, ecotourism, agricultural and fishing activities, etc.) are carried out, covering 4,725.16 ha, of which 953.76 ha are marine. In the terrestrial area, the Buffer Zones correspond to 'Type I and Type II Partial Protection areas' and also 'Type I and Type II Complementary Protection'. Two of these areas are located in the marine area of the Reserve and are partially coincident with Partial Protection and Complementary Protection areas, also including areas outside the boundaries of classified areas.

⁴ Under public consultation, pending approval.

⁵ Decree-Law no. 384B/99, of 23 September 1999, ZPE Espichel PTZPE0050, Natura 2000 Sectoral Plan Site

Transition Area - an area integrating sustainable economic activities and population centres, covering 12,741.61 ha, of which 1,564.06 hectares are marine. The Transition Area includes areas not covered by the boundary of the Natural Park, which in the terrestrial area includes, however, the Arrábida Espichel ZEC. In the terrestrial area, the area coinciding with the protected area essentially corresponds to 'Type I and Type II Complementary Protection' areas and areas not covered by protection regimes. In the Marine area, the Transition Area partially coincides with areas of partial protection, complementary protection, and also includes areas outside the boundary of classified areas.

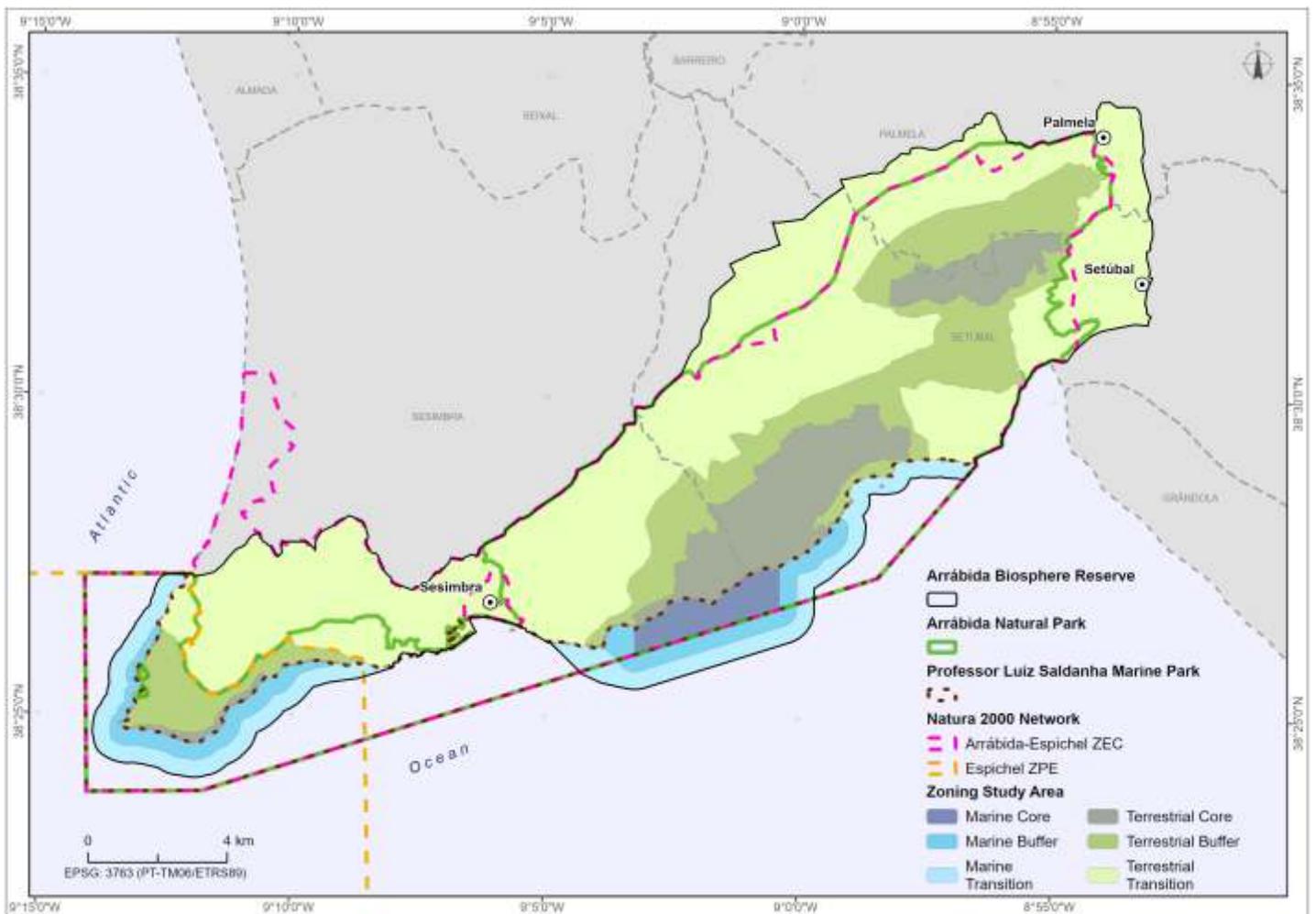


Figure 4.1 - Zoning of the Arrábida Biosphere Reserve

4.5 THROUGH APPROPRIATE ZONATION

I) CORE AREAS

Core areas legally classified with long-term protection objectives, fulfilling the conservation goals of a Biosphere Reserve and of sufficient size to meet those objectives.

The main legal classification is provided by Resolution of the Council of Ministers (RCM) no. 141/2005, of 23 August (Arrábida Natural Park Management Plan - POPNA), covering almost the entire proposed Reserve, with greater emphasis on the Core Areas, since these coincide with the areas subject to the Total Protection scheme applied to the territory of the PNA.

Three terrestrial Core Areas and one marine Core Area are defined in the proposed Arrábida Biosphere Reserve, where natural and landscape systems and values of recognised value and importance are identified, such as the unique plant formations of oak groves, areas of occurrence of local and national floristic endemism and avifauna with special conservation status, corresponding to Mata do Vidal, Mata do Solitário, Mata Coberta Nascente, Mata Coberta Poente, Arriba Sul do Cabo Espichel, and the seabeds of the Risco escarpment.

The vegetation cover in the core areas is mostly shrublands: oak groves and calcicolous shrublands, where *Quercus coccifera* dominates, along with various other shrub species that vary according to local conditions (*Pistacia lentiscus*, *Ulex densus*, *Coronilla valentina subsp. glauca*, *Cistus monspeliensis*, *Arbutus unedo*, *Olea europaea var. sylvestris*, *Juniperus turbinata*, and others). The occurrence of patches of arborescent *Quercus coccifera* stands out, with relatively stable morphological characteristics that differ from the *Quercus coccifera* shrublands.

It is in the clearings and edges of these formations that some important species occur, such as *Iberis procumbens subsp. microcarpa*, *Erucastrum nasturtiifolium*, *Arabis sadina*, *Valeriana tuberosa*, *Odontites viscosus subsp. australis*, among others.

*In the rocky outcrops within the oak grove matrix (eastern half), it is also possible to find *Narcissus calcicola*, *Silene longicilia*, and *Linaria aeruginea*. In very restricted niches, in limestone crevices with some humidity, the rare and small *Asplenium petrarchae* appears.*

Part of the terrestrial Core Areas is occupied by naturalised pine forests on dunes, i.e. pine forests with little intervention and natural undergrowth. The species present here correspond mostly to those found in siliceous shrublands or sometimes in oak groves, depending on the type of soil. Similarly, some of the rarest species also occur, namely *Centaurea africana* and *Drosophyllum lusitanicum*.

A small part of the Core Areas is occupied by cork oak groves and heaths with scattered cork oaks, consisting of tall, closed heather bushes (*Erica spp.*) and *Arbutus unedo* with arboreal *Quercus suber*. The species list is very similar to that of the siliceous scrublands, but these areas show a greater degree of naturalisation and are at a more advanced successional stage.

There are also semi-natural perennial grasslands of *Brachypodium phoenicoides* and other grass species, along with a wide variety of other herbaceous species. Typically, these grasslands have no shrub species, consisting of tufts of perennial grasses distributed more or less compactly, never exceeding about 50 cm in height. These habitats are very rich in orchids (both in number of species and abundance), mainly from the *Orchis*, *Ophrys*, *Barlia*, and *Anacamptis* genera. The *Ophrys sphegodes* orchid stands out because it is an extremely rare species in Portugal and has a fairly isolated population here.

Despite the high diversity, particularly in orchid species, these semi-natural habitats require certain conditions to persist. Transhumant grazing, provided it is not excessive, is one of the factors that promote the maintenance of this habitat, preventing the establishment of shrub and tree species that would alter the local environmental conditions.

Also noteworthy is the presence of siliceous scrublands, consisting of heathlands and scrublands on sandy and gravelly (acidic) soils, ranging from low to medium height. *Cistus ladanifer*, *Erica australis*, *Erica scoparia*, *Calluna vulgaris*, *Halimium halimifolium*, *Halimium ocymoides* are very common, as are various other species of heath, gorse and cistus, depending on the substrate (sandy or gravelly). These are important habitats for *Drosophyllum lusitanicum*, *Thymus villosus*, *Thymus capitellatus* and *Centaurea africana*.

A small portion of the terrestrial Core Areas is occupied, on the slopes facing the sea, by low, open scrublands, whose composition of dominant species has affinities with oak groves, albeit with a more open structure and with the sometimes frequent presence of *Juniperus turbinata*. These are very unique habitats, home to the majority of plants of high conservation value, including the two exclusive endemics of the PNA. The stretch extending from Cape Ares (Sesimbra) to Cape Espichel is home to *Euphorbia pedroi* and *Convolvulus fernandesii* (the latter more associated with escarpments), but also *Lavatera marítima*, *Withania frutescens*, *Orobanche rosmarina*, *Piptatherum coerulescens*, *Fumana laevipes* and *Helianthemum apenninum subsp. Apenninum*, which are rare plants in Portugal.

In the marine environment, the marine Core Area (441 ha - roughly 2.2% of the total area) corresponds to the area between Cape Lagosteiros and Ponta de São Pedro at the base of the Risco Mountain Range, coinciding entirely with the area classified as Total Protection according to the PNA Management Plan. This Zone encompasses the main underwater habitats formed by rocky outcrops, exhibiting high morphological diversity and associated mobile substrates, constituting a unique resource along the Portuguese coast and contributing to high levels of marine biodiversity at European level. It is subject to various protection measures detailed in Chapter 7.4 of the nomination form.

Marine habitats harbour significant natural and ecological values, hosting high biodiversity and well-preserved populations of various species of scientific or commercial interest. Three types of habitats important for marine biodiversity are known, as detailed in chapter 11.6 of the form.

More than 1,400 marine species have been registered, including several of great economic importance, which develop crucial parts of their life cycle here. In the case of crustaceans, for example, there are specimens of species such as the spiny lobster (*Panulirus argus*), the spider crab (*Maja squinado*), the slipper lobster (*Scyllarides latus*) and various species of crabs and razor clams, demonstrating the potential interest of this Core Area for the group as a whole.

With regard to marine fish, many of those occurring off the coast of Arrábida are considered threatened in mainland Portugal and are listed in Portugal's Red Book of Vertebrates (LVVP), highlighting the importance of the proposed Reserve as an ecological laboratory.

It is important to mention that this coastline stretch is the distribution limit for some species. In addition to some fish from the blenniid family (already included in the LVVP), some wrass species from the labridae family should be considered - *Symphodus ocellatus*, *S. rostratus*, *S. Mediterraneus* and *S. roissali* (because they may find their

northern distribution limit in Arrábida or a little further north), while the *Centrolabrus exoletus* is expected to be quite rare south of the Arrábida coasts.

These species have been prioritised and their regular occurrence gives the marine Core Area special importance in national terms for their conservation.

With regard to marine mammals, we highlight the presence of a resident population of bottlenose dolphins (*Tursiops truncatus*), which uses and depends on part of the marine Core Area included in the proposed Biosphere Reserve.

II) BUFFER ZONES

Areas clearly identified around the Core Areas where complementary activities to be developed must be compatible with the conservation objectives.

The proposed Buffer Zones (4,725 ha - accounting for 23.45% of the total area), which border the Core Areas, correspond to portions of the territory that are also largely conditioned by land-use planning instruments, namely the Arrábida Natural Park Management Plan. The range of human activities developed in these regions is particularly limited and mostly harmonised with the values present in the Core Areas. Additionally, there are significant heritage, biological, geological, landscape, archaeological, and cultural values present in the Buffer Zones themselves. In this context, the Buffer Zones have a very important intrinsic value.

Agriculture, viticulture, pastoralism, and forestry are the dominant activities, being present virtually throughout the entire territory of the Buffer Zones. In addition to those activities, there are also small rural tourism and housing clusters. The popular enjoyment of the Buffer Zones, both on land and at sea, is part of the regional culture, from Setúbal to Sesimbra. These areas experience constant visitation, with higher intensity during the summer months. However, these visits are carried out in an orderly manner and integrated into the space, with a perspective of enhancing and protecting the values present by connecting them with the local communities, rather than through isolation.

A considerable area within the Buffer Zones is also occupied by pasture and fallow land. These are rainfed crops, pasture, and abandoned areas with herbaceous vegetation. In older fallow areas, perennial plants and pioneer shrubs are predominant, such as *Foeniculum vulgare*, *Brachypodium phoenicoides* and *Dittrichia viscosa*. Over time, succession leads to the floristic composition gradually resembling that of semi-natural perennial grasslands.

During the summer months, the coastal area attracts a large number of visitors due to

the quality of its beaches and the adjacent maritime space. During this time of year, the area is subject to management measures that are more in line with this pressure.

Among those measures, we highlight the 'Arrábida sem carros' (Arrábida Without Cars) initiative in the municipality of Setúbal (which restricts car traffic along a stretch between Figueirinha Beach and Creiro Beach) or the measures to restrict car traffic to the west of the Port of Sesimbra, limiting access to Ribeiro de Cavalo Beach along this road, in order to protect and preserve the area.

The marine Buffer Zone (953 ha) coincides with an area classified as Partial Protection in the POPNA, where commercial fishing is permitted, with the exception of cage trap and line fishing, at a distance of no less than 200 m from the coastline.

III) TRANSITION AREAS

Outer transition areas where sustainable resource management practices are promoted and developed.

The Transition Area, the largest within the proposed Reserve limits (with a total of 12,739 ha - corresponding to 63.21% of the total area), comprises a vast area of land and a section of coastline (with 1,562 ha), almost entirely integrated into the Luiz Saldanha Marine Park. The Transition Area, despite being diverse and containing several urban clusters, is essentially characterised by the presence of the primary and tertiary economic sectors, with a controlled presence of manufacturing, extractive, and wine production industries. The presence of commerce and services, namely in the field of tourism, sports, and recreational activities, particularly with a strong offer in the field of nature tourism, along with a thriving catering sector deeply intertwined with Mediterranean culinary traditions and regional specialties, characterise the most prominent activities in the area.

Agriculture, viticulture, and livestock farming are present in the Transition Area, alongside significant urban centres such as part of the city of Setúbal, Quinta do Anjo, part of the town of Palmela, and the town of Sesimbra.

The extractive industry, present in the Transition Area, adheres to defined mining plans, which do not allow its areas to be extended. It also implements rigorous plans for slope recovery and quarry restoration, subject to extensive scrutiny by the relevant public authorities in the area. Apart from the Secil plant, there are no other industrial units particularly sensitive in terms of chemical pollution production or physical destruction. Once again, it is important to highlight that the plant is obliged to comply with specific obligations as it is integrated into the Arrábida region, and its production also benefits the region's sustainability. This includes environmental aspects - such as

reducing the environmental costs of transporting materials for construction and integrating the facilities into the current mobility plan during the summer. Additionally, there are economic benefits such as creating local wealth, employment, and energising the business fabric. As a pressure, it is properly identified and conditioned, with impacts strictly contained within the Transition Area, without directly or indirectly affecting the Buffer Zones or the Core Areas.

Similar to the Buffer Zone, there are coastline stretches within the Transition Area that are also subject to specific pressures during the peak tourist months, prompting land and activity management measures (especially by banning the circulation of motor vehicles, ensuring access by land for rescue or emergency vehicles to respond to situations that may compromise user safety) and ensuring the protection of nearby values in the coastal interface zone.

IV) ADDITIONAL INFORMATION ABOUT THE INTERACTION BETWEEN THE THREE TYPES OF ZONE

Without physical markers or separation on the territory associated with the three Zones, interaction is total between the Buffer Zones and Transition Areas, and more controlled between the Buffer Zones and the Core Areas. Regarding this matter, it is worth mentioning the ownership status in the proposed area. The vast majority of the land and properties are privately owned, with the exception of areas of maritime public domain and some areas held by the state administration. This context means that the interactions between activities are managed according to the principle of separation and interaction between public and private property.

The proposed zoning results from the 'de facto' geographical distribution of the values and their current state of conservation and integrity. The Core Areas contain significant natural values where the activities carried out are compatible with their preservation, and in some cases, access is prohibited, so their interaction with their surroundings, the Buffer Zones, is solely derived from their wilderness state.

However, the interaction between the Buffer Zones and the Transition Area is much more intense, and there is much greater permeability between them. The proposed zoning takes into account the existence of infrastructure, such as roads, urban centres, or facilities, as well as their location and function.

When it comes to values, the zoning ensures their adequate protection and conservation, as the proposed zones also stem from an existing reality on the ground, with a long history and recognised results in nature conservation, especially biodiversity, but also geodiversity.

4.6

ORGANIZATIONAL ARRANGEMENTS SHOULD BE PROVIDED FOR THE INVOLVEMENT AND PARTICIPATION OF A SUITABLE RANGE OF, INTER ALIA, PUBLIC AUTHORITIES, LOCAL COMMUNITIES AND PRIVATE INTERESTS IN THE DESIGN AND THE CARRYING OUT OF THE FUNCTIONS OF A BIOSPHERE RESERVE

4.6.1

AGREEMENTS IN PLACE OR FORESEEN

The process of building Arrábida's application for Biosphere Reserve status was carried out thanks to the efforts and involvement of the AMRS, the ICNF and the municipalities of Palmela, Sesimbra, and Setúbal, which prepared and promoted a participatory process that began in April 2016 with a public presentation. This collaborative co-construction and shared responsibility process engaged the local community, local and regional entities and stakeholders involved in scientific research, economic activities, environmental preservation, and cultural initiatives. It also involved universities and the general population.

During this process, the Promoting Committee of the application participated in all significant moments of community life, involving the populations and entities to highlight the benefits of the 'Biosphere Reserve' designation for enhancing a territory of regional and national importance. These moments of participation are documented in Annex II.

It is worth mentioning, as an example, the launch of the theme 'Arrábida Biosphere' during the 6th edition of the KID'S GUERNICA PROJECT in the 2017/2018 school year. This educational project, which has involved thousands of children and young people from the Setúbal Region over the years, focusing on peace-related topics, engaged 4,500 students in this edition alone. They worked on this theme, raising awareness about the objectives of the application and its significance as a guarantor of sustainable development in this territory.

In 2019, the website arrabida.amrs.pt was launched with the aim of promoting Arrábida and its potential, as well as clarifying and publicising the application process. This initiative reached new audiences and created another means of publicising and communicating the objectives of the Biosphere Reserve.



6th edition of the KID'S GUERNICA PROJECT

The presence of the Arrábida Biosphere Reserve application on social media platforms such as Facebook and Instagram has enabled the projection and dissemination of knowledge about the various stages of this construction process, currently reaching over 1,700 followers.

In the construction of the Arrábida Biosphere Reserve nomination form, stakeholders were repeatedly involved, answering questions, providing data and records, proposing initiatives, establishing partnerships, and actively collaborating in its development at all stages of the process. The various workshops conducted served as a process of consultation with territorial partners regarding the added value of the application and the extent to which they would be willing to get involved, both in the construction phase and later in the implementation of the various proposed initiatives.

In 2019, once the application was structured, it was necessary to move on to a broader consultation process. To this end, the first round of sectoral workshops was conducted, which allowed organising the participation of entities by thematic area, providing a more fruitful debate on topics such as: **i.** Administration and Local Government; **ii.** Agriculture and Fisheries; **iii.** Industry; **iv.** Education, Culture, and Heritage; **v.** Tourism, Sports, and Leisure; **vi.** Environment, Science, and Health. These workshops were attended by around 80 participants, including 68 organisations/companies, allowing for the collection of specific proposals and contributions for the construction of a common vision for the Arrábida Biosphere Reserve, as well as identifying potentialities and threats.

Despite being impacted between 2020 and 2022 by the COVID-19 pandemic, the work of engaging the population and local stakeholders in the construction of Arrábida's application for Biosphere Reserve was resumed. In November 2023, a new cycle of sectoral workshops began, this time focusing more on gathering inputs for the Biosphere Reserve Action Plan. Five sessions were held on the following themes: **i.** Territory and Local Government; **ii.** Economic Activities; **iii.** Education, Culture, and Heritage; **iv.** Tourism, Sports, and Leisure; and **v.** Environment, Science, and Health, which were attended by 31 organisations.

In these workshops, it was also possible to assess, based on the knowledge and critical thinking of all participating organisations, the economic, cultural, and social impact of classifying Arrábida as a Biosphere Reserve. The outcome of the consultation proved fruitful for the work ahead, providing insights into the most significant aspects and elements to be valued in the Reserve, as well as into the involvement of the various partners in the Action Plan. Lastly, it was also possible to collect the commitment of partners to Arrábida's application for Biosphere Reserve status. This consultation process ended with 91 organisations signing letters of commitment (Annex III).

The participation of these partners enables the establishment of a sufficiently representative Advisory Board, which will allow for continuous assessment of the impact of the classification and the measures to be considered when implementing the Action Plan.

4.6.2

WHETHER CULTURAL AND SOCIAL IMPACT ASSESSMENTS HAVE BEEN CARRIED OUT OR SIMILAR TOOLS AND GUIDELINES HAVE BEEN USED

No cultural and social impact assessment was carried out.

4.7

MECHANISMS FOR IMPLEMENTATION

DOES THE PROPOSED BIOSPHERE RESERVE HAVE

a) MECHANISMS TO MANAGE HUMAN USE AND ACTIVITIES IN THE BUFFER ZONE(S)

The proposed Biosphere Reserve benefits from the effectiveness of various local and regional land use planning instruments, as well as the involvement of the three municipalities – Palmela, Sesimbra, and Setúbal – and the Instituto da Conservação da Natureza e das Florestas.

The Regional Spatial Planning Plan for the Lisbon Metropolitan Area (PROT AML), approved by Resolution of the Council of Ministers no. 68/2002, of 8 April, amended by Resolution of the Council of Ministers no. 92/2008, of 5 June, deserves mention, as do the Municipal Master Plans (PDM) for Sesimbra, Setúbal, and Palmela (approved, respectively, by Resolution of the Council of Ministers no. 15/98, of 2 February, with the latest amendment approved in Declaration no. 9/2023, of 23 January; Resolution of the Council of Ministers no. 65/94, of 10 August, partially ratified by Resolution of the Council of Ministers no. 22/2024, of 29 January; and Resolution of the Council of Ministers no. 115/97, of 10 April, with the latest correction published in Notice no. 4796/2022). By applying to the entire administrative area of the municipalities of Sesimbra, Setúbal, and Palmela – and consequently, to the entire area covered by the proposed Reserve, these local and regional-based instruments are applied to the three types of zones in the Arrábida Biosphere Reserve, ensuring the use of space in a manner compatible with their functions.

In addition, the existing mechanisms for managing activities in the Buffer Zone include the Sectoral Plan for the Natura 2000 Network (PSRN 2000, approved by Resolution of the Council of Ministers no. 115-A/2008, of 21 July) and the Legal Framework for Nature and Biodiversity Conservation (Decree-Law no. 242/2015, of 15 October), as well as the Management Plan for the Arrábida/Espichel ZEC (under approval).

Decree-Law no. 140/99, of 24 April, republished with amendments by Decree-Law no. 49/2005, of 24 February, and subsequently by Decree-Law no. 156-A/2013, of 8 November, revises the transposition into domestic law of Council Directive no. 79/409/EEC, of 2 April (the Birds Directive, on the Conservation of Wild Birds) and Council Directive no. 92/43/EEC, of 21 May (the Habitats Directive, on the Conservation of Natural Habitats and of Wild Fauna and Flora), and regulates the Natura 2000 Network, including land use planning instruments, acts, and activities conditioned in the so-called Sites of Community Interest, in this case, the Cape Espichel ZPE (PTZPE0050, approved by Decree-Law no. 384-B/99, of 23 September 1999) and the Arrábida/Espichel ZEC (under approval).

The Buffer Zones, both marine and terrestrial, lie entirely within the perimeter of the Arrábida Natural Park and the Luiz Saldanha Marine Park (created by Regulatory Decree no. 23/98, of 14 October), where the Arrábida Natural Park Management Plan (POPNA, approved by RCM no. 141/2005, of 23 August) applies. Furthermore, the various local municipalities present in the territory adapt management measures for major uses—namely tourism and sports - to the seasonality and intensity of collateral pressures.

Portugal's coastline is regulated by Decree-Law no. 159/2012, of 24 July, which sets out the framework of principles to be observed in the management of this strip of territory, reflected in the Coastal Zone Programmes (POC). Its division corresponds to the division of the Hydrographic Regions - Alcobça-Cape Espichel Coastal Zone Programme (approved by RCM no. 66/2019, of 11 April) and Cape Espichel-Odeceixe Coastal Zone Programme (approved by RCM no. 87-A/2022, of 4 October, amended by Declaration of Rectification no. 26/2022, of 17 October).

Also noteworthy is the Maritime Spatial Planning Situation Plan (PSOEM), approved by RCM no. 203-A/2019, which seeks to address the new challenges posed to the sustainable development of the ocean by identifying and spatially and temporally representing existing uses and activities. As a planning and management instrument, it is characterised by its cross-sectoral approach, enabling the coordination of actions between public authorities and private initiative. It serves as an important and essential tool for maritime prosperity, contributing to sustainable blue growth.

b) MANAGEMENT POLICIES AND PLANS FOR THE BIOSPHERE RESERVE AREA

The guidelines and directives contained in the various referenced instruments, particularly in the PROT AML and the PDMs of Sesimbra, Setúbal, and Palmela, will be considered as support for the territorial management policy of the Biosphere Reserve.

For all Core Areas and Buffer Zones, as well as the areas classified as ZPEs in Transition Areas, in addition to the aforementioned plans, the PSRN 2000 and the Legal Framework for Nature and Biodiversity Conservation (Decree-Law no. 242/2015, of 15 October) are also relevant.

In turn, the existence of a specific Action Plan for the Biosphere Reserve (which accompanies this form) allows for the integration of the different management

instruments (PDM, PROT AML, POPNA, PSRN 2000, POC) and the bodies with specific responsibilities and attributions associated with the classified area, through its continuous updating and the involvement of the different stakeholders.

The Action Plan for the Reserve, widely discussed and resulting from the identification of real intervention needs, organised into strategic and specific objectives, consolidates a vision and a mission for the Arrábida Biosphere Reserve based on the integrated management of a territory whose main value lies precisely in the interface between humans and the biosphere, ancient and modern, traditional and contemporary, always in constant evolution, but always through a relationship of mutual gain, of permanent dialectics between conservation and development, and of constant improvement.

The Action Plan responds, with concrete measures, to the set of projects designed to address the various Sustainable Development Goals, namely:

- **Goal 4:** Quality education - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- **Goal 11:** Sustainable cities and communities - Make cities and human settlements inclusive, safe, resilient and sustainable;
- **Goal 12:** Responsible consumption and production - Ensure sustainable consumption and production patterns;
- **Goal 13:** Climate action - Take urgent action to combat climate change and its impacts;
- **Goal 14:** Life below water - Conserve and sustainably use the oceans, seas and marine resources for sustainable development;
- **Goal 15:** Life on land - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss;
- **Goal 17:** Partnerships for the goals - Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development).

In terms of national strategies, the Action Plan incorporates measures that respond to the National Strategy for Nature Conservation and Biodiversity (ENCNB) for 2030, the European Union's Biodiversity Strategy 2030, the 2030 Agenda for Sustainable Development and the Tourism Strategy for the 2017-2027 (ET 27) period.

c) IDENTIFICATION OF THE AUTHORITIES OR MECHANISMS INVOLVED IN THE IMPLEMENTATION OF POLICIES AND PLANS

The Action Plan in this application involved all its promoters in defining and pursuing the specific and programmatic objectives, as well as in describing the indicators for measuring its success and scope.

The governance model consists of an **Advisory Committee** that includes all the relevant organisations for the management and promotion of the Reserve, following invitations and their acceptance, involving the associative movement, the business community, and non-governmental environmental associations and organisations, as well as personalities of recognised academic and scientific merit. The Advisory Committee serves as a broad space for discussion, monitoring, and implementation of the Biosphere Reserve.

The governance model also includes a **Scientific Committee**, also with advisory functions, which includes organisations from the scientific community both within and outside the region, ensuring appropriate scientific direction and full fulfilment of the Reserve's logistic function. This Committee is tasked with advising the Executive Committee, and its main functions are to provide technical and/or scientific input on topics relevant to the Arrábida Biosphere Reserve.

The Executive Committee is the decision-making body of the Reserve, with authority to approve all matters relating to management. It consists of organisations responsible for the territory (Palmela City Council, Sesimbra City Council, Setúbal City Council, Instituto da Conservação da Natureza e das Florestas, and Associação de Municípios da Região de Setúbal) and the Managing Entity. The collective work experience of the five organisations that make up the Executive Committee and their relationship with the community ensure that significant concerns or needs for the preservation and enhancement of the Reserve are continually integrated into management efforts.

The Executive Committee may also establish cooperation protocols with partner organisations to ensure the successful development of the initiatives set out in the Action Plan, as well as to enhance the dissemination and promotion of the objectives of the Biosphere Reserve.

The **Managing Entity**, the Associação de Municípios da Região de Setúbal, is responsible for managing and implementing the Action Plan for the Biosphere Reserve and executing all the decisions of the Executive Committee. It will provide the logistic and administrative support necessary for the proper functioning of the Biosphere Reserve, as well as the execution of its Action Plan, through its coordinator who, together with the Technical Committee, will ensure compliance with all management requirements.

The rules and other operating regulations of the Reserve's bodies will be approved at the first meeting following its establishment.

Governance Model

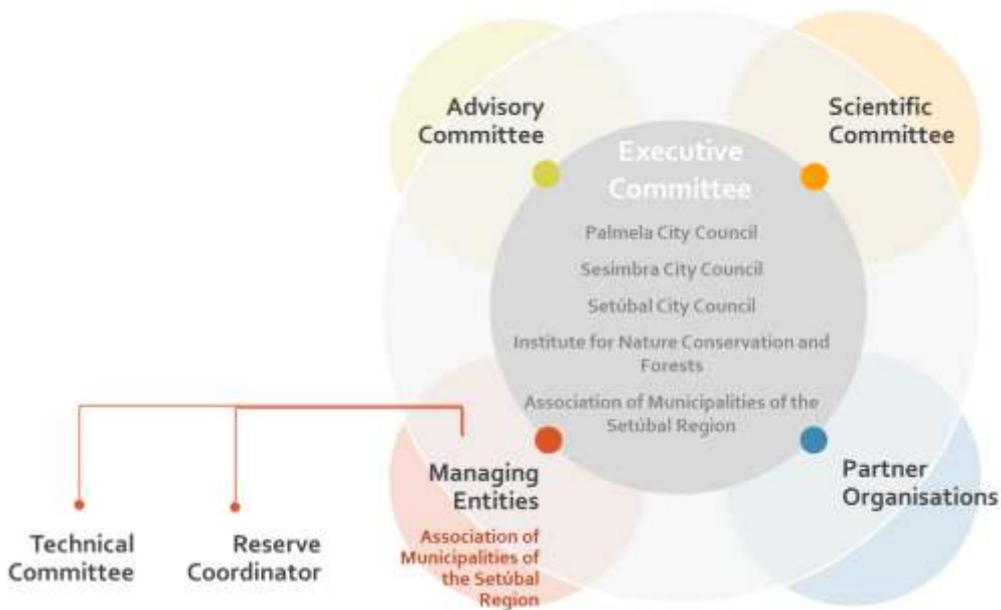


Figure 4.2 - Governance Model of the Biosphere Reserve

d) RESEARCH, MONITORING, AND ENVIRONMENTAL EDUCATION AND TRAINING PROGRAMMES

The Reserve relies on the involvement of higher education institutions (Instituto Superior Politécnico de Setúbal, Instituto Superior de Psicologia Aplicada Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa, Faculdade de Ciências da Universidade de Lisboa, Universidade de Évora and Universidade do Algarve) with which the promoters of the application traditionally collaborate, in a process that has seen the existing values come together with higher education institutions and research centres that are more or less geographically close to the Reserve. At the same time, the municipalities will continue their community engagement efforts to enhance and safeguard the values, particularly those related to geodiversity and biodiversity within the Core Areas, by focusing on education and training, especially for activities in Buffer Zones.

The research and monitoring programmes that are currently underway will continue under the Action Plan, and additional lines of support will be created as part of the development and implementation of the Plan.

5

SUPPORT

5.1

SIGNED BY THE AUTHORITY IN CHARGE OF THE MANAGEMENT OF THE CORE AREA(S)

I INSTITUTO DA CONSERVAÇÃO DA NATUREZA E DAS FLORESTAS, IP (ICNF, IP)

Name - Nuno Miguel Soares Banza

Position - Chairperson of the Board of Directors

Contact - Avenida Dr. Alfredo Magalhães Ramalho, nº 1, 1495-165 ALGÉS -PORTUGAL

Telephone - (+351) 213 507 900

Email - secretariado.cd@icnf.pt

General Website - icnf.pt

DIREÇÃO REGIONAL DE CONSERVAÇÃO DA NATUREZA E FLORESTAS DE LISBOA E VALE DO TEJO REGIONAL (DIRECTORATE FOR NATURE CONSERVATION AND FORESTS OF LISBON AND THE TAGUS VALLEY)

Name - Rui Manuel Felizardo Pombo

Position- Regional Director

Contact - CNEMA - Quinta das Cegonhas - Apartado 59, 2001-901 SANTARÉM – PORTUGAL

Telephone - (+351) 243 306 530

Email - DRCNF.LVT@icnf.pt

General Website - icnf.pt

DEPARTAMENTO REGIONAL DE CONSERVAÇÃO DA NATUREZA E BIODIVERSIDADE NA ÁREA DE JURISDIÇÃO DO DEPARTAMENTO DE CONSERVAÇÃO DA NATUREZA E FLORESTAS DE LISBOA E VALE DO TEJO PARQUE NATURAL DA ARRÁBIDA (PNA) (REGIONAL DEPARTMENT OF NATURE CONSERVATION AND BIODIVERSITY WITHIN THE JURISDICTION OF THE DEPARTMENT FOR NATURE CONSERVATION AND FORESTS OF LISBON AND THE TAGUS VALLEY ARRÁBIDA NATURAL PARK)

Name - Ana Cristina Projeto Falcão

Position - Director

Contact - Praça da República, 2900-587 SETÚBAL – PORTUGAL

Telephone - (+351) 265 541 140

Email - pnarr@icnf.pt

General Website - icnf.pt

5.2

SIGNED BY THE AUTHORITIES IN CHARGE OF THE MANAGEMENT OF THE BUFFER ZONE(S)

I INSTITUTO DA CONSERVAÇÃO DA NATUREZA E DAS FLORESTAS, IP (ICNF, IP)

Name - Nuno Miguel Soares Banza

Position - Chairperson of the Board of Directors

Contact - Avenida Dr. Alfredo Magalhães Ramalho, nº 1, 1495-165 ALGÉS - PORTUGAL

Telephone - (+351) 213 507 900

Email - secretariado.cd@icnf.pt

General Website - icnf.pt

DIREÇÃO REGIONAL DE CONSERVAÇÃO DA NATUREZA E FLORESTAS DE LISBOA E VALE DO TEJO REGIONAL (DIRECTORATE FOR NATURE CONSERVATION AND FORESTS OF LISBON AND THE TAGUS VALLEY)

Name - Rui Manuel Felizardo Pombo

Position - Regional Director

Contact - CNEMA - Quinta das Cegonhas - Apartado 59, 2001-901 SANTARÉM – PORTUGAL

Telephone - (+351) 243 306 530

Email - DRCNF.LVT@icnf.pt

General Website - icnf.pt

DEPARTAMENTO REGIONAL DE CONSERVAÇÃO DA NATUREZA E BIODIVERSIDADE NA ÁREA DE JURISDIÇÃO DO DEPARTAMENTO DE CONSERVAÇÃO DA NATUREZA E FLORESTAS DE LISBOA E VALE DO TEJO PARQUE NATURAL DA ARRÁBIDA (PNA) (REGIONAL DEPARTMENT OF NATURE CONSERVATION AND BIODIVERSITY WITHIN THE JURISDICTION OF THE DEPARTMENT FOR NATURE CONSERVATION AND FORESTS OF LISBON AND THE TAGUS VALLEY ARRÁBIDA NATURAL PARK)

Name - Ana Cristina Projeto Falcão

Position - Director

Contact - Praça da República, 2900-587 SETÚBAL – PORTUGAL

Telephone - (+351) 265 541 140

Email - pnarr@icnf.pt

General Website - icnf.pt

PALMELA CITY COUNCIL

Name - Álvaro Manuel Balseiro Amaro

Position - Mayor

Contact - Largo do Município, 2954-001 PALMELA – PORTUGAL

Telephone - (+351) 212 336 600

Email - alvaro.balseiro.amaro@cm-palmela.pt | gap@cm-palmela.pt | geral@cm-palmela.pt

General Website - www.cm-palmela.pt

SESIMBRA CITY COUNCIL

Name - Francisco Manuel Firmino de Jesus

Position - Mayor

Contact - Rua da República, nº 3, 2970-741 SESIMBRA – PORTUGAL

Telephone - (+351) 212 288 500

Email - presidencia@cm-sesimbra.pt | informacao@cm-sesimbra.pt

General Website - www.sesimbra.pt

SETÚBAL CITY COUNCIL

Name - André Valente Martins

Position - Mayor

Contact - Edifício dos Paços do Concelho, Praça de Bocage, 2901-866 SETÚBAL – PORTUGAL

Telephone - (+351) 265 541 500

Email - gap@mun-setubal.pt | smci@mun-setubal.pt

General Website - www.mun-setubal.pt

5.3

SIGNED BY THE AUTHORITIES IN CHARGE OF THE MANAGEMENT OF THE CORE AREA(S) AND THE BUFFER ZONE(S)

I INSTITUTO DA CONSERVAÇÃO DA NATUREZA E DAS FLORESTAS, IP (ICNF, IP)

Name - Nuno Miguel Soares Banza

Position - Chairperson of the Board of Directors

Contact - Avenida Dr. Alfredo Magalhães Ramalho, nº 1, 1495-165 ALGÉS - PORTUGAL

Telephone - (+351) 213 507 900

Email - secretariado.cd@icnf.pt

General Website - icnf.pt

DIREÇÃO REGIONAL DE CONSERVAÇÃO DA NATUREZA E FLORESTAS DE LISBOA E VALE DO TEJO REGIONAL (DIRECTORATE FOR NATURE CONSERVATION AND FORESTS OF LISBON AND THE TAGUS VALLEY)

Name - Rui Manuel Felizardo Pombo

Position - Regional Director

Contact - CNEMA - Quinta das Cegonhas - Apartado 59, 2001-901 SANTARÉM – PORTUGAL

Telephone - (+351) 243 306 530

Email - DRCNF.LVT@icnf.pt

General Website - icnf.pt

DEPARTAMENTO REGIONAL DE CONSERVAÇÃO DA NATUREZA E BIODIVERSIDADE NA ÁREA DE JURISDIÇÃO DO DEPARTAMENTO DE CONSERVAÇÃO DA NATUREZA E FLORESTAS DE LISBOA E VALE DO TEJO PARQUE NATURAL DA ARRÁBIDA (PNA) (REGIONAL DEPARTMENT OF NATURE CONSERVATION AND BIODIVERSITY WITHIN THE JURISDICTION OF THE DEPARTMENT FOR NATURE CONSERVATION AND FORESTS OF LISBON AND THE TAGUS VALLEY ARRÁBIDA NATURAL PARK)

Name - Ana Cristina Projeto Falcão

Position - Director

Contact - Praça da República, 2900-587 SETÚBAL – PORTUGAL

Telephone - (+351) 265 541 140

Email - pnarr@icnf.pt

General Website - icnf.p

PALMELA CITY COUNCIL

Name - Álvaro Manuel Balseiro Amaro

Position - Mayor

Contact - Largo do Município, 2954-001 PALMELA - PORTUGAL

Telephone - (+351) 212 336 600

Email - alvaro.balseiro.amaro@cm-palmela.pt | gap@cm-palmela.pt | geral@cm-palmela.pt

General Website - www.cm-palmela.pt

SESIMBRA CITY COUNCIL

Name - Francisco Manuel Firmino de Jesus

Position - Mayor

Contact - Rua da República, nº 3, 2970-741 SESIMBRA – PORTUGAL

Telephone - (+351) 212 288 500

Email - presidencia@cm-sesimbra.pt | informacao@cm-sesimbra.pt

General Website - www.sesimbra.pt

SETÚBAL CITY COUNCIL

Name - André Valente Martins

Position - Mayor

Contact - Edifício dos Paços do Concelho, Praça de Bocage - 2901-866 SETÚBAL – PORTUGAL

Telephone - (+351) 265 541 500

Email - gap@mun-setubal.pt | smci@mun-setubal.pt

General Website - www.mun-setubal.pt

5.4

SIGNATURE OF LOCAL EXECUTIVE AUTHORITY

ASSOCIAÇÃO DE MUNICÍPIOS DA REGIÃO DE SETÚBAL

Name - André Valente Martins

Position - Chairperson of the Board of Directors

Contact - Avenida Dr. Manuel Arriaga, nº 6 - 2º Esq., 2900-473 SETÚBAL – PORTUGAL

Telephone - (+351) 265 539 090

Email - amrs@amrs.pt

General Website - www.amrs.pt

PALMELA CITY COUNCIL

Name - Álvaro Manuel Balseiro Amaro

Position - Mayor

Contact - Largo do Município, 2954-001 PALMELA - PORTUGAL

Telephone - (+351) 212 336 600

Email - alvaro.balseiro.amaro@cm-palmela.pt | gap@cm-palmela.pt | geral@cm-palmela.pt

General Website - www.cm-palmela.pt

SESIMBRA CITY COUNCIL

Name - Francisco Manuel Firmino de Jesus

Position - Mayor

Contact - Rua da República, nº 3, 2970-741 SESIMBRA – PORTUGAL

Telephone - (+351) 212 288 500

Email - presidencia@cm-sesimbra.pt | informacao@cm-sesimbra.pt

General Website - www.sesimbra.pt

SETÚBAL CITY COUNCIL

Name - André Valente Martins

Position - Mayor

Contact - Edifício dos Paços do Concelho, Praça de Bocage - 2901-866 SETÚBAL – PORTUGAL

Telephone - (+351) 265 541 500

Email - gap@mun-setubal.pt | smci@mun-setubal.pt

General Website - www.mun-setubal.pt

5.5

SIGNED ON BEHALF OF THE MAB NATIONAL COMMITTEE

MAB NATIONAL COMMITTEE

Name - Anabela Rodrigues dos Santos Trindade

Position - Chairperson of the National Committee for the MAB Programme

Contact - Avenida Dr. Alfredo Magalhães Ramalho, nº 1, 1495-165 ALGÉS - PORTUGAL

Telephone - (+351) 265 539 090

Email - Anabela.Trindade@icnf.pt

General Website - icnf.pt



Part II

Description



6

LOCATION (COORDINATES AND MAPS)

The proposed Biosphere Reserve is located in mainland Portugal, at the southern tip of the Setúbal Peninsula. It has a total area of approximately 20,153 ha, according to the WGS84 projection system (EPSG: 4326).



Figure 6.1 - Context of Portugal, indicating the location of the Arrábida Biosphere Reserve

6.1

PROVIDE THE BIOSPHERE RESERVE'S STANDARD GEOGRAPHICAL COORDINATES (ALL PROJECTED UNDER WGS 84)

CARDINAL POINTS	LATITUDE	LONGITUDE
Most central point	38°29'8,9839"N	9°1'54,3045"W
Northernmost point	38°34'42,1565"N	8°53'56,2628"W
Southernmost point	38°24'0,1886"N	9°11'50,8205"W
Westernmost point	38°24'43,1148"N	9°13'54,6446"W
Easternmost point	38°32'39,1479"N	8°53'3,8042"W

Table 6.1-1 - Geographical coordinates of the Arrábida Biosphere Reserve

6.2

PROVIDE MAP(S) ON A TOPOGRAPHIC LAYER OF THE PRECISE LOCATION AND DELIMITATION OF THE THREE ZONES OF THE BIOSPHERE RESERVE

The zoning of the proposed Reserve, according to the WGS84 projection system (EPSG: 4326) with the delimitation of the three zones of the Biosphere Reserve⁶, which reflect the three different functions recommended for Biosphere Reserves within the UNESCO MaB Programme.

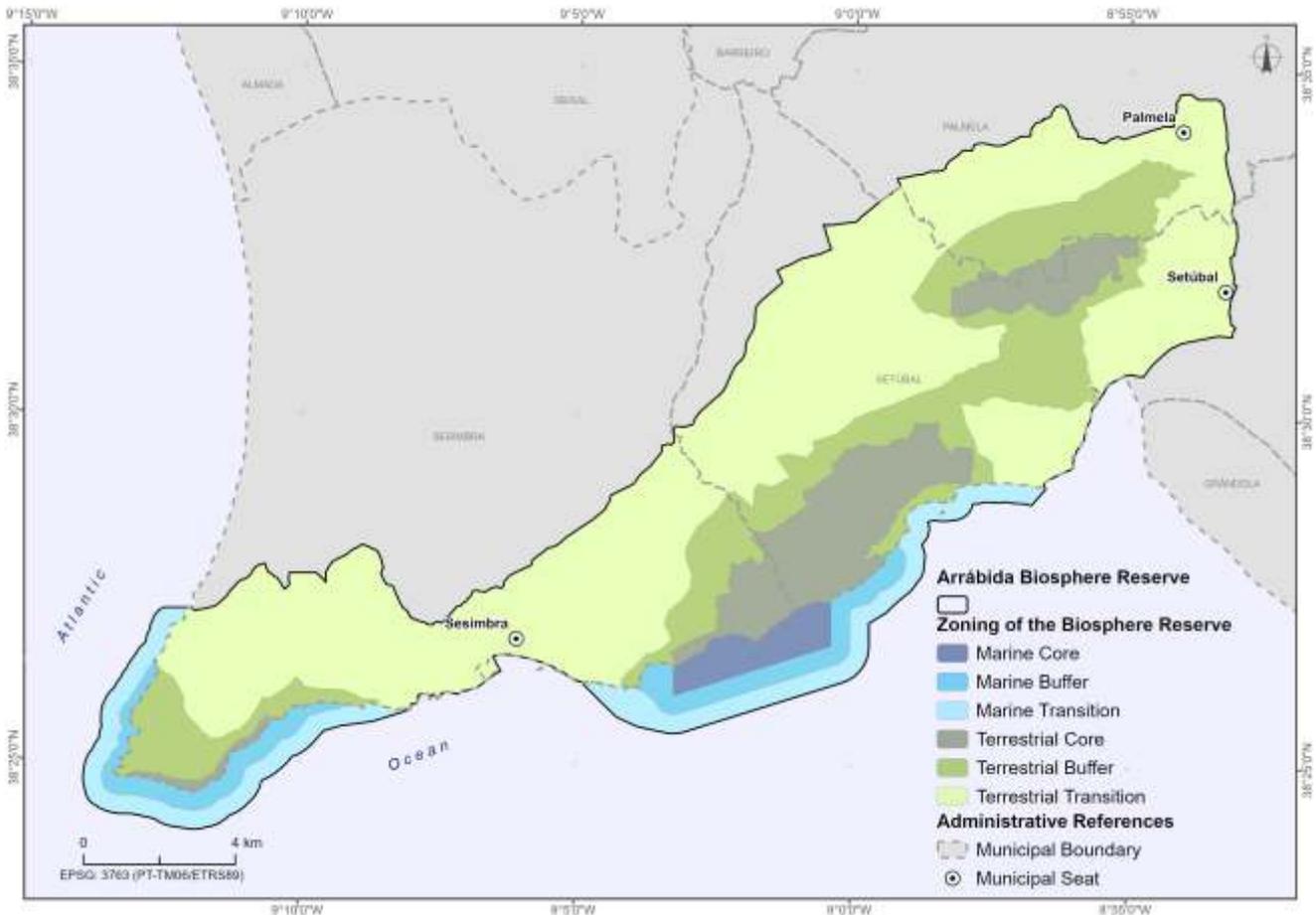


Figure 6.2 - Zoning of the Arrábida Biosphere Reserve, on a map base, according to the WGS84 coordinates system (EPSG: 4326).

⁶ The shapefiles (also in the WGS 84 coordinates system) used to produce the map presented are attached to the Form.

7

AREA

The Arrábida Biosphere Reserve has a total area of 20,152.92 ha, of which 17,196.17 ha correspond to terrestrial areas and 2,956.76 ha to marine areas, down to a depth of -50 m.

AREAS	LAND (ha)	MARINE (ha)	TOTAL (ha)	% AREA
7.1 CORE AREA	2 247,22	440,94	2 688,16	13,34%
7.2 BUFFER ZONE	3 771,40	953,76	4 725,16	23,45%
7.3 TRANSITION AREA	11 177,55	1 562,06	12 739,61	63,21%
TOTAL (ha)	17 196,17	2 956,76	20 152,92	100,00%

Table 7-1 - Areas of the Arrábida Biosphere Reserve, according to the WGS 84 coordinates system (EPSG: 4326).

7.4

BRIEF RATIONALE OF THIS ZONATION IN TERMS OF THE RESPECTIVE FUNCTIONS OF THE BIOSPHERE RESERVE

Approximately 73% of the territory of the proposed Biosphere Reserve is classified as Arrábida Natural Park (which includes the Professor Luiz Saldanha Marine Park created by Regulatory Decree no. 23/98), and 84% is classified as Natura 2000 Network (including the Arrábida/Espichel Special Conservation Area and the Cape Espichel Special Protection Area PTZPE0050). These legal statutes provide this territory with enhanced protection in terms of management for the conservation of habitats, flora, and fauna species.

The proposed zoning is the result of an extensive process of debate with local stakeholders, involved in consultations and joint working sessions, bringing together the concerns of municipalities and local authorities, the associative movement, fishing professionals, environmental advocacy associations and organisations, and tourism and leisure operators who use the territory. The zoning ensures an interaction between the areas it coordinates, not only in terms of biodiversity and habitats, but also in terms of human activities and uses, ensuring transitions between the zones that

simultaneously allow protecting what is intended to be conserved and the use and development of the values and activities that are associated with them or depend on them.

The protection statutes outlined in the Arrábida Natural Park Management Plan and the Arrábida/Espichel ZEC Management Plan (under approval) were taken into account, including various degrees of conditioning factors, thus translating into the zoning of the proposed Reserve.

In the proposed Biosphere Reserve, two types of **Core Areas** were considered: Terrestrial Core Area and Marine Core Area, in accordance with Figure 7.1. Together, they occupy approximately 13% of the total area proposed for the Biosphere Reserve.

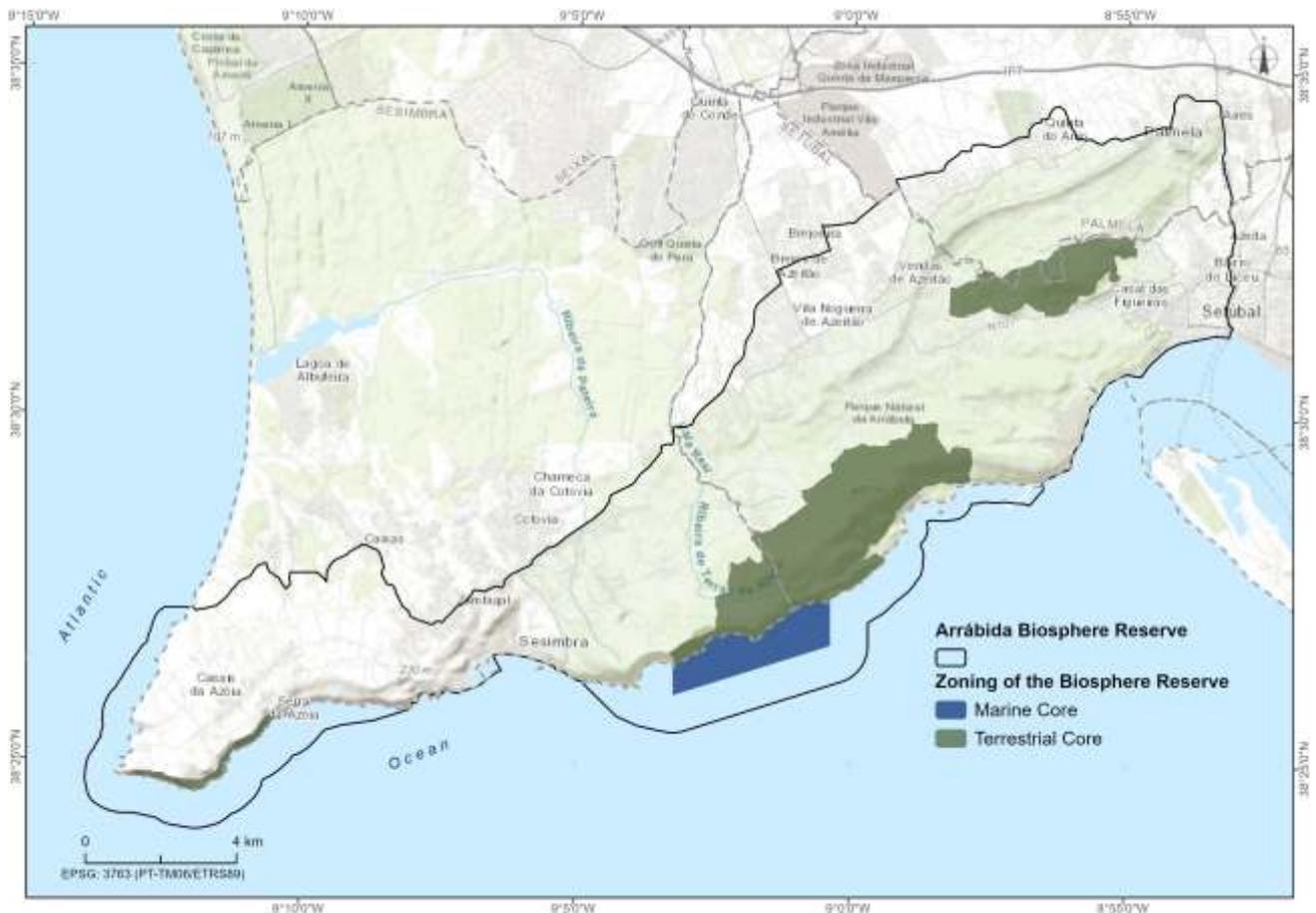


Figure 7.1 - Core Areas of the Arrábida Biosphere Reserve

The **Terrestrial Core Areas** of the proposed Reserve coincide with the Arrábida Natural Park (PNA) and the Arrábida/Espichel ZEC of the Natura 2000 Network. The main legal classification is provided by RCM no. 141/2005, of 23 August, which approves the PNA Management Plan. This is common to part of the proposed Reserve. Core Areas include areas subject to the total protection scheme, which include unique vegetation formations of oak forests, areas where local and national floristic endemisms occur, and avifauna with special conservation status. These Core Areas correspond to Mata do Vidal, Mata do Solitário, Mata Coberta Nascente, Mata Coberta Poente woodlands, and the southern cliff of Cape Espichel. Additionally, the **Marine Core Area** corresponds to the seabed south of the Risco Escarpment.

In these areas, activities are restricted to harmonise with the natural values present. The law states that whenever these areas do not belong to the public or private domain of the State, priority should be given to forms of contractualisation with the owners, taking into account nature conservation objectives, which is relevant to the vision for the Arrábida Biosphere Reserve.

In the event of the loss, in any way, of the exceptional values that led to the classification of this area, they do not lose the status assigned to them. The responsible entities, in coordination with the ICNF, must develop all actions to ensure the restoration of the pre-existing conditions. This implies the commitment of the Portuguese state to the potential restoration of the values that this Reserve encompasses.

Fully protected areas are non aedificandi spaces where human presence, except for the respective owners, is only permitted for scientific research and dissemination; for environmental monitoring, and for carrying out actions to protect the area and the conservation interests that led to its classification, or for surveillance and inspection purposes.

In the marine environment, the **Marine Core Area** corresponds to the area between Cape Lagosteiros and Ponta de São Pedro at the base of the Risco Mountain Range, coinciding entirely with the area classified as Total Protection according to the PNA Management Plan. This area encompasses the main underwater habitats formed by rocky blocks with a high level of morphological diversity and associated mobile bottoms, which are a unique resource along the Portuguese coast and are responsible for high marine biodiversity values at European level.

Portuguese legislation sets out the following priority objectives for the proposed marine core areas:

- a) Set up a marine biodiversity reserve;
- b) Ensure the maintenance of natural values and processes in a state of minimal disturbance;
- c) Preserve ecologically representative examples in a dynamic and evolving state.

Just as in the terrestrial core areas, in the event of the loss, in any way, of the exceptional values that led to the classification of this area, it does not lose the value assigned to it. The responsible entities, in coordination with the ICNF, must develop all actions to ensure the restoration of the pre-existing conditions.

Human presence in this area is only permitted in the following situations:

- a) For scientific research and dissemination purpose;
- b) For environmental monitoring and for carrying out actions for nature conservation and protecting the interests that led to the classification of the area;
- c) For surveillance and inspection purposes;
- d) In risk or calamity situations;

- e) The harmless passing of vessels, parallel to the coastline, at a distance greater than one-quarter of a mile.

The **Buffer Zone**, which occupies approximately 24% of the total area of the proposed Reserve, surrounds the Core Areas, ensuring in all cases that its use is compatible with the fundamental objectives of the core areas. There is some population in the Buffer Zone and there is low-intensity use that, due to the effectiveness of the land planning instruments covering the region, ensures a protective buffer. The terrestrial buffer zones essentially correspond to type I and type II partial protection areas, and type I complementary protection areas, within the context of land-use planning instruments, namely the PNA Management Plan. Type I and type II partial protection areas are *non-aedificandi* area, with very restricted uses under the current legal framework. The marine buffer zone encompasses partial and complementary protection areas, which include several traditional fishing activities. In the areas of the **Terrestrial Buffer Zone**, traditional activities ranging from agriculture to fishing are permitted, forming the basis of important economic sectors of regional significance, adding value and contributing to the creation of important development axes in balance with natural values.

Two types of **Transition Areas** have been included in the Biosphere Reserve: Terrestrial Transition Area and Marine Transition Area, in accordance with the following figure.

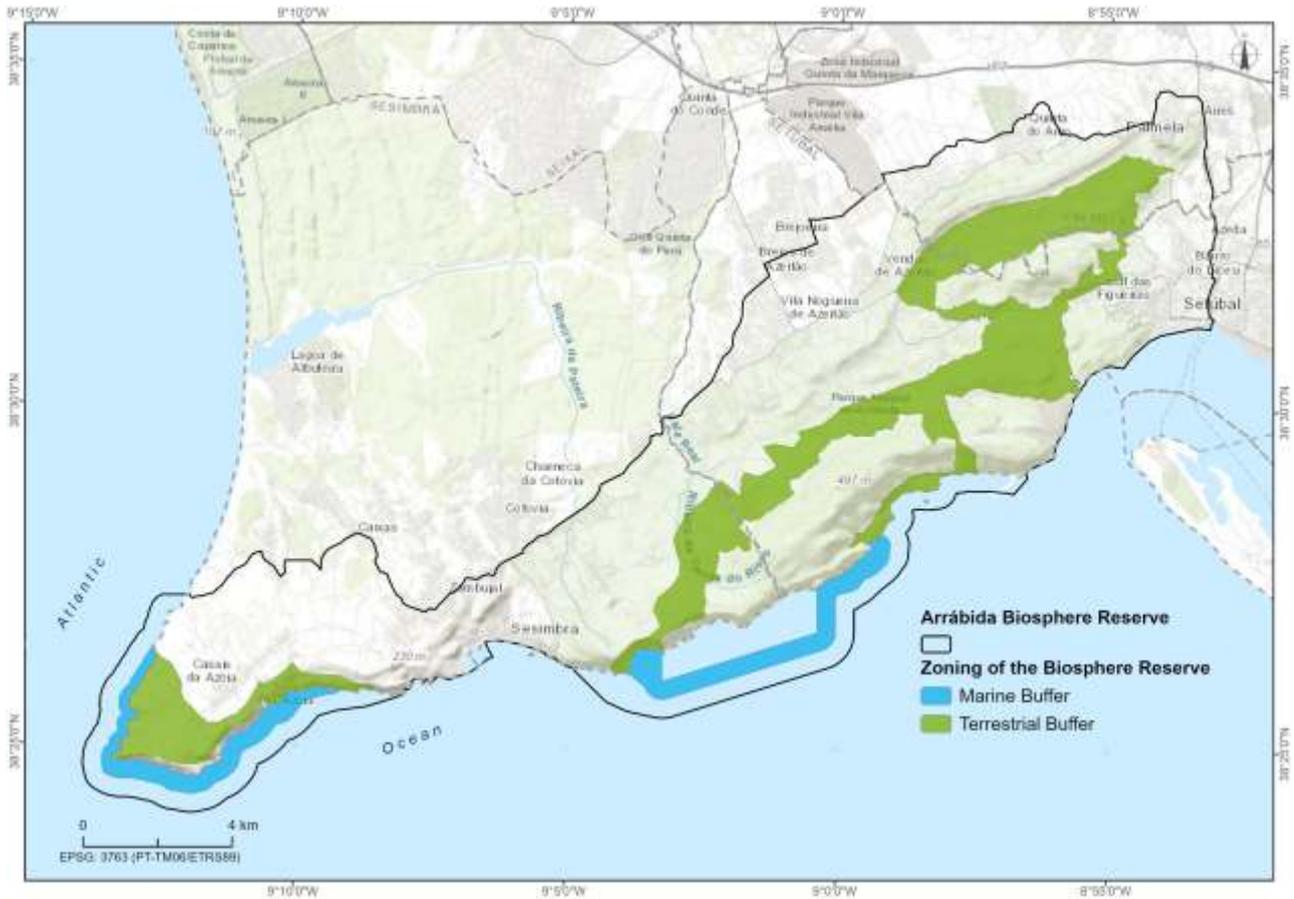


Figure 7.2 - Buffer Zones of the Arrábida Biosphere Reserve

The **Terrestrial Transition Area** occupying approximately 55.45% of the total Reserve, it is large enough to ensure a transitional zoning that contributes significantly to the protection of core values. Additionally, it encompasses a region where economic activity relies on strong regulation and monitoring - a large portion of the transition area is also covered by the Arrábida Natural Park – as well as regions with higher residential occupation and a significant presence of services. The transition area, particularly the terrestrial one, thus contributes to the existence of the necessary social, cultural, and economic infrastructure that can support the use and enjoyment of natural values by residents and visitors. We highlight the urban centres of Palmela, Quinta do Anjo, Setúbal, Azeitão, and Sesimbra.

The **Marine Transition Area**, encompasses an area that is not included in the Marine Park. In this area, fishing is an important source of income for local populations, fuelling a value chain that is also a regional element, especially given the role of artisanal fishing and leisure activities related to maritime tourism. Despite some economic and sports use, the marine transition area does not have fishing ports or marinas. There is only a mooring area at Portinho da Arrábida and Galápos, with a limited number of buoys and moorings, managed by one of the partners in the application and the Reserve.

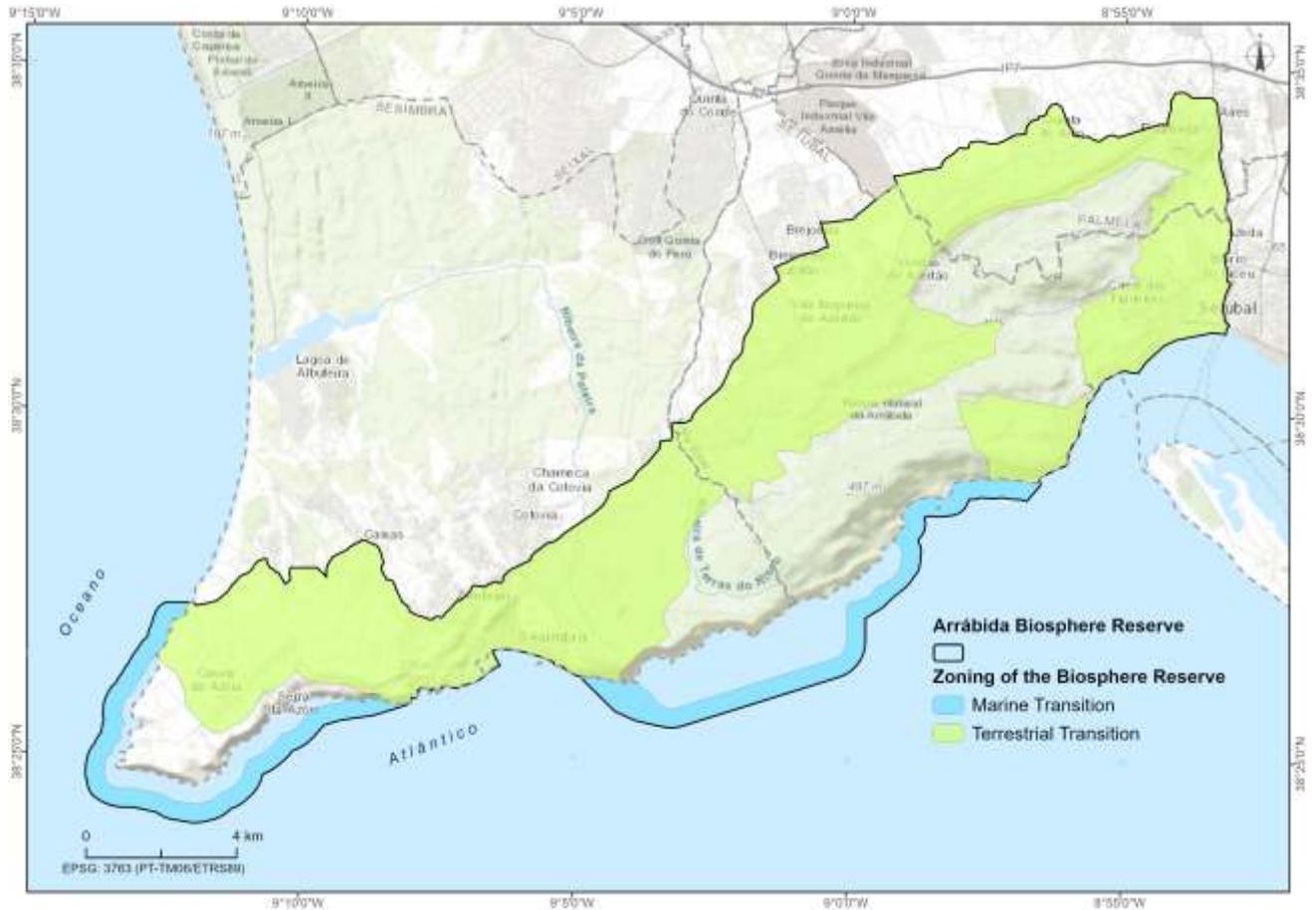


Figure 7.3 - Transition Areas of the Arrábida Biosphere Reserve

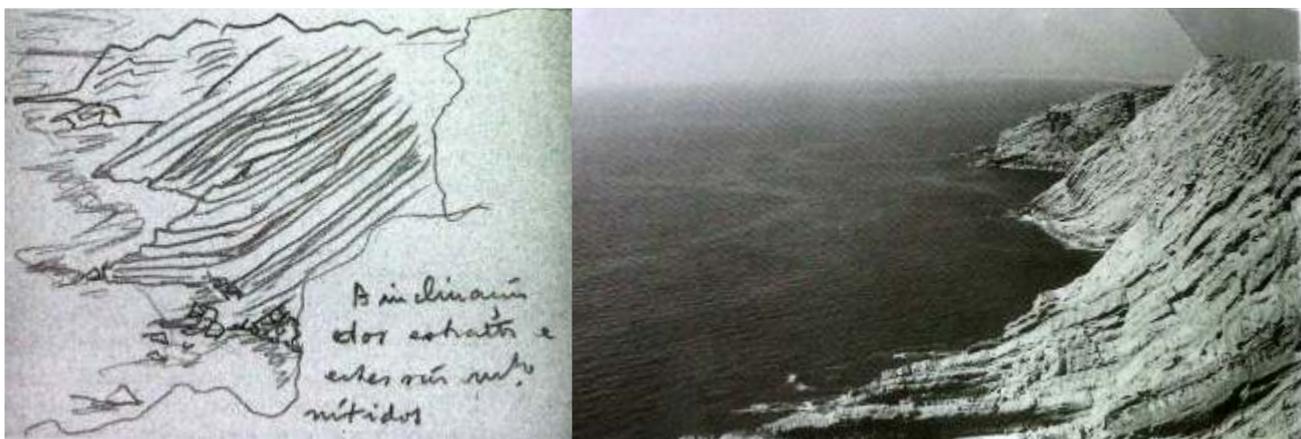
8

BIOGEOGRAPHICAL REGION

According to Udvardy's classification, the Arrábida Biosphere Reserve falls within the Palearctic realm, on the boundary between the biogeographical provinces 'Iberian Highlands' and 'Mediterranean Sclerophyll'. Given the particularities of the Reserve's territory, it can be said that it has characteristics of both provinces, with south-facing slopes sheltered from the prevailing northwest winds, which are wetter and cooler, and a region with generally gentler slopes, facing north and exposed to greater influence from cold, dry winds. From a purely cartographic reading of Udvardy's classification, the Reserve would be strictly located in the Iberian Highlands region. However, it is appropriate to identify regions of sclerophyll forest within its perimeter, which allows us to place the Reserve on the edge of the aforementioned provinces.

According to the biogeographical typology for mainland Portugal developed by Costa et al. (1998) based on the work by Rivaz-Martínez and colleagues (1990), the Arrábida Biosphere Reserve is located in the Mediterranean region, which is characterised by a scarcity of summer rainfall, where plants are subjected to at least two dry months. Costa et al. (1998) further details - the Western Mediterranean sub-region, the Mediterranean-Ibero-Atlantic super-province, the Gaditano-Onubo-Algarviense province, the Ribatagano-Sadense sector, encompassing two super-districts: the Sadense super-district and, for the most part, the Arrabidense super-district.

In 'A Arrábida, Esboço Geográfico', Orlando Ribeiro provides an in-depth description of what he observed and interpreted in this territory, in terms of geology, relief factors



in 'A Arrábida, Esboço Geográfico' by Orlando Ribeiro

and forms climate and vegetation, and aspects of the human geography of Arrábida, leaving an indelible mark on scholars of subsequent generations in various fields. The author acknowledges that, although Arrábida has a 'limited surface', it is nonetheless 'extremely complex in terms of the elements of its geography', following the teachings of Paul Choffat who stated that Arrábida 'présente tout un traité de géologie, autant par sa structure que par suite de nombreux changements de faciès des strates qui la composent'. In this context, Arrábida stands out as a unique place in landscape richness: 'I don't know of any other place in Portugal' - Orlando Ribeiro says - 'where, in such a small space, one can contemplate such varied natural aspects.'

According to his descriptions, Orlando Ribeiro refers to the Arrábida Mountain Range as **'a small mountainous region located in the southern part of the Setúbal Peninsula; bounded to the south and west by the Ocean, bordered to the north and east by the low-lying sandy lands that occupy most of the peninsula.'**

Describing this site with a clear geographical individuality, Orlando Ribeiro mentions that the group of elevations naturally clusters 'into three lines of relief, separated by valleys. The first line consists of small hills on the outskirts of Sesimbra, the Risco and Arrábida mountain ranges, and the hills stretching from Outão to Setúbal. It is the most typical area of the entire mountain range, with the most vigorous morphology; a little to the west of Sesimbra, it gently slopes down to Cape Espichel.

North of the end of this line runs another one with the São Luís and Barris or Gaiteiros mountain ranges, opening into a wide valley that, near São Luís, bifurcates to encircle that mountain and separate it both from the hills of Setúbal and from a series of

elevations stretching from Palmela to the west and forming the third line of reliefs. Overlooking the sandy plain, those run increasingly lower to the west of Coina-a-Velha, where they fade away; as they form a kind of advanced bastion of the mountain range, I have called them *Pre-Arrábida*."



One of the sources of Arrábida's geographical individuality is the fact that the boundaries of the region coincide 'with those of the land that constitutes it, an unusual case of agreement between geology and landscape'. In Orlando Ribeiro's description: 'To the west and south, Arrábida is bathed by the sea; the mountains, very close to the coast, fall steeply onto it, forming imposing cliffs. To the north and east, the boundary lies at the transition to the sandy plain: on the Palmela side, it is marked by a very abrupt orographic drop; between this point and Coima-a-Velha, it is marked by the aforementioned line of pre-Arrábida hills that fade away to the west, where the distinctive features are more attenuated. The boundaries are well defined in the composition, structure, and relief of the soil: human occupation, with the changes it has introduced into the vegetation cover, has contributed to making the transition, which is very abrupt in physical geography forms, smoother and less precise.'

In addition to the coastal forms, Orlando Ribeiro identifies seven main types of relief in Arrábida:

- 1 - the *mountain*, consisting of compact terrain, which stands out for its altitude in the region as a whole;
- 2 - the *hill*, with a smaller size;
- 3 - the inner *escarpment*, with a monoclinical relief (...);
- 4 - the *valley* of the streams, parallel to the folds;
- 5 - the *ravine* of torrential erosion, narrow and deep;
- 6 - the *tiphonic valley* of Sesimbra (...);
- 7 - the western *plateau* of Cape Espichel.

Regarding coastal forms, 'the Arrábida coast is the largest break in the direction of the Portuguese western coast'.

Regarding climate, there is great variety due to the contrasts in exposure and the special orientation of the mountain range. The following are the most important climate factors: 'the **relief**, which causes the condensation of masses of water vapour, the sea which sometimes sweetens and regulates the temperature, sometimes generates impetuous winds laden with moisture; the **plain** which, inland, constitutes a large reservoir of high temperatures during the summer; the **exposure** to a set of topographic and atmospheric circumstances that result in remarkable local diversities. (...) the oceanic influence decreases from west to east, while continental influence increases in that direction; humidity is higher to the west and precipitation is more abundant on the northern side of the elevations; south-facing slopes are warmer in the winter, have a clearer atmosphere and a more regular climate; the inland valleys and areas sheltered from maritime winds by the relief are very hot and dry during the summer; the northern slopes of the mountain enjoy moderate temperatures in the summer; the influence of the sea prevails over all others and gives the climate of Arrábida a more southern character than its latitude.'

The vegetation is influenced by the climate and the orography: 'the southern exposure, the shelter from the cold north wind, the influence of the humidity from the sea or the dryness of the inland plains, the special climatic types created by the relief forms (...) are many other climate conditions which, together with the nature of the soil, explain the physiognomy of Arrábida's vegetation. But in addition to these natural factors, we must take into account the profound action of Man, who has long been modifying the vegetation cover...'. 'The geobotanical characteristics of Arrábida clearly reflect the dominant conditions imposed by the composition and configuration of the soil. The pine forest and the moorland, or silty-clayey *garrigue*, thrive on sandy, quartzitic, detrital soils of all ages. The forest or maquis thrives preferably on dolomitic-siliceous limestone, sheltered from cold winds and exposed to warm southern humidity. The pure *garrigue* (scrubland) stretches across the mountain ridges on white limestone soils. In the wider valleys, on gentler slopes, on the plains, and on the small alluvial deposits of the streams, Man planted his crops.'



9

LAND USE

9.1

HISTORICAL ELEMENT

The diversity of landscapes and resources in the Arrábida region has been a determining factor in human communities choosing it as a place to settle since ancient times.

One of the earliest signs of human presence in the region dates back to **40,000 years** ago, specifically in the Figueira Brava Cave. The main activities of the nomadic communities that found shelter here were hunting and gathering. That era reveals a very different Arrábida from today, where large mammals such as wild horses, aurochs, mammoths, and deer abounded, among others characteristic of the colder climate of the time.

From **7,600 BP (*Before Present*)**, the consequent modification of the landscape and available resources, as a result of a gradual increase in average temperature, led hunter-gatherer groups to develop broad-spectrum subsistence strategies, promoting an intensification of the economy, preceding and preparing for the Neolithic period.

These communities were also transformative agents of the landscape, as their process of sedentarisation involved a more intense and extensive exploitation of their territory. The creation of agricultural land, but especially the clearing of woodlands and forests for pasture, accelerated the landscape anthropisation process.

Such availability and control of resources resulted in an accumulation of surpluses, demographic growth, and the freeing up of labour for other tasks. The discovery of copper mining, which was practised in some villages in Arrábida, introduced new technological advancements, alongside other activities that developed, such as weaving and pottery. This led to the introduction of products derived from food processing, such as cheese. All these transformations that occurred in the **Chalcolithic** period implied a more stratified social organisation, leading to increased tensions between groups. Thus, while in the **Neolithic** period communities lived peacefully in unprotected settlements, in the Chalcolithic period we see populations moving up to the hilltops, building settlements, sometimes fortified with walls.



Figueira Brava Cave



With the **Bronze Age**, we see an accentuation of social stratification and inequality, reflected in the hierarchical settlement model based on a system of relationships on a central hub. The recent identification of a large settlement, *Povoado do Risco*, located in the valley adjacent to the northern slope of the Risco Mountain Range (Figure below) in Sesimbra, may correspond to a central hub in the settlement of this period.

From the **8th century BC** (First Iron Age), commercial and cultural contacts were established between the indigenous communities of Arrábida and the Phoenician sailors and traders from the Western (Gulf of Cadiz) and the Eastern Mediterranean (Syrian-Palestinian Strip). Between the **1st and 5th centuries AD**, along the banks of the Sado Estuary (a phenomenon synchronous with the Tagus Estuary) and in the Arrábida mountain range, the Romans set up important structures for the production of fish preserves (*Garum*⁷ and fish sauces). Tróia stands out as the most prominent case. Alongside those developments, ceramic production centres emerged, producing vessels like amphorae, *dolia*⁸, and large pots used for storing and transporting these products. Those centres were subsidiary to the Tróia complex.

Fishing and salt mining, along with the production of preserved fish and pottery, were the main activities practised in the region. On the other hand, olive oil, vineyards, and cereals were also important crops in the agrarian structures set up in the fertile valleys of Arrábida, Palmela, and Setúbal. From the River Sado, the driving force behind all this commercial activity, boats would often leave for the port of Gades (Cadiz) and various destinations in the western empire.

⁷ Food produced from salted fish paste highly appreciated by the Romans.

⁸ Large ceramic vase used for transporting products.

After the Christian reconquest, the population took refuge around Palmela and Sesimbra, leading to a return to the countryside and regulation of its exploitation. The territories of Arrábida were managed by the **Order of Santiago**, allowing free use of certain resources such as wood, honey, wax, hunting, and pastures in some areas.



St. James Fighting the Moors 1520-1530
Unknown author, oil on oak wood, National Museum of Ancient Art

The **16th century** was also Setúbal's golden age. The town's adaptation to long-distance navigation was crucial for it to succeed among other ports that were failing. By moving the salt pans further inland within the estuary, it became one of the largest salt producers in the Western world.

In the **17th century** we already find some references, in the documentation of the Order of Santiago, to windmills in Palmela, such as the following that appears in the demarcation of the town of Reguengo dos Fetais '(...)marker rising by the windmill hill (...)', which attests to the importance of cereal cultivation in this territory⁹.

In the **19th century**, Portugal implemented various measures to promote agriculture and reduce wasteland. The extinction of bonds and of the Order of Santiago led to the transfer of land into other hands, including those of wealthy aristocrats and bourgeois.

The establishment of the José Maria da Fonseca company in **1825** stimulated wine production, and vineyard cultivation extended as far as conditions allowed. According to various sources, vineyards and wheat fields were abundant in the Picheleiros Valley, where the grapes for the renowned Moscatel wine originate. To the west, next to the Calhariz lands, wheat is predominant and is ground in the countless windmills that crown the hills of Arrábida.



⁹ In 1816, in the Military Topographic Map of the Setúbal Peninsula (Alves, 2004:3), the existing windmills can be quantified and identified (toponymy).

In the late **19th century**, historian Folque reported on the forest cover of this territory *'the strip of uncultivated soil on the Setúbal Peninsula that deserves special mention due to its location and appearance, is the Jurassic mountain range, consisting mainly of limestone, which runs from Palmela to Cape Espichel. Both the ridges and upper parts of the slopes of this mountain range and the Risco Mountain Range, as well as the Ares hill, and the hills that continue the mountain range all the way to Cape Espichel, are almost devoid of trees and without any crops over an area of 4,000 hectares.*

There are areas on this mountainous strip that are covered in undergrowth, especially in the heights of Sesimbra and the Cape; in other areas, where the limestone is completely exposed, forming rugged and bare crests and peaks, no vegetation can grow except for some olive trees or oaks that have taken root in the cracks that divide the limestone: in other areas, despite the ruggedness of the terrain, vigorous vegetation develops, as evidenced by the dense forest of Arrábida and the thickets of various types of shrubs that clothe the steep slopes of the mountain, from the convent of Arrábida to El Carmen, near Calariz.'

The elements of historical presence, both in terms of built heritage and those related to intangible manifestations, are more significant in the regions covered by the **Transition Area**. Since the **Buffer Zone** and the **Core Areas** are currently largely restricted in terms of use, there is limited presence of heritage, especially that which can be visited. However, there are some archaeological sites in the Buffer Zone, both in the Creiro area and in the Terras do Risco area, which can be visited.



9.2

WHO ARE THE MAIN USERS OF THE BIOSPHERE RESERVE?

The area of the Arrábida Biosphere Reserve corresponds to a territory that partially overlaps, in the Terrestrial Area, with the municipalities of Sesimbra, Setúbal, and Palmela. On the other hand, the surrounding Marine Area extends to a depth of -50 m, and its use is open to the local population and visitors.

The main users of the Biosphere Reserve are the population living within the terrestrial territory, concentrated in the population centres covered by it. The Transition Area is the one that shows a greater expression of human occupation compared to the entire territory covered, with 99.5% of the total population (see Chapter 10). On the other hand, the **Buffer Zones** have a residual fraction of users, with 0.5% of the total population (corresponding to just 360 inhabitants), and the **Core Areas** have no residents at all.

As shown in the following figure, the population located in the city of Setúbal União de Freguesias de Setúbal), Vendas de Azeitão, Salmoura, Vila Fresca de Azeitão, Vila Nogueira de Azeitão, Oleiros, Aldeia de Irmãos, Aldeias de São Pedro, Piedade e Portela, Aldeia Grande e Grelhal, Palmela, Quinta do Anjo, Cabanas, Aires, Baixa de Palmela, Maçã, Pedreiras, Zambujal de Cima, and Sesimbra is highlighted.

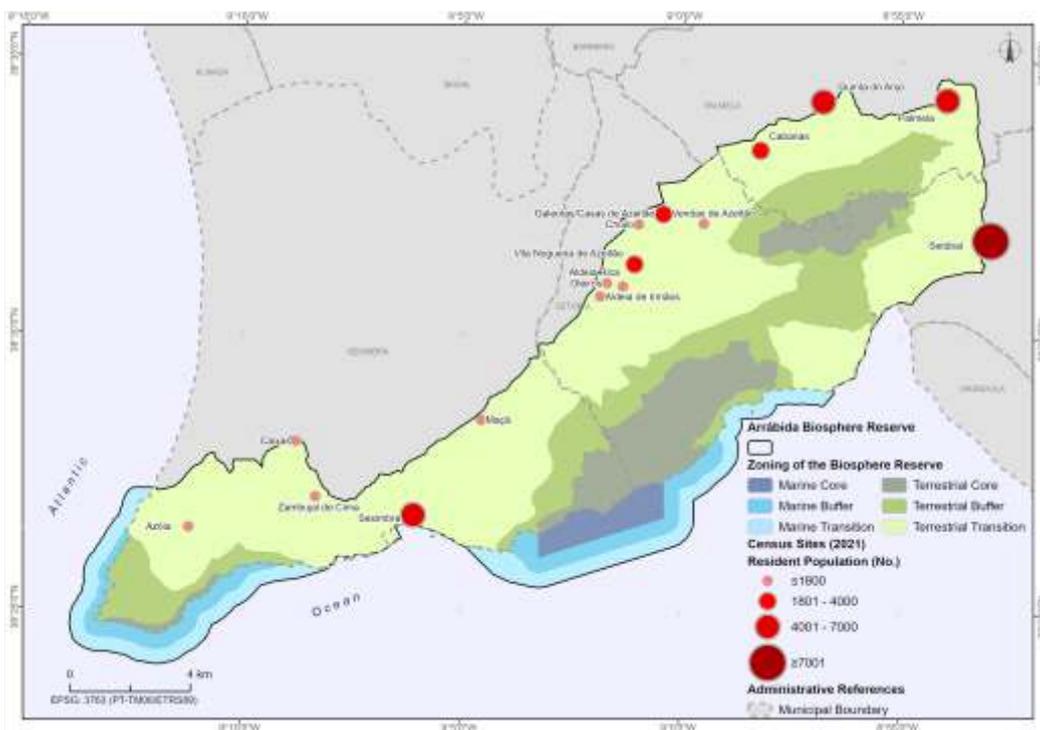


Figure 9.1 - Resident population (number of individuals) in the Arrábida Biosphere Reserve, by census location.

Most of the active population belongs to the **tertiary sector**, corresponding to commerce and services, such as public administration, education, health, banking and insurance, transportation, catering, and hospitality. In this sector, activities associated with tourism are quite significant, not only due to the growing number of accommodation units and overnight stays, but also in nature tourism, rural tourism, and maritime tourism activities. The number of visitors attracted by sports, leisure, cultural, religious, and environmental education activities is also particularly significant.

The **primary sector** also includes a significant portion of the population, focusing on activities such as small family farming, agroforestry, viticulture, beekeeping, livestock farming, pastoralism, and fishing.

In turn, the **secondary sector**, related to the processing of products, comprises activities carried out by a smaller number of individuals, including traditional cheese production, wine-making, bread-making, and extractive activities.

In the **Buffer Zone**, there is a small number of permanent users, the residents, and the economic activity associated with agriculture and pastoralism. In addition to agricultural activity, there are also nature tourism and research activities, especially developed by teams from the Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa and their respective research centres.

In the **Core Areas**, both terrestrial and marine, taking into account its current protection regimes and legal statutes, there are no significant pressures, and only activities compatible with the natural values present can be identified.

In the buffer zones, the main pressure - construction - is neutralised by land-use planning instruments, and visitation and other similar uses (such as organising sports, cultural, and leisure events) are extensively regulated and monitored, as are research, monitoring, or cleaning interventions focused on vegetation.

9.3

STRATEGIC FRAMEWORK

The strategic framework for the Arrábida Biosphere Reserve and the actions outlined in the Action Plan are defined by the Strategic Reference Framework (SRF) which, taking into account the scope and territorial impact of the application, gathered a set of strategic documents, plans, and programmes considered relevant in various domains. These documents, listed in annex, are presented below, differentiated between territorial management instruments (IGT), maritime spatial planning instruments, and other strategic plans and programmes. This analysis also summarises the main guidelines of the SRF, highlighting the themes of greater relevance/impact for the Arrábida Biosphere Reserve.

LAND MANAGEMENT INSTRUMENTS

The **National Spatial Planning Policy Programme (PNPOT)** was approved by Law no. 99/2019, of 5 September, repealing Law no. 58/2007, of 4 September. Five major Territorial Challenges were identified to address the spatial planning issues identified in the Diagnostic phase:

- '1. *Managing natural resources sustainably;*
- 2. *Promoting a polycentric urban system;*
- 3. *Promoting inclusion and enhancing territorial diversity;*
- 4. *Strengthening internal and external connectivity;*
- 5. *Promoting territorial governance'*.

These are subdivided into 15 territorially-based strategic options, of which option 1.1 stands out, given the nature of this application. **Enhancing natural capital, which 'involves considering the importance of three fundamental and strategic resources for promoting quality of life and generating wealth: water, soil, and biodiversity, which determine the suitability of the territory to produce goods and services and influence land use and occupation models.'**

In terms of the policy measures in force, those associated with the Natural Domain also stand out as being most in line with this application:

- '1.1 Managing water as a resource in a changing climate
- 1.2 Enhancing soil as a resource and combating its waste
- 1.3 Asserting biodiversity as a territorial asset
- 1.4 Enhancing the territory through landscape
- 1.6 Planning and revitalising forest territories

- 1.7 Preventing risks and adapting the territory to climate change
- 1.8 Enhancing the Coast and increasing its resilience'

The **National Water Plan (PNA)** was approved by Decree-Law no. 76/2016, of 9 November, and aims to define the major strategic options of the national water policy, to be implemented in particular by the hydrographic region management plans (PGRH) and the programmes of measures associated with them.

The PNA is therefore a national and strategic sectoral policy instrument, with the PGRH being the preferred instrument for its implementation. The **Management Plan for the Sado and Mira Hydrographic Region (PGRH - RH6)** is currently in force in the Biosphere Reserve area, corresponding to the 3rd planning cycle and approved by Resolution of the Council of Ministers no. 62/2024, of 3 April. The strategic objectives for RH6 are as follows:

- *'a) SO1 - Aligning Public Administration in water management;*
- *b) SO2 - Ensuring up-to-date knowledge of water resources;*
- *c) SO3 - Achieving and maintaining the Good Status/Potential of water bodies;*
- *d) SO4 - Ensuring water availability for current and future uses;*
- *e) SO5 - Ensuring the protection of ecosystems and biodiversity;*
- *f) SO6 - Promoting the effective and efficient management of risks associated with water;*
- *g) SO7 - Promoting the economic and financial sustainability of water management;*
- *h) SO8 - Ensuring that the water policy is compatible with sectoral policies;*
- *i) SO9 - Promoting the joint management of international basins;*
- *j) SO10 - Raising awareness among Portuguese society for active participation in the water policy'.*

The **Arrábida Natural Park Management Plan (POPNA)** was approved by Resolution of the Council of Ministers no. 141/2005, of 23 August, serving as the territorial management instrument of the Protected Area. This plan '(...) establishes protection regimes for natural resources and values, and sets out land uses and management measures aimed at ensuring the preservation and enhancement of the characteristics of natural and semi-natural landscapes, as well as the biological diversity of the respective area of intervention'.

The general objectives of the POPNA are as follows:

- *'a) Ensuring the protection and promotion of natural, landscape, and cultural values, especially in areas considered a priority for nature conservation;*
- *b) Providing a framework for human activities through the rational management of natural resources, aiming to promote both economic development and the improvement of the quality of life of resident populations in a sustainable manner;*
- *c) Addressing processes that could lead to the degradation of the existing natural values, creating conditions for their maintenance and enhancement;*
- *d) Ensuring the active participation of all public and private organisations in the management of the Arrábida Natural Park (PNA), in close collaboration with the resident populations;*
- *e) Outlining models and rules for land use, ensuring the protection, defence, and quality of natural resources, from a sustainable development perspective;*
- *f) Contributing to the implementation of a network of protected marine areas;*
- *g) Promoting the conservation and enhancement of the natural elements of the region, developing actions aimed at protecting the fauna, especially marine and rupicolous fauna, flora, especially endemic flora, and vegetation, especially terrestrial climatic vegetation, as well as geological and landscape heritage;*
- *h) Promoting the management and enhancement of natural resources, including marine resources, enabling the maintenance of essential ecological systems and life supports, ensuring their sustainable use, the preservation of biodiversity, and the recovery of depleted or overexploited resources;*
- *i) Protecting and enhancing the region's archaeological heritage, including its underwater heritage, as well as its cultural, architectural, historical, and traditional heritage;*
- *j) Contributing to the planning and regulation of agroforestry, fishing, urban, industrial, recreational, and tourist activities, aiming to prevent the degradation of the natural, semi-natural, landscape, aesthetic, and cultural values of the region, allowing for the practice of compatible activities, namely nature tourism, environmental education, and scientific research;*
- *k) Avoiding the proliferation of dispersed buildings in rural areas, preventing the fragmentation of properties and promoting land consolidation actions;*
- *l) Ensuring information, awareness-raising, training, and participation and mobilisation of civil society for the conservation of the existing natural heritage present.'*

The process of reconvertng this plan into a programme is currently underway. Previously, the ICNF conducted an evaluation of the POPNA in terms of coherence, perception, impact, results, effectiveness, and efficiency.

Regardless of whether the Biosphere Reserve area is larger than that of the PNA, it can contribute to addressing a number of information gaps identified in the evaluation of the POPNA, including the following:

- The **assessment of the conservation status of populations** and the areas where they occur, allowing for the development of effective conservation plans and actions;
- The **conduction of studies to monitor and assess** the status of populations of species with threatened status;
- The development of **prospection studies** of new populations of flora and natural habitats;
- The **implementation of a monitoring plan** aimed at constantly updating land and landscape use to ensure that its value can be regularly assessed;
- The **establishment of partnerships** aimed at burying aerial infrastructures in order to preserve settlements and the landscape structure provided by the grid pattern of the crops mosaic;
- The **development of a communication and stakeholder involvement plan**, which will define actions that will involve: publicising the existing values; raising environmental awareness; signposting the PA, and producing information and communication materials (leaflets, online, etc.), among others.

Lastly, emphasis is placed on the importance attributed by the evaluation of the POPNA for the involvement of the community and a close connection with the populations for the success of any action intended to be implemented.

The **Alcobaça-Cape Espichel Coastline Programme (POC-ACE)** was approved by Resolution of the Council of Ministers no. 66/2019, of 11 April.

The vision for this Programme is *'a coastline prepared for Climate Change and safe enjoyment, with a preserved natural, landscape, and cultural heritage, with a good state of water bodies, promoting development opportunities based on the differentiation and enhancement of territorial resources and the capacity for competitive and sustainable use of land, marine, and maritime potential'*.

The Arrábida Biosphere Reserve area is represented in the Territorial Model of the POC-ACE as 'Areas of Special Interest for Nature Conservation and Biodiversity', reflecting the environmental and ecological richness of the area.

The **Espichel-Odeceixe Coastline Programme (POC-EO)** was approved by Resolution of the Council of Ministers no. 87-A/2022, of 4 October, and aims to achieve the following six general objectives:

- *'i) Safe public enjoyment of the maritime public domain;*
- *ii) Protection of the biophysical integrity of the area and conservation of environmental and landscape values;*
- **iii) Enhancement of the existing coastal resources;**
- *iv) Flexible management measures;*
- *v) Integration of local specificities and identities;*

- ***vi) Creation of conditions for the maintenance, development, and expansion of activities relevant to the country, such as port activities and other socioeconomic activities dependent on the sea and the coastline, as well as emerging activities that contribute to local development and to counteracting seasonality'***.

The vast majority of the Arrábida Biosphere Reserve area is integrated into the territorial model as an 'Area of Special Interest for the Conservation of Nature and Biodiversity', which is subject to a management regime outlined in specific instruments.

The **Revision of the Regional Forest Planning Plan for Lisbon and the Tagus Valley** was approved by Ordinance no. 54/2019, of 11 February, with the approval of the Regional Forest Management Programme for Lisbon and the Tagus Valley, PROF-LVT, setting out *'the strategic framework, guidelines, and specific rules for the use, occupation, utilisation, and planning of forests on a regional scale, in order to promote and ensure the production of goods and services and the sustainable development of these areas'*. (Article 1(1))

The Arrábida Biosphere Reserve area falls within the homogeneous sub-region 'Cliffs - Arrábida', which establishes, with equal priority, the following general functions of forest areas, each associated with different forestry rules:

- 'a) General function of conserving habitats, species of fauna and flora, and geomonuments;
- b) General function of protection;
- c) General function of recreation and landscape enhancement'.
- Lastly, the PROF LVT also specifies which forest species should be prioritised, as listed in the following table:

The **Sectoral Plan for the Natura 2000 Network (PSRN2000)** was approved by Resolution of the Council of Ministers no. 115-A/2008, of 21 July. It is a sectoral plan, developed on a macro scale (1: 100,000) for Mainland Portugal.

The Natura 2000 network is an ecological network in the Community resulting from the implementation of Directives 79/409/EEC (Birds Directive) and 92/43/EEC (Habitats Directive), and *'aims to contribute to ensuring biodiversity through the conservation of natural habitats and wild fauna and flora in the European territory'*.

The Arrábida Biosphere Reserve area is covered by the Arrábida/Espichel Special Area of Conservation (ZEC) (PTCON0010) and the Cape Espichel Special Protection Area (ZPE) (PTZPE0050).

The PSRN2000 sets out a broad set of management guidelines for the ZEC, with reference to natural values, which *'are fundamentally aimed at maintaining the high diversity and natural characteristics that make it unique and allow it to host the existing values'*, further stating that the following management guidelines are essential:

- **Proper forest planning and management**, taking into account the maintenance of existing areas of natural and semi-natural vegetation cover and the gradual replacement of ageing forest stands consisting of exotic species with plantations of native species;
- **Planning of grazing practices** in order to ensure the conservation of the existing natural values;
- **Proper planning of urban and tourist uses**, preventing the proliferation of dispersed buildings in rural or natural areas, as well as infrastructure development;
- **Planning of recreational and nature sports activities and practices** in order to protect the natural values most vulnerable to the impacts of these activities;
- **Proper planning of aggregate extraction activities** and minimisation of their main impacts on natural values;
- Protection of watercourses and associated riparian formations;
- Control of invasive species such as the sour fig (*Carpobrotus* sp.), *Ailanthus* sp., *Oxalis* sp.;
- *Monitoring the harvesting of threatened plant species'. (our emphasis)*

On the other hand, the management guidelines for the Cape Espichel ZPE 'are aimed at maintaining the habitats of migratory species and cliff-nesting bird species. In this context, the management of the ZPE should ensure the maintenance of the agricultural mosaic, based on extensive agricultural systems with traditional rotations, and the conservation of coastal systems (heathlands, dunes, coastal scrublands, and cliffs). The preservation of marine habitats must also be guaranteed, ensuring water quality and fishing resources in the region'.

The **Regional Spatial Planning Plan for the Lisbon Metropolitan Area (PROT AML)**, approved by Resolution of the Council of Ministers no. 68/2002, of 8 April, sets out the strategic options for the AML, their translation into a territorial model, the guiding rules, and the implementation programme and resource framework, accompanied by the necessary technical substantiation studies.

The Strategic Vision presented by the PROT AML aims at: '*Giving a European and Iberian dimension and centrality to the Lisbon Metropolitan Area, a privileged and qualified space for Euro-Atlantic relations, with advanced productive, scientific, and technological resources, a unique natural, historical, urban, and cultural heritage, a land of exchange and solidarity, especially attractive for living, working, and visiting*'.

The Arrábida Biosphere Reserve area falls within Territorial Unit 10 - Arrábida/Espichel/Sesimbra woodlands, which includes the Arrábida mountain range, Cape Espichel, the woodlands of Sesimbra, the agricultural area of Azeitão, the urban axis Sesimbra/Santana/Albufeira Lagoon, with the '*common characteristic of being fundamental spaces from a natural point of view*'.

In fact, in the definition of the Metropolitan Ecological Network, this area corresponds to a structuring area, which includes the Natura Network sites and the Arrábida Natural Park.

The following table summarises the PROT AML standards/guidelines for the Arrábida Biosphere Reserve area.

PROTAML	
Territorial guidelines for TU 10 Arrábida/Espichel/Sesimbra Woodlands	
1.3.10.1	Maintain Arrábida/Espichel as unique landscapes and areas free from urban pressures.
1.3.10.2	Structure and consolidate the Sesimbra/Santana/Albufeira Lagoon system as an urban area linked to tourism, recreation, and leisure, ensuring that tourist occupation is consistent with landscape, ecologic, and heritage interests.
1.3.10.3	Control urban pressures in the woodlands of Sesimbra, considering their high heritage interest.
Primary Structuring Areas of the Metropolitan Ecological Network (Arrábida/Espichel/Sesimbra Woodlands/Albufeira Lagoon)	
2.2.2.1	IPT: a) And the instruments of a special nature must define land use, occupation, and classification models that stem from comprehensive studies for the indicated areas and consider the ecological function of these territories as dominant, priority, and structuring, ensuring that interventions in the border areas and their interior do not undermine their dominant function or diminish or alter their character.
2.2.2.2	The central and municipal administrations must: b) Establish specific licensing criteria for tourism, recreation, and leisure activities that are compatible with their dominant, system-stabilising functions, always ensuring their regional, environmental, and heritage integration.
Specific rules for agricultural, forest, wild, and natural areas (Areas to be stabilised - natural areas)	
2.2.2.1	IPT must: a) Identify and delimit natural resources that are important for agricultural production, as well as the best soils for the establishment or maintenance of agricultural and forestry activities, or for maintaining areas in their wild or natural state, in order to free them from urban pressure, defining use regulations that do not allow or promote the alteration of the fundamental factors that led to their inclusion in those categories. This delimitation must be particularly strict in the structuring and vital areas of the REM; b) Ensure that the proliferation of dispersed buildings in agricultural, forestry, or natural areas, whether for primary or secondary residences, industrial or storage facilities, is carefully monitored. In the case of facilities to support agricultural activity, it must always be demonstrated that they are essential for the operation, and that there are no alternative locations in the surrounding area or close to rural centres.

Table 9.3-1 - PROT AML Standards and Guidelines

The **Municipal Masterplans of Palmela, Sesimbra, and Setúbal** were initially published in the mid-1990s and have been subject to numerous corrections/suspensions and amendments, as shown in Table 11 in annex. They were all subject to Amendments by Adaptation to Special Programmes/Plans, including the POPNA, whose content was incorporated into the PDM.

MARITIME SPATIAL PLANNING INSTRUMENTS

With regard to maritime spatial planning instruments, the Basic Law for the Policy on National Maritime Spatial Planning and Management (LBOGEM), approved by Decree-Law no. 17/2014, of 10 April, stipulates (Article 7) that maritime spatial planning is carried out through situation plans and allocation plans. Only the National Maritime Spatial Planning Situation Plan for Mainland Portugal, Madeira, and Extended Continental Shelf Subdivisions (PSOEM), approved by Resolution of the

Council of Ministers no. 203-A/2019, of 30 December, applies to the proposed area¹⁰.

The PSOEM covers the entire national maritime space, from the baselines to the outer limit of the continental shelf, including inland maritime waters, the territorial sea, the exclusive economic zone, and the continental shelf, including beyond 200 nautical miles.

The PSOEM identifies the spatial and temporal distribution of existing and potential uses and activities, also identifying areas relevant for nature conservation, biodiversity, values related to underwater cultural heritage, and networks and structures essential for national defence, internal security, and civil protection, promoting compatibility between competing uses or activities.

In this context, paragraph 10 of the Resolution of the Council of Ministers states that, '*without prejudice to the spatialisation of uses and activities, the PSOEM, a subdivision of Mainland Portugal, establishes a protection strip for common uses aimed primarily at ensuring recreational tourism activities and small-scale fishing along the Portuguese mainland coast (...)*'

Furthermore, the PSOEM presents maps for each of the private uses and activities, i.e., those that require the reservation of maritime space, identifying the current location, potential areas, best practices, and compatibility with other uses and administrative servitudes/restrictions, which will be updated with the approval of Allocation Plans.

These plans allocate areas and/or volumes of the national maritime space to uses and activities not identified in the PSOEM, establishing, where applicable, their respective utilisation parameters. Once approved, they are integrated into the situation plan, which is automatically amended.

OTHER RELEVANT TOPICS - PLANS AND PROGRAMMES WITH GUIDELINES RELEVANT TO THE APPLICATION

Sustainability and Biodiversity

At national level, the National Strategy for Sustainable Development, established in 2007, sets forth a cross-cutting strategy for sustainable development, taking into account the economic, social, environmental, and social responsibility domains.

Prior to the National Strategy for Sustainable Development, the National Strategy for Nature Conservation and Biodiversity was approved in 2001. This strategy aims to conserve nature and biological diversity by promoting the sustainable use of those resources. It was revised in 2018, and systematised the objectives ordered by priorities to be pursued by 2030.

In this strategy, we highlight the option of setting up the Fundamental Nature Conservation Network, which consists of the National System of Classified Areas (SNAC), comprising the following core areas of nature and biodiversity conservation:

¹⁰ The dredge immersion or disposal sites proposed by the Allocation Plan for the Immersion of Dredged Material - Portuguese Mainland Coast (PAID), approved by Resolution of the Council of Ministers no. 123/2023, of 10 October, neither affect the proposed area nor are in close proximity to it.

- Protected areas included in the National Network of Protected Areas (which includes the Arrábida Natural Park, encompassing the proposed area);
- Special Protection Areas (ZPE) and ZEC integrated into the Natura 2000 Network (including the Arrábida Espichel ZEC, which is included in the proposed area);
- The remaining areas are classified under international commitments made by the Portuguese State, such as Biosphere Reserves.

SNAC also includes the continuity areas identified below:

- The National Ecological Reserve (REN);
- The National Agricultural Reserve (RAN);
- The public water domain (PWD).

Forest

The guidelines for the forestry sector date back to 2006, and the National Forest Strategy was updated in 2015, with a particular emphasis on fire hazard prevention.

Following the fires of 2017, due to their severity, the National Plan for Integrated Management of Rural Fires was approved, responding to three main principles: bringing prevention and combat closer together, professionalisation and qualification, and specialising intervention.

The Arrábida Biosphere Reserve area is covered by the Intermunicipal Plan for Forest Fire Defence - PIDFCI (Sesimbra - Palmela - Setúbal), approved and published by Notice 1209/2020, of 23 January.

Also noteworthy among the IGT is the existence of a plan focused on forest management and planning, the Regional Forest Planning Programme for Lisbon and the Tagus Valley, described above.

Climate Change and Risks

At national level, there are several Plans and Programmes that provide a detailed approach to risks, such as the National Spatial Planning Policy Programme, and there are several Plans and Programmes for specific risks, such as the aforementioned National Plan for the Integrated Management of Rural Fires and the Flood Risk Management Plan for the RH6 Sado and Mira Hydrographic Region.

Closely associated with risks is the acknowledgement of the importance of Climate Change, which is reflected at national level in the Basic Law on Climate and a set of new instruments that collectively define the National Climate Policy:

- The Roadmap to Carbon Neutrality 2050 (RNC2050) was approved by Resolution of the Council of Ministers no. 107/2019, of 1 July, *establishing 'the commitment to achieve carbon neutrality in Portugal by 2050, which translates into a neutral balance between greenhouse gas (GHG) emissions and carbon sequestration through land use and forests'*.
- The National Energy and Climate Plan 2030 (PNEC 2030), approved by Resolution of the Council of Ministers no. 53/2020, of 10 July, was developed in conjunction with the objectives of the RNC2050 and *'constitutes the main instrument of*

national energy and climate policy for the next decade towards a carbon-neutral future (...). The PNEC 2030 sets ambitious yet achievable targets for 2030 and implements the policies and measures for the effective implementation of the guidelines outlined in the RNC2050 and for the achievement of the targets set¹.

- The National Strategy for Climate Change (extended until 2025) was approved by Resolution of the Council of Ministers no. 56/2015, of 30 July, and its vision is: 'A country adapted to the effects of climate change, through the continuous implementation of solutions based on technical and scientific knowledge and good practices'. The objectives of the ENAAC 2020 are as follows:
 - *I. Improving the level of knowledge about climate change;*
 - *II. Implementing adaptation measures;*
 - *III. Promoting the integration of adaptation into sectoral policies'. and the Action Programme for Adaptation to Climate Change'.*
- The Action Programme for Adaptation to Climate Change (P-3AC), approved by Resolution of the Council of Ministers no. 130/2019, of 2 August, complements and systematises the work carried out in the context of the ENAAC 2020, with a view to implementing measures to adapt to the main impacts and vulnerabilities identified in Portugal;
- Within the scope of Local Plans for Adaptation to Climate Change (PLAAC), the PLAAC - Arrábida Project takes the form of three Local Plans for Adaptation to Climate Change in the municipalities of Setúbal, Palmela, and Sesimbra. The objective is to prepare the Arrábida Territory to face the challenge of climate change by identifying vulnerabilities, reducing risks and impacts, and promoting its adaptation and resilience. The PLAAC - Arrábida outlines and prioritises climate change adaptation measures in the short, medium, and long term, creating support tools for assisting the population and land use planning.

Tourism and Landscape

Tourism is guided by the Tourism Strategy 2027 (ET 27), which identifies priority lines of action to guide public policy decisions and investment options for tourism over the next decade. Noteworthy, for their relationship with Land Use Planning, are the priority lines of action related to the 'Enhancing the Territory' strategic axis, aimed at enhancing, preserving, and promoting the historical-cultural heritage, the coastal area and the 'blue economy', protected areas, and cities and regions (through urban regeneration).

Also important is the National Architecture and Landscape Policy (PNAP), approved in 2015, which aims to enhance architecture and landscape as strategic resources for the country's development policies, also at the local level, proposing a set of strategic and coordination measures, legislative and regulatory measures, as well as information, awareness-raising, and education measures.

9.4

DESCRIBE WOMEN'S AND MEN'S DIFFERENT LEVELS OF ACCESS TO AND CONTROL OVER RESOURCES

There are no gender differences in access to and control of resources in the proposed reserve. Article 13 of the Constitution of the Portuguese Republic enshrines the principle of equality, granting all citizens the same dignity before the law and specifying that no one shall be privileged, favoured, prejudiced, deprived of any right, or exempt from any duty on the grounds of ancestry, gender, race, language, territory of origin, religion, political or ideological beliefs, education, economic status, social status, or sexual orientation.

The creation of the Biosphere Reserve will contribute to the consolidation of practices aimed at protecting access to and control of resources by all, regardless of gender, by enhancing the participation of women and women's associative structures in the enjoyment and management of the territory.

10

HUMAN POPULATION OF PROPOSED BIOSPHERE RESERVE

About 68,120 inhabitants reside in the proposed Biosphere Reserve, mostly concentrated in the **Transition Area**, with 67,750 inhabitants. As shown in the table below, there are no inhabitants in the **Core Area**, while the **Buffer Zone** has a residual number of inhabitants.

Throughout the year, there is a flow of tourists from various nationalities, contributing to a significant increase in the population in that area, with the territory having an additional 12,887 inhabitants within the Reserve, mainly in the summer. These inhabitants are mainly concentrated in the **Transition Area**, with a smaller number in the **Buffer Zone** and **Core Areas**.

AREAS	PERMANENT	SEASONAL ¹¹
10.1 CORE AREA	0 inh	-
10.2 BUFFER ZONE	370 inh	-
10.3 TRANSITION AREA	67 750 inh	-
TOTAL	68 120 inh	12 887 inh

Table 10-1 - Number of inhabitants per area of the proposed Biosphere Reserve, of permanent or seasonal nature (BGRI, 2021).

¹¹No. of seasonal residents, based on the number of vacant traditional family accommodations or secondary residences (BGRI, 2021)

10.4

BRIEF DESCRIPTION OF LOCAL COMMUNITIES LIVING WITHIN OR NEAR THE BIOSPHERE RESERVE

The estimated population of 68,120 inhabitants has been increasing, with the estimated population being 67,293 inhabitants in 2011 and 66,689 inhabitants in 2001. There is currently a population density of 338 individuals per km², with no significant difference between the number of women (36,118 individuals) and men (32,002 individuals).

According to Statistics Portugal data (2024), in 2021 the majority of the population fell within the age group of 25 to 65 years old, followed by the age group of 65 or more years old.

In fact, with the crude birth rate in 2022 ranging between 8.4 and 9.4‰ in the three municipalities covered, the number of births does not compensate for the number of annual deaths, and the ageing index is of approximately 153 elderly people for every 100 young people. To counter this trend, efforts are being made to invest in incentives for childbirth and family support at local and regional level.



Graph 10.1 - Crude birth rate (‰) by place of residence Source: Statistics Portugal, 2024.

Regarding education indicators, the 2011 census indicate a literate population, with only about 5% of individuals having no level of education. Women are more representative in the 'no level of education' indicator, but they stand out in secondary and higher education.

MUNICIPALITY	NO LEVEL OF EDUCATION %	BASIC EDUCATION %	SECONDARY EDUCATION %	HIGHER EDUCATION %
SESIMBRA	4,41	69,07	49,88	19,62
SETÚBAL	4,93	69,65	51,00	22,59
PALMELA	5,91	67,44	49,46	21,30

Table 10.4-1 - Resident population by level of education Source: Statistics Portugal, 2024.

The main population centres within the delimited area of the Reserve, on land, are listed below, grouped according to the proposed zoning (see Figure 10.2), namely:

Core Area: an area without urban settlements or buildings.

Buffer Zone: Portinho da Arrábida. With partial presence in this area, we also identify Vale da Rasca, Picheleiros, and Casais da Serra.

Transition Area: part of the city of Setúbal (União de Freguesias de Setúbal), Grelhal, Aldeia Grande, Vale da Rasca (partial), Salmoura, Vendas de Azeitão, Vila Fresca de Azeitão, Vila Nogueira de Azeitão, Oleiros, Aldeia de Irmãos, Aldeias de S. Pedro, Piedade and Portela, Picheleiros (partial) and Casais da Serra (partial), Palmela (partial), Quinta do Anjo (partial), Cabanas (partial), Aires (partial) and Baixa de Palmela (partial), Vila de Sesimbra, Santana (partial), Corredoura (partial), Azoia, Zambujal de Cima, Maçã, and Pedreiras.

In the **municipality of Setúbal**, the capital city of the district with the same name exerts a strong influence throughout the surrounding territory, attracting people to buy goods and services. In the proposed area, the Transition Area encompasses part of this city, namely the western region, characterised especially by neighbourhoods of different origins, but predominantly working-class, ranging from the descent of the Viso hill, through Fonte Nova, Tróino, to the more central area of the Monastery of Jesus and Bonfim Park. The urban areas of Setúbal covered by the Transition Area correspond to a diverse reality, which includes neighbourhoods resulting from low-income housing programmes, more recently built neighbourhoods, and neighbourhoods in the historic western part of Setúbal extending to the train line, including 16th century bastions and walls and later fortified constructions.

Azeitão also stands out in the municipality of Setúbal, as it is the municipality's second largest urban centre. Outside the city of Setúbal, it is located in the Transition Area and surrounded by villages. In the various towns covered by the Transition Area, there are activities related to the production of wine, cheese, and traditional confectionery, and the processes for obtaining the products, namely viticulture, agriculture, and pastoralism, are also found in the territory.

In the **municipality of Sesimbra**, the town of Sesimbra stands out as the municipal seat. Characterised by its fishing community, it grew around its old core and focused on traditional fishing. Nowadays, this town combines this ancestral activity with tourist development, based on its relationship with the sea and maritime leisure activities, gastronomy, and the scenic beauty of its surroundings. It concentrates a significant number of services, cultural facilities, local shops, restaurants, and hotels.

Between the urban centre of Sesimbra and the rural area of the western sector of Arrábida, there is an axis associated with the main distribution routes - Santana and Corredoura - which has developed urban characteristics. Currently, it hosts a significant number of services and shops, as well as housing, taking advantage of its centrality, proximity to educational facilities, and the quality of the surrounding landscape.

In this municipality, the towns of Azoia, Zambujal de Cima, Maçã, and Pedreiras are the main rural settlements in the western sector of Arrábida. They are marked by rural activities, namely traditional family farming, small-scale livestock farming, pastoralism, and local trade. There is also a tradition of bread production (initially made from local resources, including cereals and their milling), with a significant

number of artisanal bakeries currently thriving in the sale of what is known as 'homemade bread'. Due to various attraction factors, there are several clusters of rural tourism, housing, or local accommodation in these rural communities.

One activity that still characterises two of these rural villages - Zambujal de Cima and Pedreiras - is limestone extraction and processing. Since the 1950s, this activity has played a significant role in the livelihood of the communities of Zambujal de Cima, initially through small artisanal units that extracted and worked traditional stonemasonry. This activity was so deeply rooted in the community that to this day there are several families with the surname 'Canteiro' (literally, stonemason). The artisanal extractions that emerged in these towns gave rise to industrial extractions that supply the Lisbon metropolitan area.

As for **Palmela**, while the town centre is the main urban centre, it is the smallest one. Within the zoning under study, Aires, Quinta do Anjo, and Cabanas show a higher level of urban development.

In Palmela, most of the active population works in the tertiary sector, corresponding to commerce and services, such as public administration, education, health, banking, insurance, transportation, catering, and hospitality. The secondary sector no longer has the economic weight it once had, but it is worth noting the continuation of some activities linked to a more ancestral 'know-how', which continue to generate wealth. These include Azeitão cheese with Protected Designation of Origin (PDO), Quinta do Anjo bread, and viticulture in general, with special emphasis on the traditional Moscatel de Setúbal.

The primary sector, on the other hand, comprises agricultural production activities, with viticulture and pastoralism being the most significant. Also noteworthy in this sector is the fishing industry, with significant economic weight in the municipalities of Setúbal and Sesimbra.

The proximity of the proposed area to the most important metropolitan hub in the country, the capital Lisbon, cannot be overlooked. Many residents of the three municipalities covered by this application commute daily to Lisbon, served by various public and private transportation routes. Indeed, this proximity leads to the displacement of the workforce for activities located outside the three municipalities. However, there is also a reverse movement of demand for goods and services, particularly those that this application aims to enhance, bringing visitors to the region from the northern arc of the metropolitan area, particularly Lisbon.

10.5

NAME(S) OF THE MAJOR SETTLEMENT(S) WITHIN AND NEAR THE BIOSPHERE RESERVE

The proposed Reserve corresponds to a territory that partially overlaps, in the Terrestrial Area, with the municipalities of Sesimbra, Setúbal, and Palmela. In the municipality of Setúbal, the area covers the União de Freguesias de Setúbal and the parish of Azeitão; in the municipality of Sesimbra, the parishes of Castelo and Santiago; and in Palmela, the parishes of Palmela and Quinta do Anjo.

The distribution of the population in the territory is not homogeneous, concentrating in the municipality capitals and some urban clusters in their surroundings (see Figure below).

The **Transition Area** covers the city of Setúbal, Grelhal, Aldeia Grande, Salmoura, Vendas de Azeitão, Vila Fresca de Azeitão, Vila Nogueira de Azeitão, Oleiros, Aldeia de Irmãos, Aldeias de S. Pedro, Piedade and Portela, Vila de Sesimbra, Azoia, Zambujal de Cima, and Pedreiras. Within the boundaries of this area, the following clusters are also partially covered - Vale da Rasca, Picheleiros, Casais da Serra, Palmela, Quinta do Anjo, Cabanas, Aires, Baixa de Palmela, Santana, Corredoura, and Maçã.

In the **Buffer Zone**, the smallest settlement is Portinho da Arrábida. Vale da Rasca, Picheleiros, and Casais da Serra, which are partially covered, are also within the boundaries of this zone.

In the Core Areas there are no urban clusters.



Main urban centres - Palmela, Setúbal, and Sesimbra

The area of the Biosphere Reserve has a highly diversified occupation, some areas of the territory having a more demarcated urban expression than others, either due to population density or morphology. However, it is the dispersed, rural settlement pattern that most characterises this territory.

In general, we can identify two forms of urban occupation:

- The first, more nuclear in nature, occurs mainly in the county seats, namely in Setúbal, Palmela, and Sesimbra, but also in the urban clusters of Quinta do Anjo, Vila Nogueira de Azeitão, and Cabanas, where multi-family residential and commercial buildings are predominant. In these urban areas, the network is densely consolidated and multifunctional, with an extensive infrastructure network;
- The second, smaller one, shows a lower density of buildings and more organic urban networks. In these areas, like Aldeia Rica, Oleiros, Aldeia de Irmãos, Maçã, and Azóia, single-family homes are predominant, with discontinuous land occupation and numerous interstitial spaces.

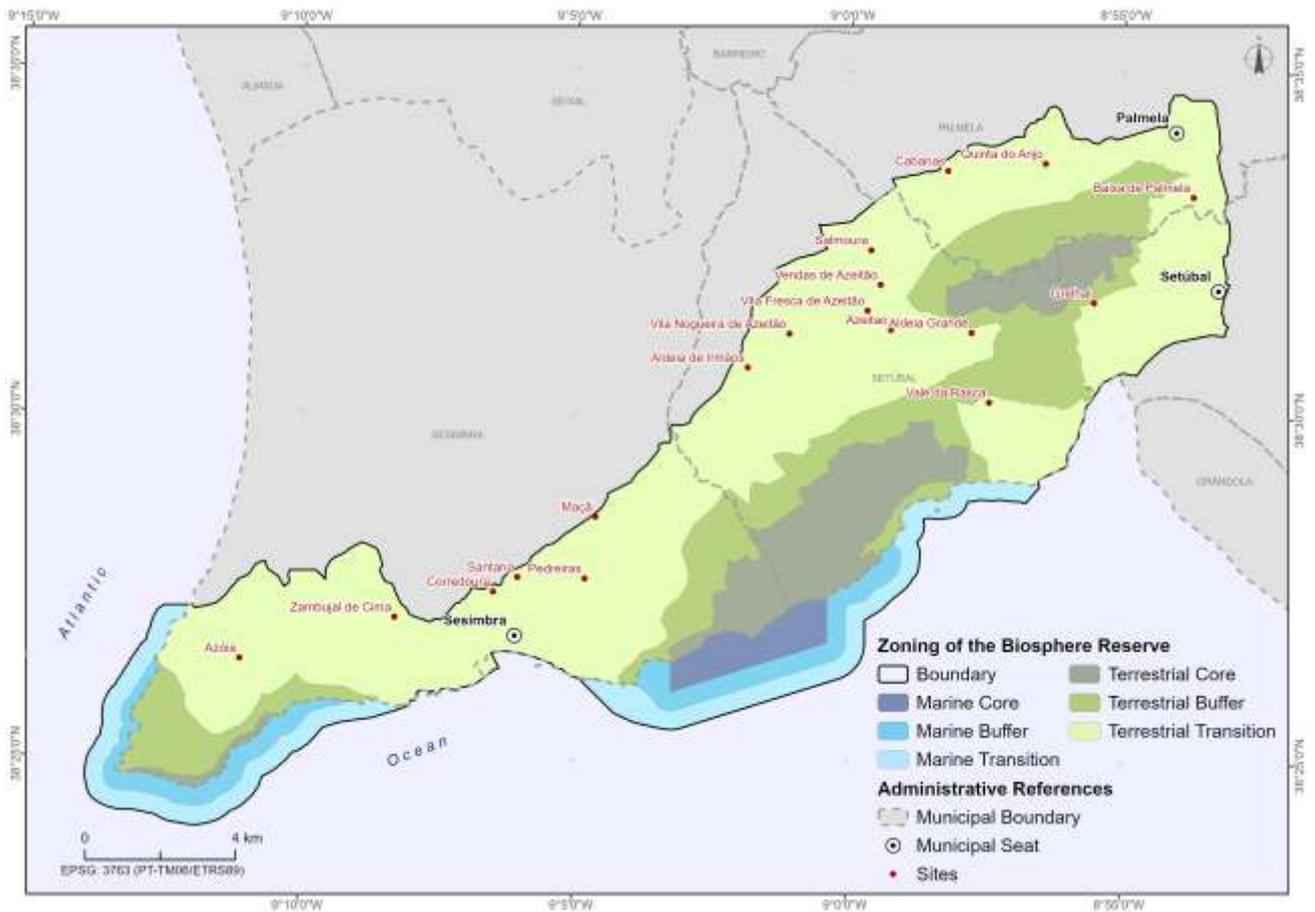


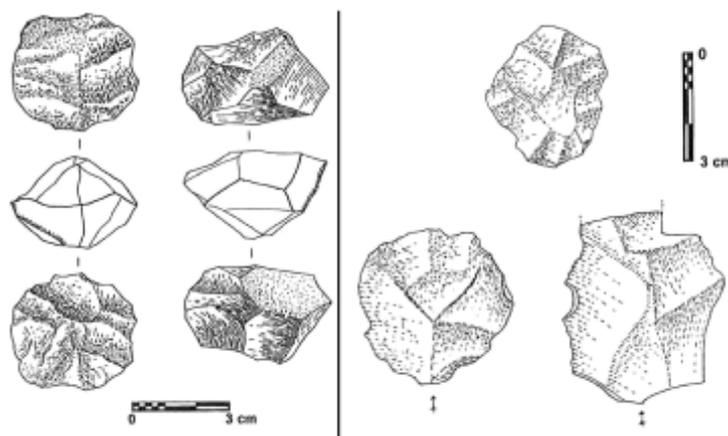
Figure 10.2 - Main urban centres in the Arrábida Biosphere Reserve.

10.6 CULTURAL SIGNIFICANCE

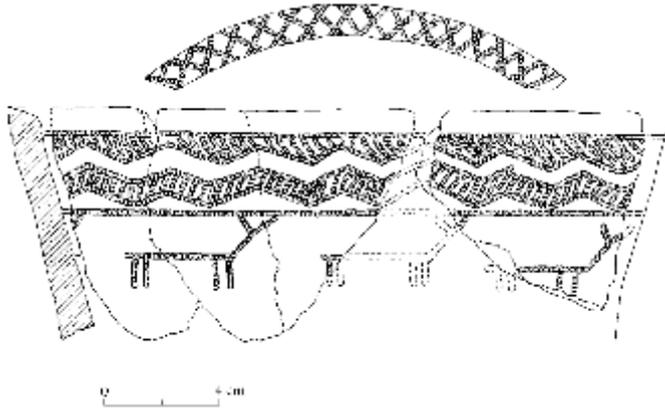
The history of human occupation in the Arrábida region is extensive and its origin dates back to sites of worldwide scientific importance such as the **Figueira Brava Cave** (Setúbal), from the Middle Palaeolithic period, which bears witness to the presence of human remains of *Homo neanderthalensis*. Studies have revealed the environmental landscape of Arrábida 40,000 years ago, with a wide range of large mammals and others characteristic of cold climates. As the sea level is lower (c. 60 metres), this cave, like others located on the coastal cliffs of Arrábida, opened onto an extensive plain where abundant species suitable for hunting would thrive.

The first agro-pastoral communities in Arrábida emerged in the late 6th and early 5th millennia BCE (Before Common Era), incorporating a range of technological innovations, including ceramic production. The improvement of living conditions and of the socio-economic framework enabled communities to work and take ownership of the land, giving them greater versatility, the ability to cook, store, and transport food, allowing for a more effective presence in residential areas.

In the last quarter of the 4th millennium BCE, the settlement pattern changed, with the construction of the first hilltop settlements and funerary monuments such as the **Artificial Caves of Casal do Pardo** (located in Quinta do Anjo, Palmela), classified as a National Monument (1934) and recognised internationally thanks to the **bell-shaped bowls** and **copper points of the 'Palmela group'**. The formal and typological uniqueness of these pieces has bestowed upon them significant distinction, complexity, and worldwide recognition in terms of heritage and scientific importance.



Figueira Brava Cave (Setúbal). Discoid cores and Levallois flaking



Artificial Caves of Casal do Pardo (Palmela). Hypogeum 3. Tall, bell-shaped cup with a decorated lip using the dotted and linear-dotted technique, featuring a combination of geometric elements and a band of deer.



Artificial caves of Casal do Pardo (Palmela). Hypogeum 1. Entrance to the burial chamber

The settlements found in the Arrábida region are structured around a population network, with different types of places coexisting physically and temporally. The construction of the first fortified settlements began in the early 3rd millennium BCE, including: the **Outeiro Redondo Settlement** (Sesimbra), which documents the ancient practice of fishing in the municipality of Sesimbra, through the presence of stone net weights and copper hooks, dating to the Chalcolithic period (3rd millennium BCE). Another well-documented activity in the Fortified Settlement of Chibanes (Palmela) is copper metallurgy (an ore that doesn't exist in Arrábida). Its practice drove agro-pastoral societies towards a system of 'regional or transregional trade networks (...)'.



Chibanes (Palmela). View of the Chalcolithic wall that defended the northern slope

During the 2nd millennium BCE, as a result of changes in socio-cultural models, with the emergence of complex and stratified societies, there were also changes in funerary spaces and behaviour toward death, and the **funerary monument at Roça do Casal do Meio** (Sesimbra) is a good example of this circumstance. In the territory under analysis and during this period, the contexts of life and death are documented in the settlements of Chibanes (Palmela), Rotura, and Pedrão (Setúbal). and in Sesimbra, at **Lapa do Fumo, Lapa Furada (Middle and Late Bronze Age)**, and the funerary monument of Roça do Casal do Meio (Late Bronze Age).

From the 8th century BC (First Iron Age), commercial and cultural contacts were established between the indigenous communities of Arrábida and the Phoenician sailors and traders from the Western (Gulf of Cadiz) and the Eastern Mediterranean (Syrian-Palestinian Strip). These early contacts with the Oriental world are evident in Arrábida through numerous artefacts, such as Oriental imported materials from various archaeological sites, which attest to its dynamics regarding regional and extra-regional contacts and trade, once again highlighting the excellent geostrategic position of the Arrábida region, close to two important communication routes: the rivers Tagus and Sado.

The arrival of Roman legions from the 2nd to 1st centuries AD onwards created a dynamic of contact with the indigenous populations who inhabited the fortified settlements in the region, such as **Pedrão** (Setúbal) and **Chibanes** (Palmela). However, this Roman approach may not have been peaceful, considering the evidence from the fortified settlements of Pedrão and Chibanes, which, through archaeological documentation, suggest that there were periods of social and political instability.

Located in the area of Cape Espichel, the underwater deposit at the **Ancão Sea** has allowed the identification of approximately 55.1% of the lead anchor stocks identified along the Portuguese coast to date, as well as the only anchor collar collected in Portugal so far. This is an important testimony to the intense maritime traffic that the Sesimbra coast may have experienced during this period. Of commercial nature, these journeys were intrinsically associated with the fish salting and sauce factories that existed throughout Arrábida.



Ancão Sea (Sesimbra). Lead anchor stocks and amphora fragment.

The production of salted fish and fish sauces should be associated with the **manufacturing units of Comenda, Rasca, Creiro, and Av. da Liberdade** (Sesimbra), to meet the commercial needs and facilitate the distribution of the production. Along the Sado Estuary, we find several potteries dedicated to the production of amphorae and other containers for storing and transporting preserved fish and sauces. The River Sado marked the intense rhythm of commercial and daily activity in this region between the 2nd century BCE and the 5th century AD, from where boats would often leave for the port of Gades (Cádiz) and various destinations in the Western Roman Empire. The findings from the underwater deposit of the Ancão Sea (Sesimbra) reinforce this picture of intense navigation and the establishment of trade routes along the Arrábida coastline.

One of the most significant moments in the **Islamisation of Arrábida** is associated with the reign of Caliph 'Abd al-Rahmān III (929-961), when the territory of Garb al-Andaluz underwent significant changes, giving rise to a new Islamisation era. During the Islamic period, the defense and surveillance of the region were ensured by the **husūn of Palmela, Coina-a-Velha and Sesimbra**. In addition to the communication between those castles, ribats and watchtowers also marked the territory's defence strategy, supported by an important network of rural settlements. Among the various findings in caves, ideal places for religious practice and reflection - *hermitage ribat*, in the Sesimbra region we highlight Lapa 4 de Maio, where a wooden plaque with an Islamic inscription containing Quranic surahs, chronologically attributable to the 12th century, was identified.

The territory of Arrábida played a key role in the Christian conquest process, as evidenced by the donation made by King Sancho I in **1186** of the Castle of Palmela to the **Order of Santiago**, reinforcing a defensive line in the region between the Tagus and Sado estuaries. Palmela experienced a period of prosperity and relevance since the early years of nationality, precisely due to its prominent geostrategic position between the rivers Tagus and Sado. The Order of Santiago held considerable power and influence with the crown and society due to its ownership of vast heritage and territory. The **Castle of Palmela** served as headquarters of the Order of Santiago in

times of war, clearly as a strategic option, as this fortified location was chosen for organising the offensive and quartering the Santiago militia. Palmela, as the headquarters of the Order of Santiago, was the political, military, and economic centre of the region, and a mandatory stop on the pilgrimage route to Santiago since the medieval period.

Notable examples of military architecture are documented in Arrábida, such as the **coastal fortifications** of Arrábida, including the **Fort of Santiago**, now the Maritime Museum of Sesimbra, and **St. Philip** (located in Setúbal). Additionally, there are examples of civil and religious architecture from the Modern period, including the Arrábida Convent and the Cape Espichel Sanctuary.

Located in the Core Area, the **Convent of St. Mary of Arrábida** is classified as a Property of Public Interest and is the most emblematic of all the religious heritage in the Arrábida region. The convent was built between 1539 and 1542 on the initiative of João de Lencastre, who gave it to Friar Martinho de Santa Maria, a Castilian of the Order of Saint Francis.



10.6.1 BUILT HERITAGE

The word 'al-rábita' (origin of the toponym Arrábida, of Arabic origin) refers to the dimension of the built heritage of the proposed Biosphere Reserve area, as it is associated with spaces of religious nature, occasionally fortified, which could function as a monastery-fortress (*ribat*), dedicated to spiritual retreat, where pious Muslims (*morabits*) devoted themselves to spiritual perfection and to the defence of the borders of Islam (*jihād*), and had the duty to sound the alarm in case of maritime or land attack, being able to join expeditions against enemies when necessary.



Fish salting production complex at Creiro (Setúbal)

Evidence of human occupation and the ancestry of cultural manifestations punctuate the Landscape through built heritage values of historical, artistic, and archaeological relevance, some of which are unique in a national context or exceptional in an international context.

Near the *Banu Benamocer Mountains* (a name proposed by Arab geographer *Al-Râzî* for the Arrábida region), the Umayyad forces decided to establish the ***Hisn of Balmalla*** (Castle of Palmela), a solid fortress built between the 8th and 9th centuries, which defended the territory to the south. Evidence of warfare is well documented there, especially during the final phase of Muslim presence and the early Christian occupations. Centuries later, between 1443 and 1482, the **headquarters of the Order of Santiago** were definitively transferred to Palmela by royal decision of King João I, at which time the **Church** and **Convent** were completed.



Interior of the Church of Santiago (Castle of Palmela)

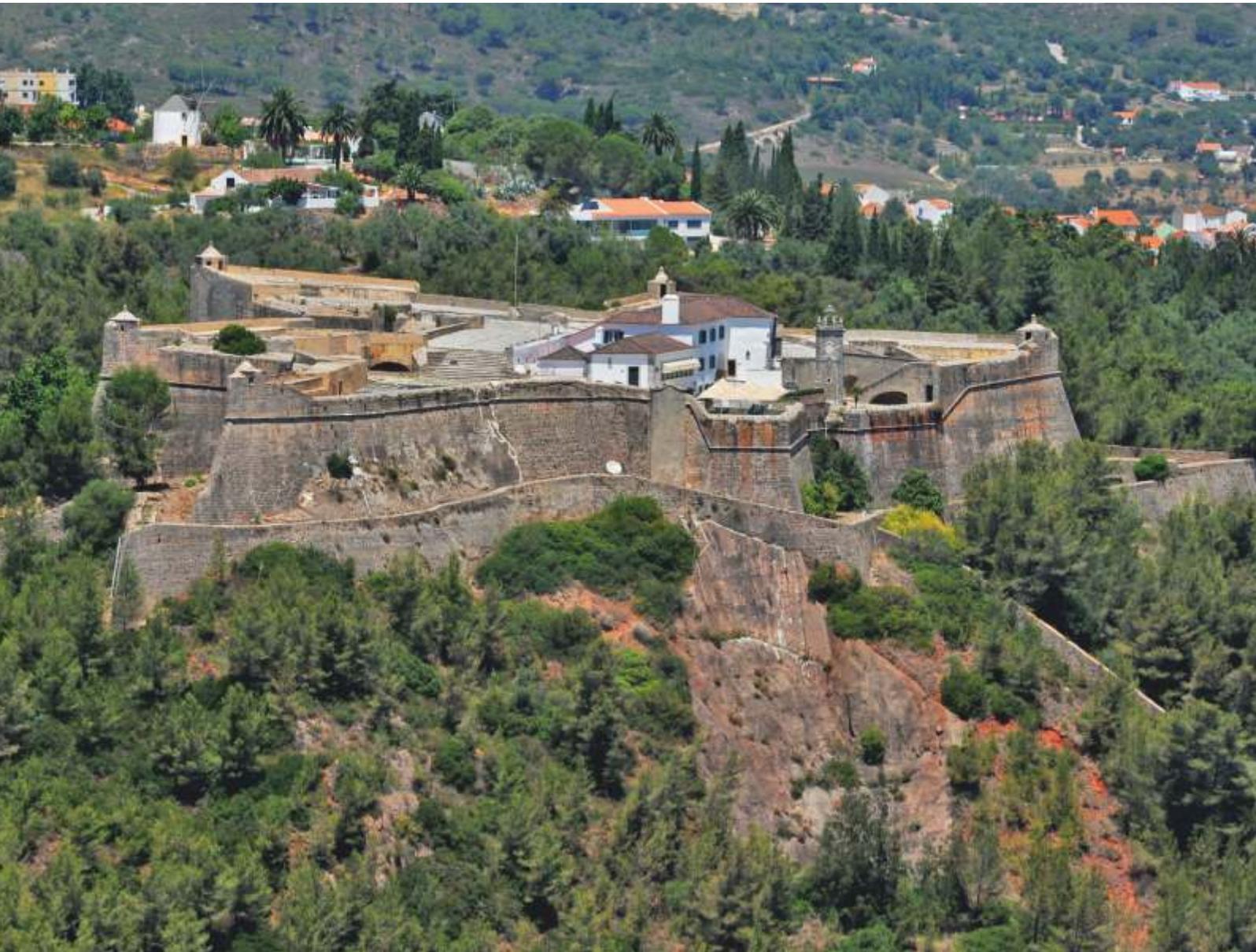
In the church, a building classified as a National Monument in 1910 along with the Castle of Palmela, one can see the ossuary chest of D. Jorge, the last master of the Order of Santiago and natural son of Ki João II.

At the eastern end of the mountain range, the **Castle of Sesimbra**, classified as a National Monument in 1910, served as a lookout point over the Atlantic, whose visibility extended as far as the Castle of Palmela, controlling the Arrábida Mountain Range itself. This fortification is of Islamic origin, chronologically attributable to the 9th century. It is one of the most important physical examples of the defensive line that existed in Arrábida during the Middle Ages. Until the late 15th/early 16th century, it housed the primitive *Vila de Cizimbra*, when the population settled in the bay focusing on activities such as fishing and shipbuilding.

The Arrábida Defence Line

The requalification of the primitive coastal defence system, driven by royal initiative, arose from the need to protect the region from possible maritime attacks. In the 16th and especially in the 17th century, it became part of Lisbon's wider defence system, which extended north to Peniche and south to Sines. The grandeur of this network of forts and fortresses is reinforced by the geomorphological nature of the terrain itself.

The Tower of Outão (Setúbal) was built in the first half of the 16th century, and the **Fort of St. Philip**, also in Setúbal, was built in the late 16th century, during the Spanish occupation (which began in 1582), as a way of strengthening the defence against piracy. Its star-shaped polygonal plan is defined by six sturdy bulwarks with sloped bases and prismatic watchtowers at the corners, covered by domes; the building is surrounded by a moat and defended, on the land side, by a second exterior wall inside the fort, in addition to the former governor's house (currently a guesthouse), there is a Baroque chapel of St. Philip, completely covered in tiles by Policarpo de Oliveira Bernard in 1736.



After the Restoration of 1640, King João IV undertook a major reorganisation of the region's fortifications between 1640 and 1680, building a series of smaller forts, including the **Fortress of Santiago de Sesimbra**, an example of 17th century military architecture, built between 1642 and 1649 on the initiative of King João IV, under the direction of Jean Ciermans, a Jesuit priest of Flemish origin. It has inner courtyards that housed various facilities such as the Governor's House, the armoury, the chapel, the dungeons, and the cistern. It is a Property of Public Interest since 1977.

On 'Journey to Portugal', J. Saramago (1981:309) writes about Arrábida and the **Convent of Arrábida**, stating that '*...probably silence, no sound, no words, and no painting either; only, in the end, the praise of the gaze: to you, eyes, I praise and give thanks.*', an argument that, in his opinion, nourished the thoughts of the friars who built and used it.

It was founded in 1542 by Friar Martinho de Santa Maria, a Castilian Franciscan to whom João de Lencastre (1501-1571), the first Duke of Aveiro, granted the land. Initially, the complex functioned as a hermitage, gradually emphasising the centrality of the building over time. The Old Convent is a multinucleated structure, partly leaning over the abyss, of miniature proportions and hidden by vegetation. It took advantage of the caves for cells and hermitages, and this type of structure was spread throughout the convent's surrounding area.

This building is now known as Ermida da Memória (Hermitage of Memory) and is associated with the legend of Hildebrand, an account of the discovery of the site that is intertwined with the emergence of the cult of Our Lady of Arrábida. Since then, devotion and belief, in their various forms, have played a decisive role, renewing themselves over the centuries and ensuring the continuous sacralisation of the site.

The New Convent, with its popular and rustic architecture, is distributed across staggered volumes on the southern slope of the mountain, facing the sea, in a cluster of small buildings. Particularly noteworthy is the artistic inlaid work that decorates the walls, fountains and chapels, made up of stone fragments combined with shells and pieces of earthenware and glass. Also noteworthy in the Church of Saint Mary is the large marble statue attached to the front of the church between the two lowered arches of the entrance, depicting Christ bound to a cross and wearing the habit of an Arrábida monk.

To the left of the complex, the Garden of Saint Peter of Alcântara, with the Chapel of Our Lady of Piety close by. Its exterior walls are decorated with Baroque inlaid work and the interior features 18th-century tiles, placed there by the Dukes of Palmela during the restoration in 1940. The main altar of the church was placed above a spring of water, which outside the church feeds the Samaritan Fountain. Accessible from the garden, this fountain holds significance in the pilgrimage routes of Arrábida.

Outside the convent, in the woods that surround it, there are chapels dedicated to *Ecce Homo* and to Our Lord Crucified, as well as other cells.

Sanctuary of Our Lady of the Cape

On the spur of Cape Espichel, the current complex of the **Sanctuary of Our Lady of the Cape** includes the small Chapel of Memory, a medieval construction, and the Church of Our Lady of Cape Espichel, as well as guesthouses, the Opera House, the aqueduct and the Water House, built throughout the 18th century. Organised around the extensive central courtyard (the *arraial*), it is a rare example of a monumental sanctuary for religious pilgrimage scenographically designed from scratch, and a unique civil and religious architectural complex in Portugal, where the baroque decoration of the temple is combined with the popular nature of the guesthouses. Considered one of the most beautiful sanctuaries in Portugal, over the years it has welcomed a large number of pilgrims who came here every year to fulfil their collective promises.

It is known from documentary references that pilgrims were coming to Espichel as early as 1366, although the original place of worship remains unknown. It probably was a small chapel. The structure currently known as Chapel of Memory, located near the cliffs of Cape Espichel, is believed to have been built on the site where, according to mythology, the image of Our Lady was discovered.

With a square plan and low walls, the temple is crowned by an unusual counter-curved dome, a structure reminiscent of similar buildings from the Islamic period known as al-qubbâ. The interior is adorned halfway up with blue and white tiles (18th century) depicting the miracle of Our Lady of the Cape, the construction of the chapel itself, the church and the guesthouses, as well as the pilgrims of the time.

Integrated into the complex, the Church of Cape Espichel was built in 1495 to cater for the ever-growing number of pilgrims who flocked there. On the tile panels of the Chapel of Memory, one can see a depiction of the construction of this new temple, with workers putting up the walls and the temple already built. Nothing has been preserved of this first late-medieval church. In the church we know today, built from 1701 onwards, we found a rare item: the ceiling by Lourenço da Cunha features a false wooden barrel vault, depicting the Assumption of the Virgin Mary in perspective architecture. The painting is in oil on stucco, with a sandy plaster. It was retouched by José Narciso in 1770 and restored in 2001 by the Junqueira 220 workshop. The ceiling of the Church of the Cape Espichel Sanctuary is the only work by Lourenço da Cunha that survived the 1755 earthquake. The façade of the temple is monumentalised by two prismatic bell towers joined by the two parallel bodies of the guesthouses and their porticoed gallery.

In Arrábida, particularly in the Azeitão area, there are notable examples of civil architecture in the estates and palaces that have shaped the landscape and identity of this region, some of which have a strong connection to the vineyards and the production of Moscatel wine and the velvety Azeitão cheese.



Pilgrims at the Cape Espichel Sanctuary

El Carmen Estate and Chapel

The **El Carmen Estate and Chapel** (Setúbal) concentrate, within the property, ancestral evidence of Arrábida's architectural heritage, dating back to the 16th century with the chapel of devotion to Our Lady of El Carmen, commissioned by D. Madalena de Girón, wife of D. Jorge - the last Master of the Order of Santiago. Currently, the division into two spaces is still clearly visible in its structure: on one side, there's the chapel, the porch, and the bell tower; in the centre, the entrances to various areas of the building, which from 1611 onwards included accommodation for pilgrims commissioned by the Brotherhood of Setúbal; on the other side, accommodation for hunting parties. Queen Maria I ordered the '*rebuilding*' of the temple and it was certainly during these construction works that a royal coat of arms was placed, replacing that of the Dukes of Aveiro.

Bacalhoa Palace and Estate

Brás Afonso de Albuquerque (Viceroy of the Indies) kept or reused some of the palace's earlier structures, in particular the circular towers with lobed roofs that evoke typical late-Gothic Manueline structures, very similar in their typology to the cylindrical watchtowers of the Belém Tower in Lisbon. However, the entire design, organisation, and decoration of the architectural spaces are based on a Renaissance language, with extraordinary ceramic tiles standing out as the most important repository of early tilework in Portugal and the richest example of its use in 16th-century Portuguese gardens.

Quinta da Bacalhoa (Setúbal) is surrounded by a square walled enclosure, divided by three gates. Its cylindrical cubicles with hemispherical domes cut into wedges give it a very distinctive appearance. One inscription reads: '*Anno 1554 Alfonsus Albuquerqueus Alfonsi Magni indorum debellatoris filius sub Joanne III Portugaliae rege condidit Anno MDLIII*' (*This residence was built in 1554 by Afonso de Albuquerque, son of Afonso the Great, who discovered the Indies, under the reign of John III of Portugal*).

The oldest known description of the estate dates back to 31 May 1631, following its acquisition by Brás Afonso de Albuquerque. In addition to the palatial building, the property also included houses for servants, vineyards, olive oil and wine presses, a stable, and coach houses.

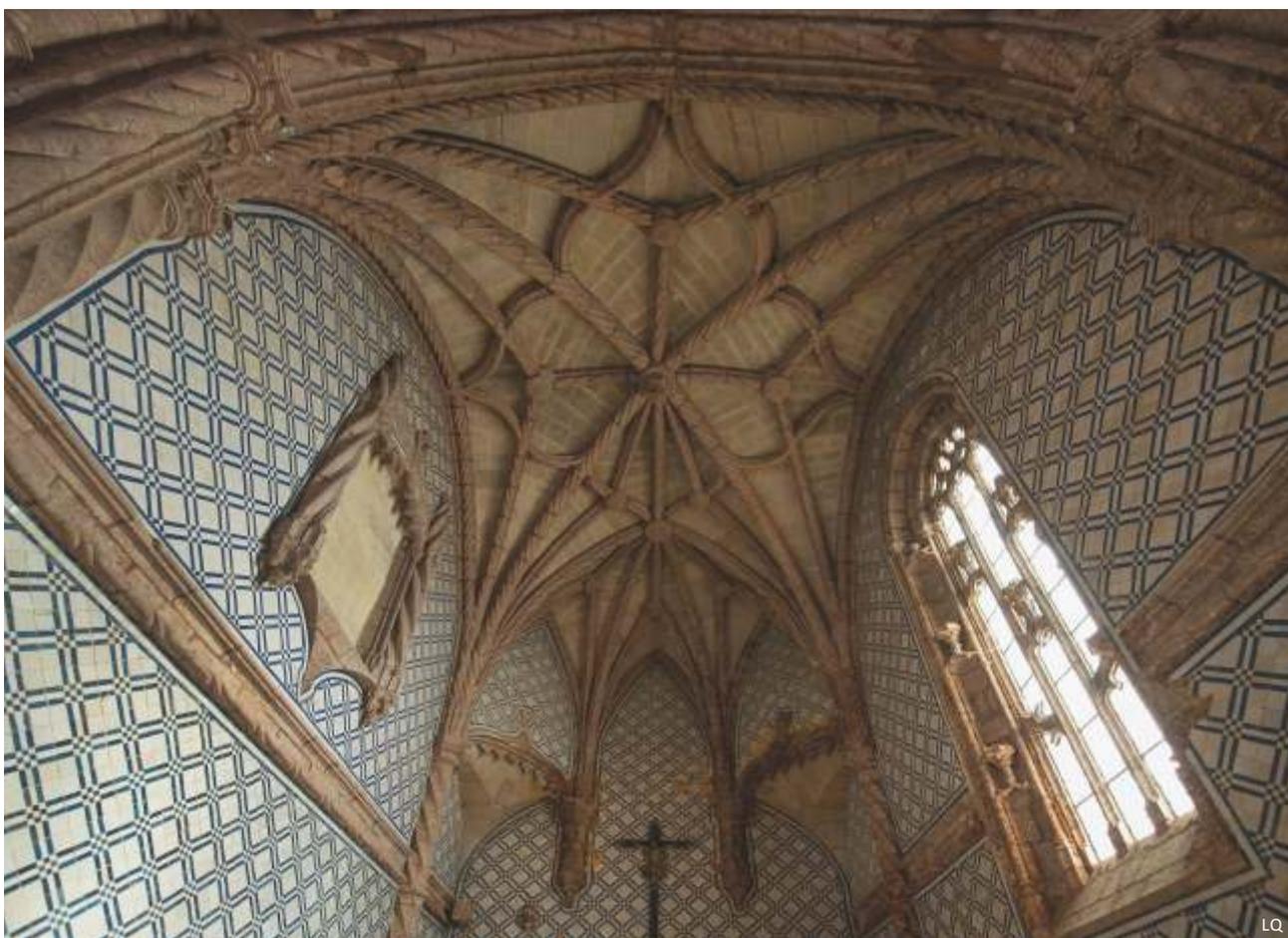
Windmills

The **windmills** scattered throughout the territory of Palmela, especially in the Louro Mountain Range, are landmarks in the Arrábida landscape. They are extraordinary gear mechanisms powered by wind force that have shaped the history of grain and bread over the centuries. Some of these mills were owned by the Order of Santiago since the 16th century.

Convent of Jesus of Setúbal

The Setúbal Museum is housed in the **Convent of Jesus of Setúbal**, classified as a National Monument by Decree of 16-06-1910. Its construction began in 1490, by order of King João II, with a design by the architect Diogo de Boitaca (the architect who would later design the magnificent Jerónimos Monastery, located in the Belém area of Lisbon). In 1495, the new King Manuel I ordered the entire church to be vaulted and the convent's dimensions to be restructured, so that it could accommodate thirty-three nuns.

The distribution of spaces within the Convent of Jesus is traditional, respecting the architectural characteristics of a cloistered convent, with a clear physical separation from the outside world. It consists of a set of buildings enclosed by a wall, and the main spaces are distributed around the square formed by the cloister, of which the church is one side and the other are occupied by the so-called communal areas. The cloister had a garden that cooled the space with its central fountain and vegetation.



LQ

The **Church** (the first hall church) has three naves, whose dividing arches rest on twisted columns made of Arrábida breccia. Its apse rises above its body. It was built using innovative solutions that would later become common in the Manueline style: round arches (instead of pointed arches), vaults resting on lowered arches, rib networks, the twisted motif in the configuration of the columns, at the start of the chancel vault, and in some of its ribs, decorative elements such as half-spheres and rounded chamfers.

The **Chancel** was covered by a Lioz limestone vault with ribbing in Arrábida breccia, lined with checkered tilework on the side walls, and at the back of the chancel, an altarpiece with 14 large paintings in oil on oak wood, dating from 1517/1519-1530 and attributed to the Lisbon workshop of Jorge Afonso, which was organised on 3 levels.

The **Arrábida Breccia Portal** has 18 niches designed for statues, which are believed to have never been sculpted. On the tympanum there are two Alphas (the letter of the Greek alphabet symbolising the Mystery of Creation, i.e., God) and on the archivolt there are numerous Ypsilons (the letter of the Greek alphabet symbolising the Mystery of Incarnation, i.e., Jesus), which are the decorative (and symbolic) elements that stand out. The doors we see today date back to 1599, according to the date engraved on the outside.

The **Arrábida Breccia** is a formation originating in the proposed area for the Biosphere Reserve and was recently (in 2023) classified as a 'World Heritage Stone' by the International Union for Geological Sciences (IUGS) - an NGO partner of UNESCO.

10.6.2 INTANGIBLE HERITAGE

It is its transcendent nature that best defines the spirit of the Arrábida region, which, within the broader context of great sacred places, makes it unique and exceptional: within it coexist contemplative practices with scholarly roots, anachoritic or conventual, Christian or Islamic, alongside popular Christian liturgies closer to a religion without clergy, with the proliferation of popular pilgrimages that have endured to this day.

Espichel Promontory

The Akra Barbarium of the Romans, i.e., the place where the earth ends and the unknown begins, where cults and legends overlap in a religious and symbolic stratigraphy that has preserved and reinterpreted ancestral beliefs that remain active through pilgrimage routes that cross the territory.

The cultural manifestations associated with Arrábida - popular religiosity, as well as the arts and crafts related to agriculture, fishing, pastoralism, and gastronomy - are a living heritage with a long history of occupation of the territory and cultural tradition.

Among the numerous cultural manifestations that occur in Arrábida, the most emblematic are the festivities in honour of Our Lady of the Cape, which take place in August and September along the pilgrimages routes of Sesimbra and Palmela; the procession of the Lord of the Wounds, patron saint of fishermen in Sesimbra; the maritime celebration of Our Lady of Troia; the Escudeira Festival; the pilgrimage to El Carmen, in the heart of the mountain range; the Festivity of Lord Jesus of the Wounds in Sesimbra; or the pilgrimages in honour of Our Lady of Arrábida. We're talking about festivals and devotion, masses, prayers, celebrations, offerings and promises, as well as gatherings and camaraderie, at a time when all spheres of human life intersect.



Legend of Pedra da Mua

The Legend of Pedra da Mua, an origin myth that marks the beginning of the Marian worship at Cape Espichel, tells us about an image that appeared in 1275, shining brightly under the moonlight. The belief speaks of Mary's return to earth. The marks of the hooves of the donkey that carried her, imprinted on the stone, strengthened the belief in the exceptional nature of the Sacred Spirit of this place over the centuries. And although the marks have since been identified as dinosaur footprints, an important palaeontological testimony for world history, the Pilgrimage to Cape Espichel to worship Our Lady continues to this day.

Once considered one of the most beautiful sanctuaries in Portugal, over the years it has welcomed a large number of pilgrims who came here every year to fulfil their collective promises. The Saloio Pilgrimage (which currently includes 26 parishes) traversed the banks of the River Tagus in a collective pilgrimage. Today, the pilgrimage to Cape Espichel continues with the Routes of Sesimbra, Azóia, and Palmela. Although the guesthouses have been closed since 1996, the devotion of the worship and the festive atmosphere have persisted over the years.

Fishing Art

The connection with the ocean illustrates one of the most important intangible expressions of the proposed area: fishing and activities associated with wooden shipbuilding are a reality in the territory, taking advantage of the high and recognised quality of the region's fish. Using nets, hooks, or traps (pots), they employ an ancestral knowledge passed down from generation to generation, materialised in nautical orientation techniques, knowledge of the seabed and landmarks, empirical understanding of the weather, the study of species and their habits, a unique way of speaking, and deeply ingrained beliefs and traditions.

Having adapted to the progressive evolution of fishing art and the boats themselves, this activity encompasses a wide range of knowledge that makes up an undeniably valuable intangible heritage.

Cheese and Wine Art

Cheese-making is one of the most prominent art expressions in the territory, deeply rooted in extensive pastures where sheep graze, guided by millennia-old knowledge, with the aim of producing the exceptional cheeses of Azóia and Azeitão. With a flavour enriched by the artichoke thistle (*Cynara cardunculus*), they are produced using ancient techniques, reflecting the very texture of the mountains.

Wine is also a significant aspect for the communities in the Arrábida region. In fact, vine-growing in the Palmela region was already widespread at the dawn of nationality, as documented by the charter that King Afonso Henriques granted to the Freed Moors in 1170, ordering them to '*omnes vineas meas preparetis*' (*prepare all my vineyards*) (FLORES and NABAIS 1992, p. 42). In the Setúbal Peninsula, vineyard production and winemaking are climatically influenced by the rivers Tagus and Sado and by the proximity of the ocean. This is where the grapes of the Moscatel Roxo grape variety ripen, the raw material for Moscatel Roxo, a wine with the Moscatel de Setúbal Designation of Origin, produced mainly from vineyards located on the mountain's slopes.



10.7

SPECIFY THE NUMBER OF SPOKEN AND WRITTEN LANGUAGES IN THE PROPOSED BIOSPHERE RESERVE

Only Portuguese is used.



11

PHYSICAL CHARACTERISTICS

11.1

GENERAL DESCRIPTION OF SITE CHARACTERISTICS AND TOPOGRAPHY OF AREA

The interest and scenic qualities of the Arrábida mountain range derive from the exceptional beauty conferred by the unique character of a mosaic of landscapes where the contrast between the mountains and the sea is striking, the juxtaposition of rocky cliffs and crystalline water, of impressive slopes and welcoming beaches, the combination of dense forests and tranquil valleys, the impact of the visible morphology, and the surprise of unexplored caves. In this relatively small area one can observe a truly remarkable variety of landscapes, combined with meteorological phenomena and atmospheric conditions that contribute to an exceptional scenic setting, to a constant change of textures and tones, to a 'sea of clouds' that forms an impressive backdrop to the mountain range.

The main geomorphological unit of the entire area, the so-called Arrábida mountain range, consists of 3 axes: the first consists of small elevations on the outskirts of Sesimbra, the Risco and Arrábida mountain ranges, and the hills between Outão and Setúbal; the second is formed by the S. Luís and Gaiteiros mountain ranges; and the third is formed by the Louro and São Francisco mountain ranges.

The orientation of the mountain range is ENE-WSW (alpine orientation), with a length of around 35 km and an average width of 6 km. The maximum altitude is 501 m at the Formosinho anticline.

To the north of the mountain range there is a vast plain area that is wider near the western boundary of the proposed area, narrowing progressively as one moves eastward.

The Arrábida mountain range, and the plain area that surrounds it, has a great diversity of soils, due to the multivariate composition of the rocky materials that make up the parent rock. The vast majority of the soils are of sedimentary origin, although there are some eruptive intrusions. All the landforms visible in Arrábida today depend not only on aspects related to tectonics and erosion, but also on those related to the geology of the area, which is largely composed of limestone, dolomitic, or detrital rocks.

The coastline is quite rocky, cut out by small bays with white sand beaches and usually topped by escarpments of considerable height.

The **Marine Area** has particular characteristics, namely a rocky bottom, close to the coast, of a very specific nature resulting mainly from the fragmentation of the cliff itself, standing out greatly from its surroundings, since the Portuguese coast, to the north of Cape Sines, is predominantly sandy. As we move away from the coastline, rocky bottoms give way first to sandy bottoms, followed by silt bottoms. Its most notable features include the existence, on land, of a system of mountain ranges and highlands that provide the marine strip with very significant protection from the northerly winds that predominate in mainland Portugal; to the east, the estuary of the River Sado; in the ocean, a configuration of the seabed with large abyssal canyons, the Lisbon canyon to the west and the Setúbal canyon to the south, near the boundary of the proposed area, with depths of around 1000 m.



11.2

ALTITUDINAL RANGE

11.2.1

HIGHEST ELEVATION ABOVE SEA LEVEL

Called Alto do Formosinho, it has an altitude of 501 metres.

11.2.2

LOWEST ELEVATION ABOVE SEA LEVEL

On beaches, it corresponds to 0 metres.

11.2.3 FOR COASTAL/MARINE AREAS, MAXIMUM DEPTH BELOW SEA LEVEL:

The maximum depth is 1,000 metres at Cape Espichel and 100 metres in the Core Area.

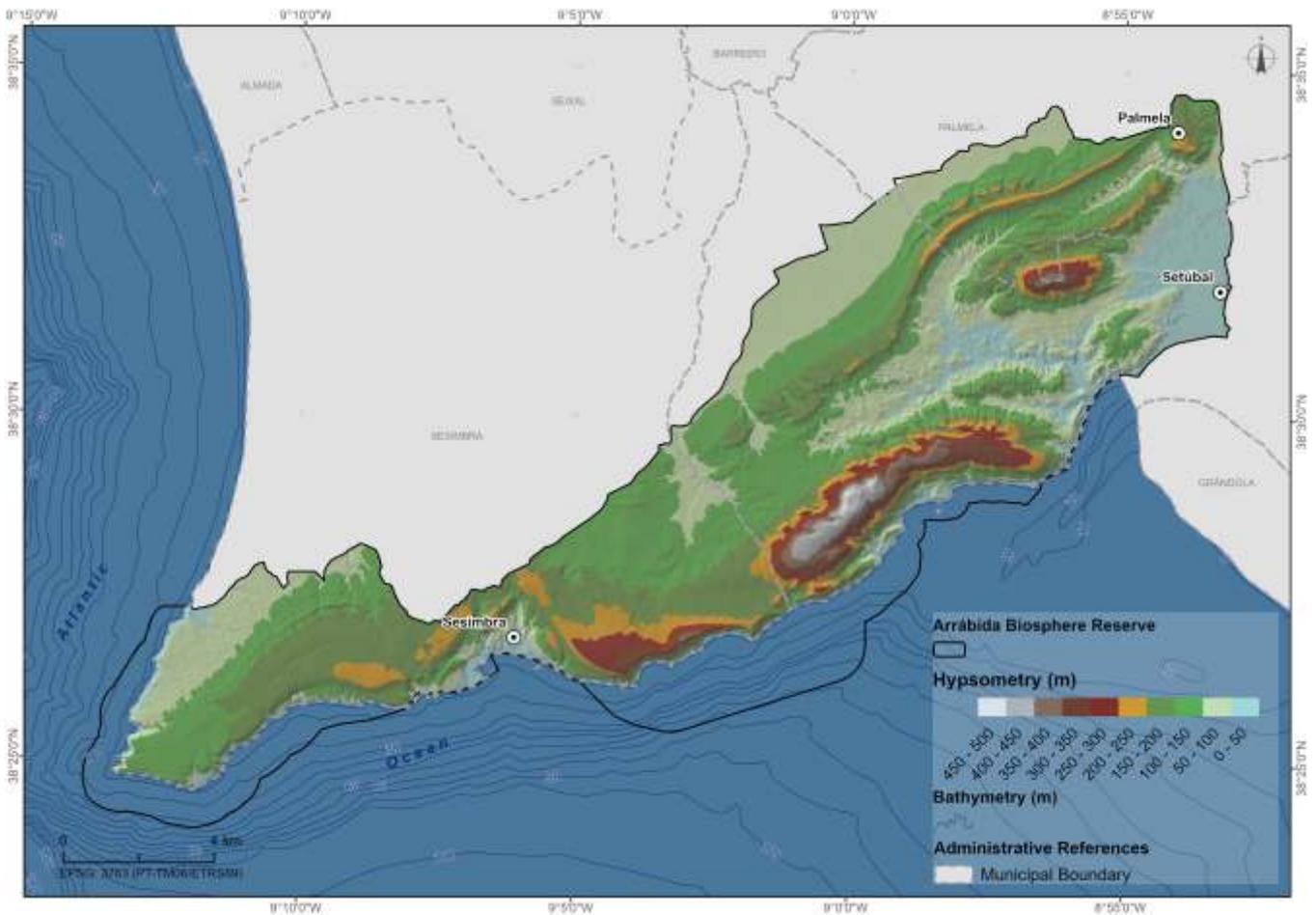


Figure 11.1 - Altitudinal range in the Arrábida Biosphere Reserve (Source: DGT, Military charts 432, 433, 442, 443, 444, 445, 453, 454, 455, 456, 464, 465, 466)

11.3 CLIMATE

Arrábida has strong Mediterranean characteristics, with two extreme seasons: The summer is hot and dry, with temperatures reaching levels similar to those in tropical regions, accompanied by prolonged periods of drought that can extend for several months; the winter is generally cold and humid. These seasons are interspersed with two intermediate ones, autumn and spring.

The proximity of the sea, in this case the Atlantic Ocean, is an important climatic factor that gives the region greater humidity and, consequently, milder temperatures throughout the year. Therefore, we can say that there is an Atlantic influence on the Mediterranean typicality, which essentially manifests itself in reducing temperature variation and increasing atmospheric humidity, a situation that occurs from mid-autumn to mid-spring. The orientation and consequent exposure of the relief will also have a mitigating effect on the type of climate in the region.

The results obtained from maps for the Köppen-Geiger classification, which corresponds to the latest revision by Köppen in 1936, confirm that most of the mainland territory has a temperate climate, Type C with Subtype Cs (temperate climate with dry summer) and the following variations:

- Csa, temperate climate with hot, dry summer in the overall region;
- Csb, temperate with dry, mild summer in the higher altitude areas of the mountain range.



Figure 11.2 - Köppen Climate Classification (1971-2000) Source: IPMA

11.3.1

AVERAGE TEMPERATURE OF THE HOTTEST MONTH

The highest average maximum temperatures are recorded in July and August, at 29.3°C and 29.5°C, respectively.

11.3.2

AVERAGE TEMPERATURE OF THE COLDEST MONTH

The lowest average minimum temperature occurs in January, reaching a record low of around 4.7°C.

11.3.3

MEAN ANNUAL PRECIPITATION

The spatial distribution of annual precipitation in the region indicates that values generally vary between 600 mm in lower altitude areas and 800 mm in higher elevation areas.

11.3.4

EXISTENCE OF A METEOROLOGICAL STATION

In Setúbal, the Climatological Automatic Station (EMA II), identified by number 770, is located at an altitude of 35 m, with coordinates 38.548° N; 8.891°W. It has been in operation since November 1996.



11.4

GEOLOGY, GEOMORPHOLOGY, SOILS

The Arrábida mountain range is located at the southern end of the Setúbal Peninsula and outcrops in a strip with an average width of about 7 km and stretching for 35 km in a WSW-ENE direction.

It is a peripheral mountain range of the Alpine belt, resulting from the collision between the Eurasian and African lithospheric plates. It is of relatively recent age, having evolved during the Miocene, from the Upper Burdigalian to the Tortonian, i.e. over a period of around 10 Mya.

The deformation particularly affects the sediments of the regional cover, deposited in the so-called Lusitanian Basin, located on the western Iberian margin during the Mesozoic. The tectonic inversion of the basin, resulting from the aforementioned collision, brings this 3 to 4 km thick sedimentary package to the surface. Thus, the entire sedimentary succession deposited in the southern sector of the Lusitanian Basin is exposed in Arrábida, and only here, as well as a series of structures that highlight the tectonic style associated with the early distension opening phases of the North Atlantic.

The sedimentary record in the Arrábida is not limited to Mesozoic units, as it exposes the most complete and continuous sedimentary succession of the Cenozoic in the country, particularly from the Miocene, which is related to the evolution of the Tagus river basin. The formation of the mountain range profoundly altered the original course of that river, being largely responsible for the location of its current vestibular section. In contrast to the Mesozoic sedimentary package, which is predominantly carbonate, the Cenozoic one is mainly composed of detrital rocks.

In fact, the sedimentary record in Arrábida, as well as along the entire southern and western Iberian margin, during the Upper Cretaceous/Lower Miocene interval, is scarce and difficult to date, as these are deposits of continental facies. According to

recent research, the occurrence of significant magmatic activity between 100 and 60 Mya is not surprising, as evidenced by the formation of various structures and massifs not far from the Arrábida region:

- 1) the Mafra Complex (about 50 km to the NNW), with approximately 100 MyA;
- 2) the Sintra massif (40 km to the NW), which is around 85 to 72 Mya, is concomitant with two other massifs to the south of the Arrábida (Sines and Monchique);
- 3) the Lisbon Volcanic Complex (25 km to the N), with approximately 60 Mya. Although relatively small in size, there are some outcrops of magmatic rocks in the Arrábida that, as will be seen below, are highly relevant for a better understanding of the formation of the massifs mentioned above.

In summary, from a geological perspective, Arrábida is a key region for a better knowledge and understanding of the three fundamental stages of evolution (post-Palaeozoic) of the western margin of the Iberian sub-plate, namely: **1)** the opening of the North Atlantic; **2)** the magmatism and resulting crustal uplift occurred during the Late Cretaceous to Paleogene period; and **3)** the collision with the African plate.

The Quaternary dynamics in Arrábida are also very relevant, particularly concerning landscape shaping. In fact, the dismantling of reliefs formed during the tectonic reversal, on an Atlantic façade strongly affected by the agents of coastal dynamics, over a period that underwent repeated and strong eustatic variations, combined with the dominant composition of the exposed rocks - limestones, marly limestones, and dolomites - gives it an enormous morphological diversity, of great aesthetic, scientific, and pedagogical value.

GEODIVERSITY

The geodiversity of the Arrábida mountain range, which is almost entirely encompassed by the perimeter of the Arrábida Biosphere Reserve, has immense intrinsic value, an enormous landscape, cultural, and even economic value. Its orography, its water network, the karstic forms that reveal in so many places the ancient history of Arrábida and the passing of time and the elements across its nearly smooth surface, its complex system of caves that make up a network of galleries and chambers in its depths, its direct contact with the sea on the south-facing slope and on the cliffs to the west, its almost east-west (ENE-WSW) orientation, its mineralogy, and its geographical location, are elements of geodiversity that, far beyond their geological value, create the matrix, the substrate on which the history of Arrábida's biodiversity is made possible.

The limestone formed in the open ocean and on the ancient outflows of lake systems hosted vegetation and various communities of animals and other organisms, also in constant evolution, accompanying the mountain range over its 30 million years of existence. The vegetation cover, specific communities, habitats, and biome found today in the Arrábida Biosphere Reserve are directly influenced by a geodiversity - including a temperate and Mediterranean climate - that is a source of life and a territorial component. This geodiversity not only allowed the development of lush vegetation and relevant biodiversity on a national and global scale but also facilitated the establishment of the first human communities which settled along the coast, taking advantage of caves and grottos, initiating the colonisation of the region.

The Arrábida mountain range, due to its structural diversity and spatial distribution and orogeny, presents various geological environments, both present and past, namely igneous formations, which although vestigial, are nonetheless illustrative of the local diversity. The Arrábida mountain range features coastal cliffs with and without beaches exposed to the northwest swells, cliffs with and without beaches facing south and protected from the predominant swell regime, gently sloping beaches, and bays, as well as sandy and rocky bottoms in the marine region of the Reserve. Particularly noteworthy is the Marine Core Area, which serves as a source of marine aquatic life and as a breeding ground for numerous species, some of which are

consumed and support traditional and ancestral fishing practices. Furthermore, on land, the Formosinho, São Luís da Serra, and Louro anticlines provide diverse forest environments that change according to the orientation of the slopes, preserving a coolness sanctuary facing south and exposing the surface to the aridity of the north winds. The plain, while not dominant, also provides space and conditions for the development of typical biodiversity and human activities such as livestock farming and agriculture. On a clear day, from a high point on the Arrábida relief, one can see almost all the described landmarks and witness the vastness of its monumental beauty. This is decisively influenced by its dense layer of permanent dark green vegetation, as well as the sculpted outlines shaped by time on the rocky massif, the result of millions of years of tireless tectonic work.

The geodiversity of the proposed Arrábida Biosphere Reserve is a significant element in its own right, contributing significantly to an application of this nature. It forms the foundational pillar upon which biodiversity and human activity are built, fully embodying the principles and values that the Man & Biosphere programme aims to protect, preserve, and consolidate, encompassing Humanity, Life, and Earth as a whole.

KARSTIC MORPHOLOGY

Given that most of the terrain comprising Arrábida is carbonate-based, and considering the temperate climate prevailing in the region over the past millions of years, examples of karstic morphology are abundant. Of particular note within the framework of surface karst morphology is the exokarst:

The surface is dominated by different types and developments of lapiaz formations, namely:

- I. lapiaz fields in grooves, in areas where slope is predominant over structural factors, such as the slopes of the Formosinho mountain range;
- II. lapiaz fields on plateaus, in areas where structural surfaces are gently sloping and associated with a monoclinical arrangement of layers, with a slight inclination, such as the top of the Formosinho Mountain Range and the northern slope of the Risco Mountain Range;
- III. lapiaz fields in needle form, commonly found on marine abrasion platforms, especially on the Cape Espichel Platform and its 'rechãs'¹² (e.g., Chã dos Navegantes), which represent ancient beach levels. These formations primarily developed along stratification joints.

Small enclosed depressions, such as dolines, are also common, particularly on the flat surface of the Cape Espichel sector. Another depression of karstic origin, this time much larger (around 2 km²) is the Calhariz plain, shaped over the pericline termination of the Formosinho anticline, forming an almost endorheic basin of karstic origin (polje); detailed morphological analysis of the area suggests that its formation was relatively recent.

¹² Rechã' - a marine abrasion platform, evidenced at levels different from the current mean sea level.



It is precisely along the watercourse that currently drains this ancient polje - the Terras do Risco Stream - that one of the most spectacular and imposing structures associated with fluviokarstic valleys is found: a sequence of giant's kettles, among which one stands out, with a volume of approximately 150 m³ (cylindrical shape with a section diameter of approximately 6 m and a height of 5 to 6 m), the largest known in the country.



In the context of endokarstic morphology, it is noteworthy that the constant discovery and inventorying of new karstic cavities demonstrate that, in this regard, the Arrábida region approaches the Estremadura Limestone Massif

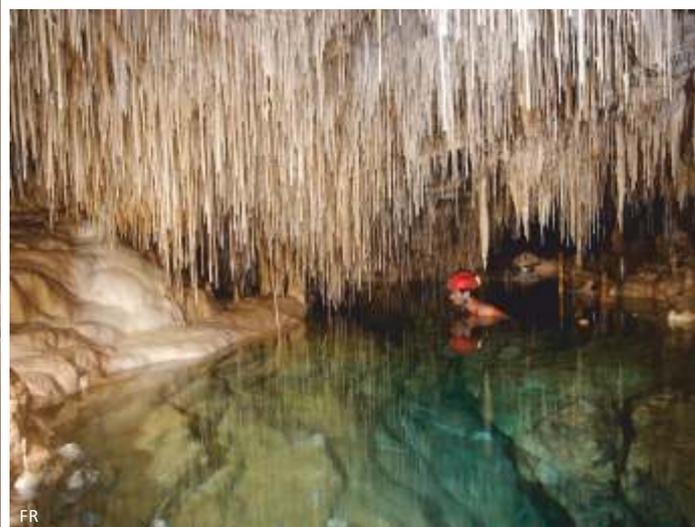
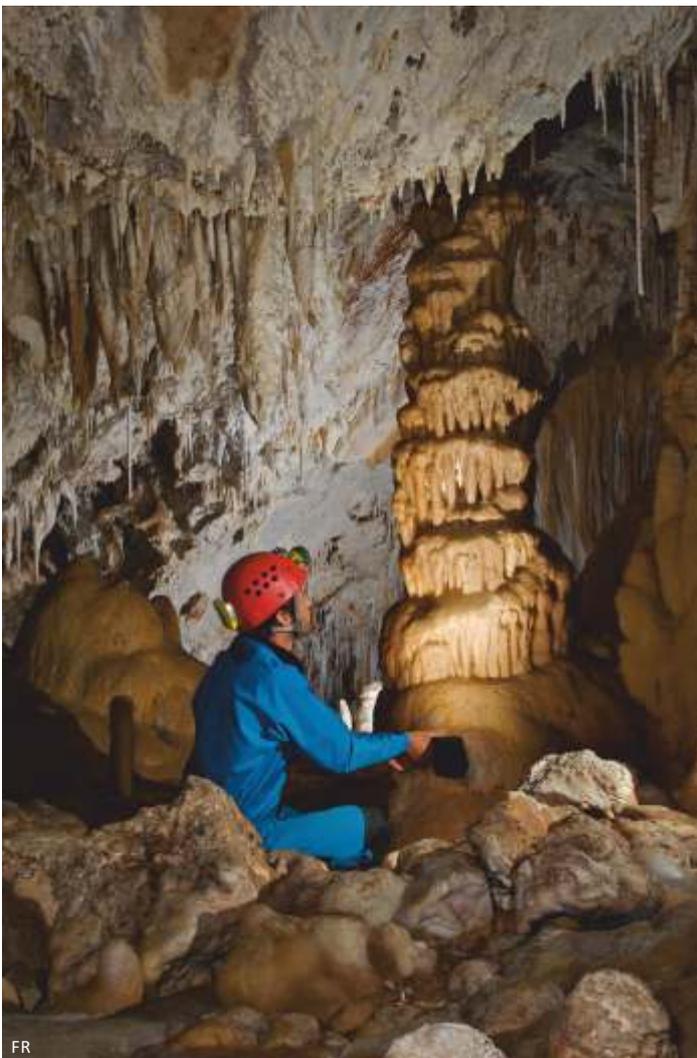
in terms of speleological relevance. However, in the specific case of the Frade Cave, there is no parallel in the country, as it can be compared to the most famous caves in the world in terms of quality, beauty, development, diversity, rarity, and uniqueness of most of its speleothems. It has a known extension of approximately 600 meters and is in an excellent state of preservation. Despite its remarkable aesthetic appeal, its scientific interest is undoubtedly greater.



Other cavities also stand out, the largest concentration of which is located under the Cape Espichel Platform, just like the previous one. These include the cases of the Grande Falha Cave and the Garganta do Cabo Cave, which are structurally controlled and develop along faults, with the former reaching a 500 m length. They feature galleries at sea level, but where freshwater deposits are known, and have interesting speleophores as well as traces of ancient marine action.



FR



At an elevation of approximate 200 m, there are more significant caves such as the Fumo Cave, a 70-metre-long fossilised phreatic gallery, and the Zambujal Cave, also fossilised.

The Zambujal Cave developed by exploring thick, massive limestone benches of a limestone massif whose primary porosity and intrinsic permeability are very high. The evolution of the cave and the lithochemical structures shows clear structural control. It has a profusion of calcite formations (stalactites, stalagmites, curtains), rare in their development, as well as gours and eccentric formations. The likely continuation of the cavity in depth is highly probable.

There are numerous galleries at sea level, embedded in the cliffs at various altitudes and displaying paleokarstic fillings and marine deposits that mostly represent ancient fossilised cavities.

Also noteworthy on the coastal cliff, carved out of Miocene biocalcarenites, are the following subsurface karstic forms: the Figueira Brava, Greta, Verde, Santa Margarida, Conchas and Areias caves, as well as a profusion of sinkholes.

In Upper Jurassic limestones, on the slope overlooking the Alpertuche Beach, the Médico Cave develops over an approximate length of 70 metres. In this same unit and with an approximate extension, but located in Outão, we find the Feiticeiras Cave.



FR

COASTAL MORPHOLOGY

As previously mentioned, the ocean has played an important role in shaping the landscape of the Arrábida region, not only in terms of the current rugged relief along almost the entire southern edge of the Arrábida Mountain Range, but also in carving surfaces that bear witness to different eustatic levels (abrasion platforms and raised beaches) resulting from the different glacial and interglacial periods of the Quaternary.

Arrábida borders with the ocean to the south, for most of its extension through steep escarpments, from the vicinity of Cape Espichel to near Setúbal. The Risco Mountain Range is the most vigorous example of this, being the highest coastal escarpment in Europe carved out of carbonate units.



On the other hand, the large plain of the Cape Espichel Platform is also noteworthy, corresponding to a marine abrasion surface, culminating in Arrábida to the west, with elevations ranging very smoothly from 240 m to 140 m, which directly overlook the sea through sub-vertical cliffs.

The cliffs are profusely embedded by various levels of Quaternary flattening, as well as intersected by numerous watercourses, suspended over the sea.



SOILS

The Arrábida mountain range, and the plain area that surrounds it, has a great diversity of soils, due to the multivariate composition of the rocky materials that make up the parent rock. The vast majority of the soils are of sedimentary origin, although there are some eruptive intrusions. All the landforms visible in Arrábida today depend not only on aspects related to tectonics and erosion, but also on those related to the geology of the area, which is largely composed of limestone, dolomitic, or detrital rocks.

As is characteristic of predominantly limestone regions, the hydrography has aspects specific to this type of composition, such as the non-perennial and limited nature of watercourses.

The soils are mostly skeletal or skeletonised, with skeletal red soils predominating over limestone (calcic rhodochromic luvisols) which, in some areas, have evolved into brown forest soils (calcic cambisols). The higher altitude areas of crystalline limestone and the associated steep slopes favour the erosion of residual soils, inhibiting the development of thick soils and colonisation by vegetation. These soils have very limited water retention capacity, and water infiltrates rapidly as the limestone material dissolves or runs down the slopes into the valleys or the sea.

11.5

BIOCLIMATIC ZONE

The geographical area where the Biosphere Reserve is located has a typically Mediterranean climate with significant Atlantic influence. This climatic effect results in a high atmospheric humidity index that promotes relatively insignificant annual temperature variations. Average atmospheric temperatures are around 17°C. This climatic and biogeographical context is the basis for the occurrence of two extreme seasons:

- Hot, dry summers, sometimes with subtropical temperatures, and periods of drought that can extend for several months;
- Generally cold winters, with high levels of humidity from mid-autumn to mid-spring.

Despite their proximity to the sea, the continentality index of the terrestrial areas is one of the highest within the context of the coastal territories of Mainland Portugal. This situation is largely due to the climatic comfort produced by the western coastline (the western part of Mainland Portugal and the Setúbal Peninsula) and the region's mountainous alignment (the Arrábida, Risco, S. Luís, Gaiteiros, Louro, and São Francisco mountain ranges). This mountainous alignment, together with the lateral variation of the vegetation patches, fosters small local bioclimatic variations, particularly in terms of solar exposure, insolation, and precipitation.

Insolation has two phases, one of increasing brightness (January-August) and one of decreasing brightness (September-December). However, in the context of Mainland Portugal, it has moderately high values, ranging from 2,700 to 2,900 hours per year, as does the solar radiation index (between 150 and 160 kcal/cm²)).

On the other hand, the average annual precipitation is relatively modest for the national context, ranging between 600 and 800 mm. In terms of aridity index, it is classified as dry sub-humid to humid in most of the area covered (see table below).

AREAS	MEAN ANNUAL PRECIPITATION (mm)	ARIDITY INDEX		CORE AREA(S)	BUFFER ZONE(S)	TRANSITION AREA(S)
		PENMAN	(UNEP INDEX)			
Hyper-arid	P<100	<0.5	<0.05			
Arid	100-400	0.05--0.28	0.05--0.20			
Semi-arid	400-600	0.28--0.43	0.21--0.50			
Dry sub-humid	600-800	0.43--0.60	0.51--0.65	x	x	x
Humid sub-humid	800-1200	0.60--0.90	>0.65	x	x	
Perhumid	P>1200	>0.90				

Table 11.5-1 -Aridity index resulting from the use of the P/ETP formula. Average annual precipitation (P)/Average annual evapotranspiration potential (ETP)

According to the typological proposal by Rivas-Martinez *et al.* (2002), the area of the Reserve falls within the Mediterranean Region, Western Mediterranean Sub-Region, Lusitano-Andalusian Coastal Province, Gadihana-Sadense Sub-Province, Ribatagano-Sadense Sector, Sadense District, and Arrabidense District.

The northern part of the Reserve falls within the Sadense District, an area where the soils are often of alluvial origin, resulting from podsolised sands or resting on hard gravels and Miocene sandstones. It encompasses the Setúbal Peninsula, the sands of the Sado valley as far as Melides and Santa Margarida do Sado. It is home to species such as *Malcolmia lacera subsp. gracilima* and the endemic *Santolina impressa*. The most common vegetation series are the cork oak groves of *Oleo-Quercosubercois sigmetum*, on sands, and those of *Asparago aphylli-Quercosubercois sigmetum*, on harder substrates such as sandstones.

The Arrabidense District corresponds to the limestone territories consisting of the Arrábida Mountain Range, mostly exposed to the south and located on the thermo-Mediterranean plateau. Most of its endemics are common to those of the Portuguese Divisory, but *Convolvulus fernandesii* and *Euphorbia pedroi* are endemic species exclusive to this biogeographical unit. The dominant communities are the endemic holm oak groves and the associated forest series (*Viburno tini-Quercosubercois sigmetum*). The *Quercosubercois-Juniperetum turbinatae* is also typically the edaphoxerophilous community of coastal cliffs and steep slopes. The oak forests of *Arisaro-Quercetum broteroi* occur in places with some water compensation, as do the wild olive tree vertisols of *Viburno tini-Oleetum sylvestris*.

11.6

BIOLOGICAL CHARACTERISTICS

The proposed Reserve has a high diversity of ecosystems and is home to various types or representatives of terrestrial, coastal, and marine habitats listed in Annex I of the Habitats Directive (Directive no. 92/43/EEC of the Council, of 21 May). In the Arrábida/ Espichel ZEC, whose area overlaps 83.5% of the Biosphere Reserve area, there are 42 known types of habitats with a significant presence, the vast majority typical of soils derived from basic rocks.

According to the land use map (Annex III), forests and scrublands cover 48.7% of the surface area of the Reserve, with forests accounting for 25.5% and scrublands for 23.2%. Pastures, whether improved or spontaneous, cover 3.7% of the area. Agroforestry areas (cork oak, cork oak and holm oak, stone pine, and others) occupy a total of 2.0% of the area. And, residually, there are uncovered or sparsely vegetated areas (0.6%), including rocky outcrops, sparse vegetation, beaches, dunes, and inland or coastal sandy areas.

The remaining territory is occupied by agricultural areas (18.0%) and urban areas (12.1%), forming a network of population clusters composed of the main settlements, Sesimbra, Setúbal, and Palmela, as well as smaller ones, villages, and hamlets.

One of the most relevant characteristics of Mediterranean plant formations is their great floristic and phytosociological heterogeneity. Although Mediterranean ecosystems can be considered young due to the relatively recent emergence of the

Mediterranean climate, they are composed of species originating from almost all biogeographical regions in the world, in a complex combination of various elements: some evolved locally, while others colonised this region from adjacent areas or from more distant regions at various times in the past.

The high botanical interest of Arrábida lies in the composition of its vegetation, where three floristic elements converge: the Euro-Atlantic - dominant in exposures to the north quadrant, cooler, moister, and shadier, the Mediterranean - dominant in exposures to the south quadrant, warmer, drier, and brighter, and the Macaronesian - prevailing in the most markedly maritime situations, such as cliffs. The high floristic diversity is revealed by phytosociological studies, revealing some 1,368 taxa in the region, including more than a hundred endemic and rare plants, such as *Euphorbia pedroi* and *Convolvulus fernandesii*.

Assuming vegetation as the main terrestrial land use component, the interest lies in guiding this characterisation primarily in that direction. The communities considered correspond to types of land use that clearly differ in their vegetation structure, which is generally due to differences in the dominant species. Below are brief interpretative descriptions of these formations, and, when appropriate, important species that may occur in them are highlighted.

CHARACTERISTIC PLANT FORMATIONS AND THEIR SPECIES

Shrublands

The vegetation cover in the core areas is mostly **shrublands: kermes oak and calcicolous scrublands**, dominated by *Quercus coccifera* along with various other shrub species. It is a heterogeneous group as the dominant species depend on various factors, such as slope, exposure, distance from the sea, soil depth, among others: *Pistacia lentiscus*, *Ulex densus* (in the western half), *Coronilla valentina subsp. glauca*, *Phillyrea angustifolia*, *Cistus monspeliensis*, *Arbutus unedo* (in the mountains), and on the sunnier southern slopes, *Olea europaea var. sylvestris* and *Juniperus turbinata*.

In some places there are arboreal patches of *Quercus coccifera*, in particularly favourable locations in terms of soil and hydrological regime, presenting relatively stable morphological characteristics that are different from *Quercus coccifera* shrublands, which has led some authors to consider *Q. coccifera* L. *subsp. rivasmartinezii*, later proposed as a species, *Quercus rivasmartinezii*. Unique vegetation formations of arboreal oak groves stand out, such as Mata do Vidal, Mata do Solitário, Mata Coberta Nascente, and Mata Coberta Poente.

In very dense oak groves, diversity tends to be lower, but clearings and edges are home to several important species, including *Iberis procumbens subsp. microcarp*, *Erucasrtrum nasturtifolium*, *Arabis sadina*, *Valeriana tuberosa*, *Nothobartsia asperrima*, *Odontites viscosus subsp. australis*, among others.

Silicolous scrublands

There are also **silicolous scrublands**, consisting of **heathlands** and **scrublands on sandy** and gravelly (acidic) soils, ranging from low to medium height. *Cistus ladanifer*, *Erica australis*, *Erica scoparia*, *Calluna vulgaris*, *Halimium halimifolium*, *Halimium ocymoides* and various other species of heath, gorse and cistus are very common, depending on the substrate (sandy or gravelly). These are important habitats for *Drosophyllum lusitanicum*, *Thymus villosus*, *Thymus capitellatus*, and *Centaurea africana*.

Rocky outcrops

In the **rocky outcrops** within the oak grove matrix (eastern half), it is also possible to find *Narcissus calcicola*, *Silene longicilia* and *Linaria aeruginea*. In very restricted niches, in limestone crevices with some humidity, the rare and small *Asplenium petrarchae* appears.

Fallow lands, pastures, and other degraded wastelands

A considerable area is also occupied by pastures, fallow lands, and degraded wastelands. These are rainfed crops, pasture, and abandoned areas with herbaceous vegetation. In older fallow areas, perennial plants and pioneer shrubs, such as *Foeniculum vulgare*, *Brachypodium phoenicoides* and *Dittrichia viscosa* are frequently predominant. Over time, succession leads to the floristic composition gradually resembling that of semi-natural perennial grasslands.



Perennial semi-natural grasslands

There are also semi-natural perennial grasslands of *Brachypodium phoenicoides* and other grass species, along with a wide variety of other herbaceous species. Typically, these grasslands have no shrub species, consisting of tufts of perennial grasses distributed more or less compactly, never exceeding about 50 cm in height. These habitats are very rich in orchids (both in number of species and abundance), mainly from the *Orchis*, *Ophrys*, *Barlia* and *Anacamptis* genera. The *Ophrys sphegodes* orchid stands out because it is an extremely rare species in Portugal and has a fairly isolated population here.

Despite the high diversity, particularly in orchid species, these semi-natural habitats require certain conditions to persist. Transhumant grazing, provided it is not excessive, is one of the factors that promote the maintenance of this habitat, preventing the establishment of shrub and tree species that would alter the local environmental conditions.



Ophrys bombyliflora



Orchis coriophora

Naturalised pine forests

Part of the terrestrial core areas is occupied by **naturalised pine forests on dunes**, i.e. pine forests with little intervention and natural undergrowth. The species present here correspond mostly to those found in siliceous scrublands or sometimes in oak groves, depending on the type of soil. Similarly, some of the rare species mentioned there also occur, namely *Centaurea africana* and *Drosophyllum lusitanicum*.

Cork oak forests and heathlands with scattered cork oaks

A small part of the core areas is occupied by **cork oak groves** and **heaths with scattered cork oaks**, consisting of tall, closed heather bushes (*Erica spp.*) and *Arbutus unedo* with arboreal stature, and arboreal *Quercus suber*. The species list is very similar to that of the siliceous scrublands, but these areas show a greater degree of naturalisation and are at a more advanced successional stage.



Maritime slopes

A small part of the terrestrial core areas is occupied, on the slopes facing the sea, by low, open scrubland, whose composition of dominant species has affinities with oak groves, albeit with a more open structure and with the sometimes frequent presence of *Juniperus turbinata*. These are very unique habitats, home to the majority of plants of high conservation value, including two exclusive endemisms. The stretch extending from Cape Ares (Sesimbra) to Cape Espichel is home to *Euphorbia pedroi* and *Convolvulus fernandesii* (the latter more associated with escarpments), but also *Lavatera maritima*, *Withania frutescens*, *Orobanche rosmarina*, *Piptatherum coerulescens*, *Fumana laevipes* and *Helianthemum apenninum subsp. apenninum*, rare plants at national level.

In the sector to the east of Sesimbra, extending to Outão, although the constituent species of this habitat remain similar, the floristic composition includes other rare species, the most notable of which are *Stipa offneri*, *Volutaria crupinoides*, *Patellifolia patellaris*, *Fagonia cretica*, *Crambe hispanica*, *Hesperis laciniata*, among others.

The maritime slopes facing west (north of Cape Espichel) have a clearly distinctive and much less characteristic flora, which is repeated in several points along the Portuguese coast.



View of specimens of *Euphorbia pedroi*

Maritime cliffs

The limestone escarpments over the sea have little or no vegetation and share some of the more specialised flora on vertical rocks, namely *Convolvulus fernandesii*, *Lavatera maritima*, *Galium lucidum subsp. corrudifolium* and *Piptatherum coerulescens* in the western sector of Sesimbra, and *Stipa offneri* and *Piptatherum coerulescens* to the east. Closer to sea level, we find *Asplenium marinum*, one of the few ferns that tolerates salinity, growing in rock crevices under the effect of salt spray, and very localised along the Portuguese coast.



Convolvulus fernandesii

Cork oak groves

In small areas of the proposed region, there are *Quercus suber* groves overgrown with annual arable pastures. These habitats require periodic grazing or clearing to maintain their structure; otherwise, natural progression leads to the appearance of shrubs and a consequent tendency to become similar to cork oak forests.

Open scrublands, thyme fields, and wild olive tree groves on stony ground

There are also open scrublands of thyme fields and wild olive tree groves on stony ground: areas with sparse, low-height scrubs, generally very dry and south-facing, stony, and marly soils. Low shrub species such as *Thymbra capitata*, *Rosmarinus officinalis* and *Santolina rosmarinifolia*, and in the westernmost region, *Ulex densus* are quite common. Perennial grass species such as *Hyparrhenia hirta* and *Brachypodium phoenicoides* are also abundant. These are important habitats for *Teucrium haenseleri* and *Lavandula multifida* (species whose northern distribution limit in Portugal is in the Arrábida).

Oak groves

Oak groves also occur in woodlands consisting of *Quercus faginea subsp. broteroi*, *Quercus coccifera*, *Phillyrea latifolia*, *Pistacia lentiscus*, *Rhamnus alaternus*, and also other large shrubs such as *Viburnum tinus*, and *Bupleurum fruticosum* along the edges. Lianas are also predominant, especially *Smilax aspera* and *Lonicera spp.* These are closed and shady woodlands, with a high and dense tree and shrub layer, but relatively open lower strata. At the herbaceous level, one can often find *Paeonia broteroi*.

In the oak groves on the northern slope of the mountain or in sheltered valleys, where there have been no fires for many decades, there is also a rare small tree, *Acer monspessulanum*.



Western peony, *Paeonia broteroi*

Coastal sand vegetation and other halophytic vegetation

Coastal sandy (dune) vegetation and other halophytic vegetation are also represented, although they are very restricted in the Arrábida region due to the absence of coastal dune complexes; however, part of this vegetation, such as *Crucianella maritima*, *Ammophila arenaria*, *Armeria pungens* and *Herniaria maritima*, has come to occupy these sandy areas, which differ in origin and soil composition. The different nature of the substrate does, however, allow for the occurrence of other rather rare species, such as *Limonium echioides* and *Chaenorhinum serpyllifolium subsp. lusitanicum*.

Juniper tree forests

As for juniper tree forests, they can occur on dunes, where the dominant species is *Juniperus turbinata subsp. turbinata* or *Juniperus navicularis*, or on limestone, in which case they consist of tall coastal scrub co-dominated by *Juniperus turbinata* and *Quercus coccifera* along with various low shrub species such as *Cistus ladanifer*, *Cistus monspeliensis*, *Pistacia lentiscus*, *Barlia robertiana* or *Cephalanthera longifolia*. In these limestone substrates *Juniperus turbinata* forms arboreal thickets - stable communities that are unique in Portugal.

Watercourses

In the proposed area there are numerous watercourses, generally of a torrential nature, entrenched in more or less deep valleys with riparian vegetation, such as *Fraxinus angustifolia*, *Populus nigra*, *Salix neotricha*, *Salix atrocinerea*, *Clematis campaniflora*, *Tamarix africana*, *Quercus faginea*, *Crataegus monogyna*, *Rosa sempervirens*, *Rubus ulmifolius*, etc

Peatlands and oligotrophic hygrophilous grasslands

Grasslands and scrublands on permanently waterlogged soils, with oligotrophic waters. The dominant shrub species are *Genista ancistrocarpa*, *Erica erigena* and *Ulex minor*. As far as herbaceous plants are concerned, there are some that only occur in Arrábida, such as *Pinguicula lusitanica*, *Cheirolophus uliginosus* and *Teucrium scordium*, as well as various other hygrophilous species associated with peaty habitats, which are scarce in the region.



Ulex densus

FAUNA

The fauna is extremely rich and diverse, resulting from the interaction between a complex set of environmental factors (significant in the processes of species selection and spatialisation) and human activities (whose greatest expression was felt after the end of the last glacial period (Wurm), approximately 10,000 years ago).

Excessive deforestation and the increase in agriculture and pastoralism have completely transformed the original morphology and landscape of Mediterranean ecosystems, leaving them with a high degree of structural heterogeneity, characterised by an intricate agroforestry mosaic, with natural habitats persisting in the interstices of this landscape.

The abundance and diversity of species depend on this typically Mediterranean mosaic landscape, which provides a high level of habitat heterogeneity at structural level. Indeed, in few places in the Portuguese territory can one find such a remarkable example of the combination of natural and human aspects, with such a high level of faunal diversity. Around 199 species of vertebrates are known, including 12 species of amphibians; 17 reptiles, 34 mammals, and 136 birds. Arrábida is also a site of great diversity of invertebrates, with about 650 identified species, including 106 species of spiders, 445 species of beetles, 61 species of butterflies, 37 species of ants, and 4 species of lace bugs.

Invertebrates

It is estimated that there are 653 species of invertebrates (exclusively arthropods) in the proposed area, highlighting the presence in the Arrábida mountain range of 6 species of **coleoptera** endemic to Portugal - *Geocharis boeiroi*, *G. moscatelus*, *Typhocharis sarría*, *Iberodorcadion lusitanicum*, *Cneorhinus serranoi*, *Lusotyphlus sarrius*. The species *Geocharis boeiroi*, *Cneorhinus serranoi*, and *Lusotyphlus sarrius* stand out because they occur exclusively in the Arrábida Mountain Range.

Among hymenoptera, the *Gonionna kugleri* ant stands out, being endemic to the Iberian Peninsula and occurring in the Arrábida Mountain Range and a few other locations (Mértola, Arruda dos Vinhos, Coruche, and Chamusca).

Lepidoptera also find exceptional habitat characteristics in the Arrábida mountain range, with species such as *Pseudophilotes panoptes*, an Iberian endemism, *Euchloe tagis* (Portuguese dappled white), *Anthocaris euphenoides*, *Cupid minimus*, *Melitaea didyma* and *Lasiommata maera* which, due to their rarity, should be considered conservation priorities.

The *Anaspistula ataecina* is an extremely rare **spider** species endemic to Mainland Portugal, known only from four caves in the Frade cave system, near Sesimbra.

Also noteworthy is the presence of the *Xeroplexa setubalensis*, a terrestrial **gastro-pod** species endemic to Portugal, whose only known population currently exists in the Arrábida Mountain Range.

VERTEBRATES

As far as vertebrate fauna is concerned, there are references¹³ for to 12 species of **amphibians**, 17 of **reptiles**, 136 of birds, and 34 of **mammals** in the Arrábida Mountain Range, many of which have an unfavourable conservation status. There are 20 species of birds listed in Annex I to the Birds Directive and 11 species with an unfavourable conservation status according to the LVVP, such as Bonelli's Eagle (*Aquila fasciata*), classified as 'Endangered' (EN), and the Peregrine Falcon (*Falco peregrinus*), classified as 'Vulnerable' (VU). In the herpetofauna group (amphibians and reptiles), there are 2 species listed in Annex B-II to the Habitats Directive, the Iberian painted frog (*Discoglossus galganoi*) and the Mediterranean pond turtle (*Mauremys leprosa*). In the mammals group, it's worth highlighting a medium-sized feline species, the European wildcat (*Felis silvestris*), classified as 'Endangered' (EN) in the Red List of Mammals of Mainland Portugal (2023), and 5 species of cave-dwelling bats, all included in Annex B-II to the Habitats Directive, and with unfavourable status according to the same reference.

The diverse ecological characteristics within the Arrábida Limestone Massif provide numerous habitats that favour biodiversity. The main biocenotic values are established along the coastline, largely due to an extensive interface of coastal limestone cliffs that reach heights of up to 380 meters. The specific richness is therefore considerable, especially when considering that the area in question is almost devoid of non-marine aquatic biotopes, which naturally results in an under-representation of aquatic birds. It is also worth noting that although the nesting and wintering communities are well characterised, it is very likely that the list of migratory and accidental species will be considerably expanded following more detailed and ongoing surveys. In fact, ornithological studies of this part of the country are far from exhaustive, which also emphasises the role of research within the context of a Biosphere Reserve.

¹³Information provided in the POPNA.

More than the absolute specific richness or importance for conservation, it is important to highlight the interest that these ornithological communities have when viewed from a more specific perspective. In this and the following sections, attention is drawn to some particular aspects, such as:

More than the absolute specific richness or importance for conservation, it is important to highlight the interest that these ornithological communities have when viewed from a more specific perspective. In this and the following sections, attention is drawn to some particular aspects, such as:

- (1) the interest in studying the bird communities of well-preserved Mediterranean woodlands.
- (2) the unique situation of Arrábida's natural habitats, where plants that depend on birds and other vertebrates for their dispersal are predominant.
- (3) the Cape Espichel region as a concentration point for small migratory birds coming from across Europe, and
- (4) the area's significance as a place for study, leisure, and environmental education.

The communities of rupicolous birds (which nest on the rocks) are quite rich, highlighting the importance of the cliffs in the area. In the crevices and cracks of the cliffs, nesting species include, among others, birds with protected status such as the Eurasian eagle-owl (*Bubo bubo*), the Bonelli's eagle (*Aquila fasciata*), or the Peregrine falcon (*Falco peregrinus*). The nesting of Bonelli's eagles (*Aquila fasciata*) on the cliffs above the sea is indeed a unique case in Europe, representing a distinctive element in this community. Certain species, such as the swift *Apus spp.* or the European shag *Phalacrocorax aristotelis*, even nest inside small caves, thus forming a particularly close bond with the rocky environment. Other species highly characteristic of this environment are the blue rock thrush *Monticola solitarius* and the black redstart *Phoenicurus ochruros*.

The marine area within the proposed site is relatively limited in terms of seabirds. These birds typically undertake large daily movements and mainly remain in this area during migration. Among the more sedentary birds, we should mention the European shag and the yellow-legged gull *Larus michahellis*.

The ornithological communities of the extensive Mediterranean scrublands (maquis and 'garrigue') that cover Arrábida become interesting in the winter, not for their composition, but for the interactions between plants and birds that contribute to the ecosystem's structure. In fact, the scrublands of Arrábida are largely dominated by trees and shrubs that produce fleshy fruits (berries) dispersed by birds, and to a lesser extent by other vertebrates. Obvious examples of this type of plant are mastic trees, myrtles, wild olive trees, or arbutus. And an overwhelmingly dominant fraction of the bird community that winters in these habitats feeds precisely on berries or fleshy fruits, especially the extraordinarily abundant European robin *Erithacus rubecula*.

Arrábida is therefore a privileged site for observing and studying the interactions between migratory birds and Mediterranean plants. These interesting interactions are essentially mutualistic and are believed to be the result of a coevolution process.

Cape Espichel: a privileged point of concentration for migratory birds

Every year, hundreds of millions of birds migrate between Europe and Africa. Furthermore, a similar number migrates from the higher or middle latitudes of the European continent to more southern sectors. The Portuguese coast is a privileged place to witness this wonderful phenomenon, and the promontory of Cape Espichel is, along this coast, one of the most favourable places to observe it.

In autumn, small passerines represent the bulk of the migratory flow. Most of those nesting in western, central and northern Europe move southwestward and concentrate in the western part of the Iberian Peninsula, before setting out on the journey across the vast ecological barrier formed by the sea and the Sahara, heading towards tropical Africa. At Espichel, the presence of trans-Saharan migrants can be seen from the end of July. The migration intensifies throughout August, reaching its peak in September. These are mainly small insectivorous birds that migrate at night. They can be seen during the day, taking a break from migration and foraging frantically for food in the pastures or in the hedges and scrublands that predominate in the region. Amongst the most numerous and conspicuous are various types of blackcaps and warblers, such as the willow warbler *Phylloscopus trochilus*, the common whitethroat *Sylvia communis*, or the garden warbler *Sylvia borin*. There are also wheatears (*Oenanthe*), re-starts (*Phoenicurus*), stonechats (*Saxicola*), nightingales

(*Luscinia*), or pipits (*Anthus*). Indeed, this flow is not only composed of small birds. During this time of year there are also some long-distance migratory birds of prey, including several falcons (*Falco*) or even large gliders, such as the rare Egyptian vulture *Neophron percnopterus*. Other non-passerines include birds such as the European turtle dove *Streptopelia turtur*, various swifts *Apus spp.*, or the lesser-known Eurasian wryneck *Jynx torquilla*.



Common shag

When October arrives, the passing of long-distance migrants heading towards tropical Africa slows down (although it may continue until the first days of November), and a new migration wave begins, this time bound for the southern Iberian Peninsula and North Africa. Some species are, once again, nocturnal migrants, such as the Eurasian blackcap *Sylvia atricapilla*, the European robin, the redwing *Turdus iliacus*, the song thrush *Turdus philomelos*, or the common chiffchaff *Phylloscopus collybita*. But even more conspicuous and spectacular is the daytime migration of small granivores that can be seen on many October and November mornings. Flocks of small birds succeed one another, including finches *Fringilla spp.*, goldfinches *Carduelis carduelis*, greenfinches *C. chloris*, linnets *C. cannabina*, serins

Serinus serinus, bullfinches *Pyrrhula pyrrhula*, and sparrows *Passer spp.*, among others. Flocks of larger birds, such as stock doves *Columba oenas* or golden plovers *Pluvialis apricaria* may also appear at this time, adding to the beautiful ornithological spectacle.

Like all sites where migratory birds congregate, Cape Espichel is a place where rare or accidental birds can often be found, far off their normal migration routes. Therefore, it is also a place of great interest for birdwatchers seeking elusive species and other novelties.

In the spring, on the other hand, the migratory flow in the Iberian Peninsula passes through more eastern sectors, so, unlike in autumn, Cape Espichel is not a favourable spot for birdwatching, except during periods of strong east winds. This does not apply to seabirds, such as gannets *Morus bassanus* or scoters *Melanitta nigra*, whose migration can be observed here at any time of the year.

MARINE COMMUNITY

Created with the aim of preserving the richness of the existing biodiversity, the Luiz Saldanha Marine Park protects its role as a breeding ground for many marine species and consequently contributes to the sustainability of local fishing resources. It is a stretch of coastline with particular characteristics which, as far as rocky bottom habitats are concerned, can be considered a 'continental island', since both to the north and to the south there are extensive sandy areas stretching for dozens of kilometres.

Marine habitats harbour significant natural and ecological values, hosting high biodiversity and well-preserved populations of various species of scientific or commercial interest. As mentioned, there are three types of habitat relevant for marine biodiversity:

- 1110 Sandbanks which are slightly covered by sea water all the time
- Subtype 1 - Sandbanks without vascular vegetation;
- Subtype 3 - Sandbanks with *Zostera marina*;
- 1170 Reefs;
- 8330 Submerged or partially submerged sea caves.

More than 2000 marine species have been recorded, including several of great economic importance, which develop crucial parts of their life cycle here. For example, in the case of crustaceans, there are specimens of species such as the spiny lobster (*Panulirus argus*), the spider crab (*Maja squinado*), the slipper lobster (*Scyllarides latus*) and various species of crabs and razor clams, demonstrating the potential interest of this area for the group as a whole.

With regard to **marine fish**, many of those occurring off the coast of Arrábida are considered threatened in mainland Portugal and are listed in Portugal's Red Book of Vertebrates (LVVP), highlighting the importance of the proposed region as an ecological laboratory.

It is important to mention that this coastline stretch is the distribution limit for some species. In addition to some fish from the blenniid family (already included in the LVVP), some wrass species from the labridae family should be considered - *Symphodus ocellatus*, *S. rostratus*, *S. mediterraneus* and *S. roissali* (because they may find their northern distribution limit in Arrábida or a little further north), while the *Centrolabrus exoletus* is expected to be quite rare south of the Arrábida coasts. These species have been prioritised and their regular occurrence gives the marine area national importance in conservation efforts.

With regard to **marine mammals**, there is a resident population of bottlenose dolphins (*Tursiops truncatus*), which uses and depends on part of the marine area included in the proposed Biosphere Reserve. This cosmopolitan cetacean species belongs to the *Delphinidae* family and has a wide geographical distribution. It is classified as 'Least Concern' at the national level by the Red List of Mammals of Mainland Portugal and by the IUCN (International Union for Conservation of Nature).

As far as **marine flora** is concerned, it is particularly notable for its usually lush populations of algae. However, it should be noted that some of them should be a conservation priority at national level, such as the phaeophycean algae of the kelp group (whose most significant representative on the region's coast is *Saccorhiza polyschides*).

Both algae and marine plants, when they are especially well-developed, are particularly important because of the special habitat they create, as they give rise to exceptional refuge and breeding areas for juveniles of numerous species of fish and crustaceans. Although algae can be extremely important habitats, they are not yet included in the legislation designed to protect species and habitats. However, based

on the available data, we can provide a selection of some species of marine flora present in the area, which are considered to be priorities:

- *Zostera marina*: seagrass from the Zosteraceae family. In Portugal, sheltered sea conditions, such as those found in the Arrábida area, are very rare, making the marine prairies of this plant true relics.
- *Mesophillum lichenoides*: red algae from the Coralinaceae family. It belongs to the type of encrusting algae which, due to the fixation of high quantities of minerals, have rigid and brittle stalks. In the Mediterranean, they are very important values in numerous marine reserves and parks.
- *Saccorhiza polyschides* and *Cystoseira usneoides*: brown algae that cannot tolerate very high sea water temperatures. They grow very quickly in the summer months, reaching heights of over 4 metres. They form dense forests on rocky bottoms starting from a depth of 4 metres, and serve as an important refuge for juvenile marine species. In Portugal, these algae are in sharp decline due to the gradual warming of the waters. In the Arrábida area they still show, particularly in



colder years, very significant growth and intermittent extinction and recolonisation dynamics. The proposal suggests considering taxa as 'vulnerable', i.e., that although populations may be abundant in certain years, they are under threat from factors causing intense regression.

- *Genus Gelidium*: this algae once had the most representative banks in the country in the area of the Luiz Saldanha Marine Park, particularly in the areas surrounding Cape Espichel, Today, it is becoming urgent to consider some areas of the Portuguese coast as refuges.

In short, priority species include all marine mammals and reptiles occurring in the area, even if only occasionally, species of shellfish and cephalopods, as well as economically significant crustaceans, all fish listed as threatened in the LVVP, as well as those reaching their distribution limit in the region; marine kelp and seagrass.



ES-DP

Marine prairie

12

ECOSYSTEM SERVICES

12.1

IF POSSIBLE, IDENTIFY THE ECOSYSTEM SERVICES PROVIDED BY EACH ECOSYSTEM OF THE BIOSPHERE RESERVE AND THE BENEFICIARIES OF THESE SERVICES

The survey and quantification of ecosystem services¹⁴ of the Arrábida Natural Park were conducted as part of the master's *thesis 'Assessing and quantifying ecosystem services of the Arrábida Natural Park'* (Colaço, 2021). The survey of existing ecosystem services took into account two international classification systems defined for ecosystem services: *Millennium Ecosystem Assessment Framework (MA)*¹⁵ and *The Economics of Ecosystems and Biodiversity (TEEB)*¹⁶. These systems are interrelated, encompassing all provisioning, regulating, and cultural services, each with its advantages and disadvantages due to the specific context for which they were developed.

The proposed Reserve encompasses the Arrábida Natural Park and the Luiz Saldanha Marine Park, a protected area that includes a wide variety of ecosystems and a high level of associated biodiversity, as well as a strong human presence and consequent economic activities.

¹⁴ Ecosystem services - these are benefits that human beings derive from an ecosystem, either actively or passively, and can be categorised in various ways.

¹⁵ The MA was the first large-scale system to be developed and was later adopted and improved by the TEEB and CICES systems. The MA organises ecosystem services into four categories: provisioning, regulation, support, and cultural.

¹⁶ The TEEB proposes a typology of 22 services subdivided into four categories, derived from the MA classification: provisioning, regulation, habitat, and cultural/amenity. The TEEB omitted support services, considering them a subdivision of ecological processes. Alternatively, habitat services are identified in a separate category to emphasise the importance of ecosystems for migratory species and as 'protectors' of genetic diversity. Therefore, the availability of these services depends directly on the conservation status of the habitat providing them.

In terms of **provisioning services** in the Arrábida Biosphere Reserve, we highlight the production of:

- a. Fishing
- b. Sheep cheese and butter
- c. Fruit and Vegetables
- d. Olives and olive oil
- e. Wine and liqueurs
- f. Aromatic herbs
- g. Honey and honey products
- h. Water
- i. Agriculture
- j. Wood and cork
- k. Jams and jellies
- l. Limestone and marl

In terms of **regulation services** in the Arrábida Biosphere Reserve, we highlight the following:

- a. Air quality and availability, conditioned by the forest and its morphology
- b. O₂ production by terrestrial vegetation, algae and seagrasses
- c. Regulation of precipitation and temperature by vegetation cover and orography
- d. Recharge of underground aquifers
- e. Protection of soil against erosion by dense vegetation cover
- f. Pollination ensuring the fertilisation of dioecious species
- g. Insect control, potential disease vector by bat and bird populations
- h. CO₂ sequestration by terrestrial vegetation and marine microalgae
- i. Protection against storms by vegetation cover and orography
- j. Moderation of extreme climatic events by rocky reefs, dunes and cliffs in the marine zone

In terms of **habitat and maintenance services** in the study area, we highlight the following:

- a. Formation of vegetative soil and mineral soil
- b. Processes of organic matter decomposition and nutrient mineralisation
- c. Habitat for 3,650 species in the seven terrestrial habitats and two marine habitats
- d. Presence of endemic fauna and flora species
- e. Presence of approximately 42% of the flora species identified in Portugal
- f. High biodiversity
- g. Presence of agricultural varieties

In terms of **cultural services** in the study area, we highlight the following:

- a. Natural landscape (mountains and sea)
- b. Intangible Heritage (recreation of traditions such as pilgrimages)
- c. Cultural diversity (different communities establishing various relationships with the territory: rural, fishing, and urban communities)
- d. Social relations
- e. Deep relationship of people with nature
- f. Contemplation and reflection
- g. Sense of belonging
- h. Artistic and sensory inspiration
- i. Feeling of freedom and isolation
- j. Living laboratory that allows formal and informal knowledge in various areas: geology, biology, anthropology, and archaeology
- k. Scientific and traditional knowledge (evidence of human evolution; occupation of the territory; traditional practices and knowledge)
- l. Tourism (Nature, Cultural, Wine, Gastronomic, Seaside)

It has been shown that all types of ecosystems can provide services, albeit different ones.

In this way, their proper management can enhance the protection of natural ecosystems and expand their benefits to society. The beneficiaries of these services are diverse and include local communities, the scientific community, visitors and tourists, as well as users of the products generated in this Biosphere Reserve in general.

TYPE OF SYSTEM	ECOSYSTEM PROVISION	REGULATION SERVICES	CULTURAL SERVICES
Urban	Harvests	Global climate; Local climate; Air quality; Water purification; Nutrients; Erosion; Natural hazards; Pollination; Pests and diseases; Waste	Tourism and leisure; Landscape aesthetics and inspiration; Knowledge systems; Religious and spiritual experience; Cultural heritage and cultural diversity; Natural heritage and natural diversity
Quarries	Mineral resources		Knowledge systems; Cultural heritage and cultural diversity
Vineyard	Harvests; Fodder	Global climate; Local climate; Air quality; Nutrients; Erosion; Pollination; Pests and diseases; Waste	Tourism and leisure; Landscape aesthetics and inspiration; Knowledge systems;
Agricultural environment	Harvests; Fodder; Cattle; Wood; Food and wild resources	Global climate; Local climate; Air quality; Water purification; Nutrients; Erosion; Natural hazards; Pollination; Pests and diseases; Waste	Tourism and leisure; Landscape aesthetics and inspiration; Knowledge systems; Religious and spiritual experience; Cultural heritage and cultural diversity; Natural heritage and natural diversity
Agroforestry	Harvests; Fodder; Cattle; Wood; Food and wild resources	Global climate; Air quality; Water purification; Nutrients; Erosion; Natural hazards; Pollination; Pests and diseases; Waste	Tourism and leisure; Landscape aesthetics and inspiration; Knowledge systems; Religious and spiritual experience; Cultural heritage and cultural diversity; Natural heritage and natural diversity

Woods and Forests	Fodder; Wood; Food and wild resources	Global climate; Local climate; Air quality; Water purification; Nutrients; Erosion; Natural hazards; Pollination; Pests and diseases; Waste	Tourism and leisure; Landscape aesthetics and inspiration; Knowledge systems; Religious and spiritual experience; Cultural heritage and cultural diversity, Natural heritage and natural diversity
Pasture	Fodder; Cattle; Food and wild resources	Global climate; Local climate; Water purification; Nutrients; Erosion; Natural hazards; Pollination; Pests and diseases; Waste	Tourism and leisure; Landscape aesthetics and inspiration; Knowledge systems; Religious and spiritual experience; Cultural heritage and cultural diversity, Natural heritage and natural diversity
Scrublands	Fodder; Cattle; Wood; Food and wild resources	Global climate; Local climate; Air quality; Water purification; Nutrients; Erosion; Natural hazards; Pollination; Pests and diseases; Waste;	Tourism and leisure; Landscape aesthetics and inspiration; Knowledge systems; Religious and spiritual experience, Cultural heritage and cultural diversity, Natural heritage and natural diversity
Sparsely vegetated areas	Cattle; Food and wild resources	Global climate; Water purification; Nutrients; Erosion; Natural hazards; Pests and diseases; Waste	Tourism and leisure; Landscape aesthetics and inspiration; Knowledge systems; Religious and spiritual experience, Cultural heritage and cultural diversity; Natural heritage and natural diversity
Marine	Fodder; Fishing; Food and wild resources	Global climate; Local climate; Water purification; Nutrients; Pests and diseases; Waste	Tourism and leisure; Landscape aesthetics and inspiration; Knowledge systems; Religious and spiritual experience, Cultural heritage and cultural diversity, Natural heritage and natural diversity

Table 12.1-1 - Ecosystem services identified in each ecosystem

12.2

SPECIFY WHETHER INDICATORS OF ECOSYSTEM SERVICES ARE USED TO EVALUATE THE THREE FUNCTIONS (CONSERVATION, DEVELOPMENT, AND LOGISTIC SUPPORT) OF THE BIOSPHERE RESERVE

As part of the '*Assessing and quantifying ecosystem services of the Arrábida Natural Park*' (Colaço, 2021) thesis, ecosystem service indicators were created with the aim of assessing the three functions of the Biosphere Reserve. Some of these indicators were identified as part of the POPNA assessment, including the spatial boundaries of the Biosphere Reserve, while others were identified by analysing sustainability indicators.

In the POPNA assessment, 47 indicators were created¹⁷ associated with three thematic areas - natural values; economic activity (hunting, construction, fishing, and tourism) and social activity (population), and operation/administration. On the other hand, the document 'Proposal for a Sustainable Development Indicators System' by the Direção Geral do Ambiente also provides a set of sustainability indicators. Based on these indicators, and with the aim of promoting solutions that coordinate the conservation of ecosystems and their biodiversity with their sustainable use, through a multidisciplinary approach that allows understanding and managing changes and interactions between socio-ecological systems, 17 indicators were selected.

The selected indicators meet the objectives set for the three functions of a Biosphere Reserve, systematise existing and reference data, and enable an assessment of results, namely in terms of monitoring the implementation of the Biosphere Reserve Action Plan. In view of the above, the following table shows the indicators selected according to the theme and function associated with the Biosphere Reserve proposal.

¹⁷ Presented in the POPNA Indicators Report

INDICATOR	THEME	FUNCTION
Surface and groundwater quality	Fresh water	Conservation
Water quality in seaside areas	Marine and coastal environment	Conservation
Changes in land use and occupation	Soil	Conservation
Area occupied by forests	Forest	Conservation
Diversity and abundance of fauna and flora species	Nature conservation	Conservation
Occupation by invasive exotic species	Conservação da Natureza	Conservation
Estimated number of visitors	Economic activity - tourism	Development
Regional products	Economic activity	Development
Recovered quarry area	Economic activity - construction	Development
Number of companies licensed for nature tourism and leisure activities	Economic activity - tourism	Development
Estimated number of participants in nature sports activities	Economic activity - tourism	Development
Extension of existing pedestrian trails	Economic activity - tourism	Development
Number of research projects conducted	Scientific research	Logistic support
Number of publications produced	Scientific research	Logistic support
Number of researchers involved in projects	Scientific research	Logistic support
Number of environmental education initiatives carried out	Education	Logistic support
Number of students and teachers covered by environmental education initiatives	Education	Logistic support

Table 12.2-1 - Set of indicators selected according to theme and associated function, i.e. conservation, sustainable development, and logistic support.

The indicators identified above were fundamental in delimiting the Arrábida Biosphere Reserve and supported the initiatives outlined in the Biosphere Action Plan.

12.3

DESCRIBE BIODIVERSITY INVOLVED IN THE PROVISION OF ECOSYSTEMS SERVICES IN THE BIOSPHERE RESERVE

Arrábida's vegetation has a high natural value, with three floristic elements converging in the area: the Euro-Atlantic, the Mediterranean, and the Macaronesian. According to phytosociological studies, there are more than 1,350 taxa in the area, distributed among more than 111 families. It is essentially the exuberance of the vegetation that makes it different from everything else around it. In the small territory that stretches from Setúbal to Palmela, we find around 40% of all the flora in mainland Portugal, making this mountain range the largest national phytodiversity deposit. The unique botanical characteristics of this site, rich in endemisms and rare species, are due to its location, its climatic and geological characteristics, and human influence on the site, leading to its international status as a Biogenetic Reserve of the Council of Europe¹⁸.

Associated with this great plant diversity, there are 42 types of habitats present (ten of which are considered priority habitats) and a great diversity of fauna with around 199 species of vertebrates including 12 species of amphibians, 17 species of reptiles, 34 species of mammals, and 136 species of birds. Arrábida is also a site of great diversity of invertebrates, with about 650 identified species, including 106 species of spiders, 445 species of beetles, 61 species of butterflies, 37 species of ants, and 4 species of lace bugs.

Because the biodiversity of the area is so rich, it would be impossible to list all the species responsible for creating ecosystem services. Therefore, the most prominent species, along with the area in which they are present, are shown according to the ecosystem services provided using the TEEB typology, the faunal/floristic group to which they belong, and their conservation status. The current conservation statuses are in line with the International Union for Conservation of Nature (IUCN Red List), which divides species into nine categories: Not Evaluated (NE), Data Deficient (DD), Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), and Extinct (EX). The species listed in the annexes to the Habitats Directive, better known as Directive 92/43/EEC, which provides European-level protection to the species covered, are also distinguished.

¹⁸ Classified as a Biogenetic Reserve by the Council of Europe in 1979, under the Man & Biosphere programme

The following table shows the most prominent marine floristic species responsible for providing ecosystem services.

SERVICES	FLORA	CONSERVATION STATUS
Provisioning	<i>Gelidium sp.</i>	Habitats D.
Regulation / Habitat	<i>Zostera marina</i>	Vulnerable (VU), Habitats D.
	<i>Laminaria ochroleuca</i>	Habitats D.
	<i>Saccorhiza polyschides</i>	Habitats D.

Table 12.3-1 - Floristic biodiversity associated with the Marine Area according to the ecosystem services provided (TEEB typology) and conservation status [Not Evaluated (NE), Data Deficient (DD), Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), and Extinct (EX)]. The species listed in the annexes to the Habitats Directive, better known as Directive 92/43/EEC, which provides European-level protection to the species covered, are also distinguished.

The following table shows the most important terrestrial biodiversity.

SERVICES	FLORA	CONSERVATION STATUS
Provisioning	<i>Thymus carnosus</i>	Habitats D.
	<i>Pinus pinea</i> - Stone Pine	Habitats D.
	<i>Laurus nobilis</i> - Laurel	Habitats D.
	<i>Fraxinus angustifolia</i> - Narrow-leaved ash	Habitats D.
	<i>Alnus glutinosa</i>	Habitats D.
	<i>Fraxinus excelsior</i> - Ash	Habitats D.
	<i>Quercus faginea</i> - Portuguese oak	Habitats D.
	<i>Quercus faginea subsp. broteroi</i> - Portuguese oak	Annex I to the POPNA
	<i>Quercus coccifera subsp. rivasmartinesii</i> - Kermes oak	Endemic, Annex I to the POPNA
	<i>Quercus suber</i> - Cork oak	Habitats D.
	<i>Quercus rotundifolia</i> - Holm oak	Habitats D.
	<i>Ruscus aculeatus</i> - Butcher's-broom	Habitats D.
	Orchidaceae (29 sps)	
	<i>Lavandula stoechas</i> - Spanish lavender	
Regulation/ Habitat and Maintenance/ Cultural	<i>Pinus pinaster ssp. atlántica</i> - Maritime Pine	Habitats D.
	<i>Limonium spp.</i>	Habitats D.
	<i>Salix sp.</i>	Endemic, Habitats D.
	<i>Quercus canariensis</i>	Critically Endangered (CR), Habitats D.
	<i>Quercus faginea</i> - Portuguese oak	Habitats D.
	<i>Quercus faginea subsp. broteroi</i> - Portuguese oak	Annex I to the POPNA
	<i>Quercus coccifera subsp. rivasmartinesii</i> - Kermes oak	Endemic, Annex I to the POPNA
	<i>Quercus suber</i> - Cork oak	Habitats D.

	<i>Quercus rotundifolia</i> - Holm oak	Habitats D.
	<i>Rhododendron ponticum</i> - Pontic rhododendron	Habitats D.
	<i>Populus alba</i> - White poplar	Habitats D.
	<i>Arabis sadina</i>	Endemic, Habitats D.
	<i>Euphorbia transtagana</i>	Endemic, Habitats D.
	<i>Thymus camphoratus</i>	Endemic, Habitats D.
	<i>Acer monspessulanus</i> - Montpellier maple	Annex I to the POPNA
	<i>Ulex densus</i> - Gorse	Endemic, Habitats D.
	<i>Herniaria maritima</i>	Endemic, Habitats D.
	<i>Iberis procumbens subsp. microcarpa</i>	Endemic, Habitats D.
	<i>Juncus valvatus</i>	Habitats D., Near Threatened (NT), Endemic
	<i>Narcissus calcicola</i>	D. Habitats
	<i>Pseudarrhenatherum pallens</i>	Endemic, Vulnerable (VU), Habitats D.
	<i>Arabis sadina</i>	Endemic, Habitats D.
	<i>Chaenorhinum serpyllifolium subsp. Lusitanicum</i>	Endemic, Endangered (EN), Habitats D.
	<i>Convolvulus fernandesii</i>	Endemic, Endangered (EN), Habitats D.
	<i>Euphorbia pedroi</i>	Annex I to the POPNA, endemic to the PNA
	<i>Euphorbia transtagana</i>	Habitats D.
	<i>Fagonia cretica</i>	Annex I to the POPNA, endemic to the PNA
	<i>Lavatera maritima</i>	Vulnerable (VU), Annex I to the POPNA
	<i>Withania frutescens</i>	Endangered (EN), Annex I to the POPNA
	<i>Silene longicilia</i>	Endemic, Habitats D.

Table 12.3-2 - Floristic biodiversity associated with ecosystem services in the Terrestrial Area and their respective conservation status. The current conservation statuses are in line with the International Union for Conservation of Nature (IUCN Red List), which divides species into nine categories: Not Evaluated (NE), Data Deficient (DD), Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), and Extinct (EX). The species listed in the annexes to the Habitats Directive, better known as Directive 92/43/EEC, which provides European-level protection to the species covered, are also distinguished.

The following table shows the most prominent faunal species responsible for various ecosystem services in the **marine environment**.

SERVICES	FAUNA	CONSERVATION STATUS
Provisioning	<i>Conger conger</i> - Conger eel	Least Concern (LC)
	<i>Pollachius pollachius</i> - Pollack	Not evaluated (NE)
	<i>Trisopterus luscus</i> - Pouting	Not evaluated (NE)
	<i>Phycis phycis</i> - Forkbeard	Not evaluated (NE)
	<i>Dicentrarchus labrax</i> - European sea bass	Not evaluated (NE)
	<i>Mullus surmuletus</i> - Striped red mullet	Not evaluated (NE)
	<i>Diplodus sargus</i> - White seabream	Not evaluated (NE)
	<i>Diplodus vulgaris</i> - Two-banded seabream	Not evaluated (NE)
	<i>Diplodus annularis</i> - Annular seabream	Least Concern (LC)
	<i>Diplodus puntazzo</i> - Sharpshout seabream	Not evaluated (NE)
	<i>Diplodus cervinus</i> - Zebra seabream	Least Concern (LC)
	<i>Pagellus acarne</i> - Axillary seabream	Least Concern (LC)
	<i>Pagrus pagrus</i> - Red porgy	Least Concern (LC)
	<i>Sarpa salpa</i> - Dreamfish	Least Concern (LC)
	<i>Sparus aurata</i> - Gilt-head seabream	Least Concern (LC)
	<i>Spondyliosoma cantharus</i> - Black seabream	Least Concern (LC)
	<i>Solea senegalensis</i> - Senegalese sole	Deficient data (DD)
	<i>Hippocampus hippocampus</i> - Short-snouted seahorse	Deficient data (DD)
	<i>Hippocampus ramulosus</i> - Long-snouted seahorse	Deficient data (DD)
	<i>Palinurus elephas</i> - Spiny lobster	Vulnerable (VU)
<i>Scyllarus arctus</i> - Slipper lobster	Least Concern (LC)	
<i>Maja squinado</i> - Spinous spider crab	Not Listed IUCN	
<i>Necora puber</i> - Velvet swimming crab	Not Listed IUCN	
Regulation/ Habitat and Maintenance	<i>Paramuricea clavata</i> - Small polyped gorgonian	Not Listed IUCN
	<i>Leptogorgia sarmentosa</i> - Orange gorgonian	Not Listed IUCN
	<i>Eunicella verrucosa</i> - Pink sea fan	Vulnerable (VU)
	<i>Leptogorgia lusitanica</i> - Gorgonian	Not Listed IUCN
Cultural	<i>Tursiops truncatus</i> - Bottlenose dolphin	Habitats D.
	<i>Mola mola</i> - Ocean sunfish	Vulnerable (VU)
	<i>Phocoena phocoena</i> - Harbour porpoise	Habitats D.
	<i>Paramuricea clavata</i> - Small polyped gorgonian	Least Concern (LC)
	<i>Eunicella verrucosa</i> - Pink sea fan	Vulnerable (VU)
	<i>Leptogorgia sarmentosa</i> - Orange gorgonian	Not Listed IUCN
	<i>Paramuricea clavata</i> - Small polyped gorgonian	Not Listed IUCN

Table 12.3-3 - Faunal biodiversity associated with ecosystem services in the Marine Area and their respective conservation status - amphibians and reptiles. The current conservation statuses are in line with the International Union for Conservation of Nature (IUCN Red List), which divides species into nine categories: Not Evaluated (NE), Data Deficient (DD), Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), and Extinct (EX). The species listed in the annexes to the Habitats Directive, better known as Directive 92/43/EEC, which provides European-level protection to the species covered, are also distinguished.

The following tables show the most prominent faunal species, according to class, responsible for various ecosystem services in the **terrestrial environment**.

SERVICES	FAUNA	CONSERVATION STATUS
Regulation/ Habitat and Maintenance/ Cultural	<i>Discoglossus galganoi</i> - Iberian painted frog	Iberian endemism, Near Threatened (NT), Birds and Habitats Directive
	<i>Hyla arborea</i> - European tree frog	Birds and Habitats Directive
	<i>Pelobates cultripes</i> - Western spadefoot	Birds and Habitats Directive
	<i>Mauremys leprosa</i> - Mediterranean pond turtle	Birds and Habitats Directive
	<i>Chalcides bedriagai</i> - Bedriaga's skink	Iberian endemism, Birds and Habitats Directive
	<i>Coluber hippocrepis</i> - Horseshoe whip snake	Birds and Habitats Directive
	<i>Acanthodactylus erythurus</i> - Spiny-footed lizard	Iberian endemism

Table 12.3-4 - Faunal biodiversity associated with ecosystem services in the Terrestrial Area and their respective conservation status - birds. The current conservation statuses are in line with the International Union for Conservation of Nature (IUCN Red List), which divides species into nine categories: Not Evaluated (NE), Data Deficient (DD), Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), and Extinct (EX). The species listed in the annexes to the Habitats Directive, better known as Directive 92/43/EEC, which provides European-level protection to the species covered, are also distinguished

SERVICES	FAUNA	CONSERVATION STATUS
Regulation/ Habitat and Maintenance/ Cultural	<i>Alcedo atthis</i> - Common kingfisher	Birds and Habitats Directive
	<i>Anthus campestris</i> - Tawny pipit	Birds and Habitats Directive
	<i>Apus melba</i> - Alpine swift	Priority Species - POPNA
	<i>Aquila fasciata</i> - Bonelli's eagle	Priority Species - POPNA
	<i>Bubo bubo</i> - Eurasian eagle-owl	Priority Species - POPNA
	<i>Caprimulgus ruficollis</i> - Red-necked nightjar	Vulnerable (VU) in national territory according to Cabral <i>et al.</i> 2005
	<i>Circaetus gallicus</i> - Short-toed snake eagle	Birds and Habitats Directive
	<i>Columba sp. (livia; oenas; palumbus)</i>	Species protected by the POPNA
	<i>Corvus corone</i> - Carrion crow	Species protected by the POPNA
	<i>Coturnix coturnix</i> - Common quail	Species protected by the POPNA
	<i>Falco naumanni</i> - Lesser kestrel	Birds and Habitats Directive
	<i>Falco peregrinus</i> - Peregrine falcon	Priority Species - POPNA
	<i>Garrulus glandarius</i> - Eurasian jay	Species protected by the POPNA
	<i>Hieraaetus pennatus</i> - Booted eagle	Birds and Habitats Directive
	<i>Phalacrocorax aristotelis</i> - European shag	Vulnerable (VU)
	<i>Pica pica</i> - Eurasian magpie	Species protected by the POPNA
	<i>Scolopax rusticola</i> - Eurasian woodcock	Species protected by the POPNA
	<i>Streptopelia turtur</i> - European turtle dove	Species protected by the POPNA
	<i>Sturnus vulgaris</i> - Common starling	Species protected by the POPNA
	<i>Turdus sp. (iliacus; merula; philomelos; pilaris; viscivorus)</i>	Species protected by the POPNA
<i>Strix aluco</i> - Tawny owl	Least Concern (LC)	
<i>Athene noctua</i> - Little owl	Least Concern (LC)	
<i>Sterna albifrons</i> - Little tern	Vulnerable (VU) in national territory according to Cabral <i>et al.</i> 2005	
<i>Sterna hirundo</i> - Common tern	Vulnerable (VU) in national territory according to Cabral <i>et al.</i> 2005	
<i>Sterna sandvicensis</i> - Sandwich tern	Least Concern (LC)	

Table 12.3-5 - Faunal biodiversity associated with ecosystem services and their respective conservation status - birds. The current conservation statuses are in line with the International Union for Conservation of Nature (IUCN Red List), which divides species into nine categories: Not Evaluated (NE), Data Deficient (DD), Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), and Extinct (EX). The species listed in the annexes to the Habitats Directive, better known as Directive 92/43/EEC, which provides European-level protection to the species covered, are also distinguished

SERVICES	FAUNA	CONSERVATION STATUSES
Regulation/ Habitat and Maintenance/ Cultural	<i>Euplagia quadripunctaria</i>	Birds and Habitats Directive
	<i>Euphydryas aurinia</i> - Marsh fritillary	Birds and Habitats Directive
	<i>Geocharis boeiroi</i>	Endemic
	<i>Cneorhinus serranoi</i> - Weevil	
	<i>Candidula setubalensis</i> - Snail	Endemic, endangered (EN)
	<i>Euchloe tagis</i> - Portuguese dappled white	Endemic
	<i>Cupido minimus</i>	
	<i>Pseudophilotes panoptes</i>	Iberian endemism
	<i>Melitaea didyma</i>	
	<i>Lasiommata maera</i>	

Table 12.3-6 - Faunal biodiversity associated with ecosystem services and their respective conservation status - invertebrates. The current conservation statuses are in line with the International Union for Conservation of Nature (IUCN Red List), which divides species into nine categories: Not Evaluated (NE), Data Deficient (DD), Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), and Extinct (EX). The species listed in the annexes to the Habitats Directive, better known as Directive 92/43/EEC, which provides European-level protection to the species covered, are also distinguished.

SERVICES	FAUNA	CONSERVATION STATUS
Provisioning	<i>Ovis aries</i> - Sheep	Not listed IUCN
	<i>Sus scrofa</i> - Wild boar	Least Concern (LC)
Regulation/ abitat and Maintenance	<i>Felis silvestres</i> - Wildcat	Species protected by the POPNA
	<i>Tadarida teniotis</i> - European free-tailed bat	Species protected by the POPNA
	<i>Myotis myotis</i> - Greater mouse-eared bat	Birds and Habitats Directive
	<i>Miniopterus schreibersii</i> - Common bent-wing bat	Near Threatened (NT), Species protected by the POPNA
	<i>Rhinolophus euryale</i> - Mediterranean horseshoe bat	Near Threatened (NT), Species protected by the POPNA
	<i>Rhinolophus ferrumequinum</i> - Greater horseshoe bat	Birds and Habitats Directive
	<i>Rhinolophus hipposideros</i> - Lesser horseshoe bat	Birds and Habitats Directive
	<i>Rhinolophus mehelyi</i> - Mehely's horseshoe bat	Near Threatened (NT), Species protected by the POPNA
	<i>Barbastella barbastellus</i> - Western barbastelle	Birds and Habitats Directive
	<i>Lepus granatensis</i> - Granada hare	Least Concern (LC)
	<i>Oryctolagus cuniculus</i> - European rabbit	Near Threatened (NT)
	<i>Sus scrofa</i> - Wild boar	Least Concern (LC)
	Cultural	<i>Genetta genetta</i> - Common genet
<i>Felis silvestres</i> - Wildcat		Species protected by the POPNA
<i>Herpestes ichneumon</i> - Egyptian mongoose		Birds and Habitats Directive
<i>Meles meles</i> - European badger		Birds and Habitats Directive
<i>Mustela putoris</i> - European polecat		Birds and Habitats Directive
<i>Mustela nivalis</i> - Least weasel		Birds and Habitats Directive
<i>Vulpes vulpes</i> - Red fox		Birds and Habitats Directive
<i>Sus scrofa</i> - Wild boar		Least Concern (LC)

Table 12.3-7 - Faunal biodiversity associated with ecosystem services and their respective conservation status - mammals. The current conservation statuses are in line with the International Union for Conservation of Nature (IUCN Red List), which divides species into nine categories: Not Evaluated (NE), Data Deficient (DD), Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), and Extinct (EX). The species listed in the annexes to the Habitats Directive, better known as Directive 92/43/EEC, which provides European-level protection to the species covered, are also distinguished.

12.4

SPECIFY WHETHER ANY ECOSYSTEM SERVICES ASSESSMENT HAS BEEN DONE FOR THE PROPOSED BIOSPHERE RESERVE

The identification of ecosystem services, as well as the quantification and economic valuation of carbon storage and sequestration in a terrestrial area within the Biosphere Reserve area, was carried out in 2021 as part of a master's thesis (Colaço, 2021). In this work, the ArcGIS software was used to create the Geographic Information System (GIS), as well as InVEST modelling tools.

With regard to carbon sequestration, it was concluded that the Woodland class (Mata do Vidal, Mata Coberta, Mata do Solitário woodlands) contributes the most to carbon storage and sequestration, followed by the Forests, Scrublands, and Complex Agricultural Areas classes, which coincide with the average values.

There was an increase in carbon storage over time, with an average carbon sequestered per year of approximately 112 t C year⁻¹ between 1967 and 1978 and 115 t C year⁻¹ between 1978 and 2010. With regard to the economic valuation of this service, it was concluded that the study area could contribute an order of magnitude of four million euros per year, considering the market value of the European Emissions Trading Scheme (ETS).

A study was conducted in the Biosphere Reserve area to analyse the carrying capacity of two beaches in the area, Figueirinha and Portinho de Arrábida, between 2013 and 2014. Data on seaside tourism were collected, allowing for reference values related to cultural services.

In the high season (July, August, and September), during the observation periods, Figueirinha beach had a minimum of 560 and a maximum of 2,330 visitors per day. On the other hand, Portinho da Arrábida had a minimum of 217 and a maximum of 1,603 tourists per day.

Questionnaires to users of the seaside area made it possible to gauge their perceptions and the reasons for choosing that area. A positive perception of both beaches was confirmed by users, particularly regarding natural beauty (97% of positive opinions) and environmental quality (84% of positive opinions).

In a third study conducted in the Biosphere Reserve in 2016, as part of a doctoral thesis, a methodology was developed for the participatory and integrated assessment of

ecosystem service values with the aim of developing a conceptual model specific to the area under assessment. The process unfolded in three distinct phases, including various participatory moments and combining different tools.

The proposed approach began with the scoping phase - 'set the scene' - developed through a collaborative process of defining the scope of ecosystem services. At this stage, an institutional analysis was combined with a stakeholder analysis to identify key stakeholders, their interdependencies, as well as the institutional framework governing the study area.

It was followed by a participatory workshop, where participants identified ecosystem services in the study area, as well as threats and connections with elements of human well-being. A preliminary analysis of the social, economic, and ecological importance attributed to ecosystem services was also conducted.

The second phase aimed to deepen understanding about the structure supporting the provision of a sustainable flow of the ecosystem services identified. Different groups of social stakeholders collaborated in conceptualising the processes that characterise the services, during a participatory conceptual modelling workshop, allowing the interrelationships between the different ecosystem services to be identified and key indicators for management processes to be selected (see Chapter 12.2).

The final stage in the development of the conceptual model was aimed at involving stakeholders to articulate values”.

The empirical results and the evaluation by participants supported the conclusion that the conceptual model developed provides a platform that enables stakeholder engagement in a sequence of tasks for assessing ecosystem services in the Biosphere Reserve and making decisions on policies and conservation management, logistic support, and sustainable development. It is worth mentioning that this evaluation contributed to the development of the Action Plan.

13

MAIN OBJECTIVES OF THE BIOSPHERE RESERVE'S DESIGNATION

13.1

DESCRIBE THE MAIN OBJECTIVES OF THE PROPOSED BIOSPHERE RESERVE, INTEGRATING THE THREE FUNCTIONS (CONSERVATION, DEVELOPMENT, AND LOGISTIC)

The uniqueness of the territory that comprises the Arrábida Biosphere Reserve is sustained by the richness and diversity of its natural heritage (one of the main national ecosystems, with multiple habitats and unique species on a national/international scale, in various environments - terrestrial, marine, and coastal) and the relational mosaic and harmonious coexistence it establishes with human communities and traditional economic activities that have developed here over centuries, contributing to its identity and distinctiveness.

The use and sustainable exploitation of endogenous resources can and should play a role in boosting regional and local development if national/international best practices are experienced and adopted, and if the involvement of multiple stakeholders (populations, producers, public and private entities, etc.) is improved. The co-construction of an ambitious and virtuous strategy and the shared responsibility for pursuing an effective operational approach, enhanced by the establishment of innovative partnerships that bring together territorial and sectoral interests, is one of the critical success factors that has already been generated and are expected to be further enhanced in the future, with gains in effectiveness for the ecological, socioeconomic, and cultural sustainability of this territory.

Conserving, enhancing, and promoting the proposed Biosphere Reserve territory as a learning and teaching laboratory for best practices at multiple scales will not only lead to international recognition but, above all, will allow this territory to be seen as an example, as a reference of how it is possible to protect and safeguard ecosystems,

habitats, and natural species, as well as landscape values, while simultaneously developing traditional economic activities in a consistent and effective manner, ensuring the permanence of populations and community life in balance with nature.

The harmony to be established between human communities, traditional economic activities, and natural ecosystems is (and will be) a hallmark of this territory, which is expected to be projected as a demonstrative example of the capacity of Biosphere Reserves to assume a central and distinctive role in the desired global changes when it comes to promoting sustainability.

As a living laboratory for sustainability, the Arrábida Biosphere Reserve will experience sustainable development, supported by increased knowledge, advancements in and application of science, innovative responses, and the efforts and proactivity of local communities, to reduce the loss of biodiversity and enhance the economic dynamism in this territory.

The natural heritage conservation and enhancement initiatives to be developed and the sustainable use of endogenous resources to be tested and subsequently shared and promoted internationally will confer significant prominence and visibility/recognition to the Arrábida Biosphere Reserve. Additionally, cooperation, collaboration, and co-responsibility among populations and key stakeholders in pursuing the strategic and operational approach will strengthen the identity and sense of belonging to this territory, a fundamental dimension to ensure the permanence of populations, traditional activities, and community life.

In this context, it is possible to combine the conservation function (of ecosystems, landscapes, habitats, and species) with the economic function (socially and culturally sustainable) and the logistic function (training, awareness-raising, knowledge production and dissemination), forming a consolidated and complementary mosaic of systems that represent and enhance the Arrábida territory.

Fostering its high biogeographical relevance by promoting its conservation and enhancement (botanical peculiarity and diversity; great diversity of habitats and plants of high conservation value, including two exclusive endemisms; existence of more than a thousand species in the marine area, including those of high economic importance, such as the spiny lobster (*Panulirus argus*) and the spinous spider crab (*Maja squinado*); the presence of prairies of marine plants of the *Zostera* genus, a rarity on a global scale) and, simultaneously, harnessing and maximising the richness of human intervention over centuries in this territory, exploring and demonstrating innovative approaches to sustainable development, is the foundation of the strategy to be pursued.

So, in general terms, the **guiding principles** for the Arrábida Biosphere Reserve involve reconciling natural values and historical and cultural heritage with local economic activities, fostering the sustainable and participatory management of the territory and enhancing the existing resources, while simultaneously contributing to the permanence and improvement of the well-being of populations.

To achieve an image of a territory of (and with) the future, where socio-economic realities and dynamics will be sustainable, where ecosystems will be protected and valued, within a context of active involvement and participation of local communities and key territorial and sectoral stakeholders, the proposed **vision** can be systematised in the following sentence:

Arrábida, a unique and learning territory, where the virtuous use of natural and human capital in harmony with the conservation and enhancement of the existing values, contribute to experimenting with innovative solutions in the balance between Man and Nature to ensure a sustainable future.

As a Biosphere Reserve, the mission to be pursued mainly involves leveraging the strengths and opportunities and finding the best solutions to overcome the weaknesses and threats associated with its ecosystems, habitats, and species, but also with the permanence of populations and the maintenance of traditional economic activities. Thus, in a context characterised by a broad mosaic of singularities, it is essential to ensure the creation of conditions to develop a multidimensional strategy (environmental, cultural, and heritage) that contributes to progress and prosperity, while ensuring the sustainable use and exploitation of resources and the

conservation and protection of threatened habitats and species. Thus, the mission to be pursued involves:

Asserting Arrábida as a living laboratory where natural ecosystems and social and economic activities coexist harmoniously and sustainably;

Preserving Arrábida based on the way traditional economic activities are practised, endogenous resources are exploited, and local communities are involved;

Promoting Arrábida as an example of a way of life and a place to enjoy, based on sharing traditions, values and responsible behaviour as a legacy for the future.

To fulfil this inspiring mission, considering the priority areas of intervention for its achievement, a set of general objectives is recommended, encompassing the core functions of Biosphere Reserves (conservation, economic development, and logistic support). Within the framework of Arrábida's specificities and potentials, which mark and differentiate it at international scale, and given the constraints to its development and sustainability, these general objectives are perfectly aligned and consistent with the Sustainable Development Goals.

In this context, the general objectives of the Arrábida Biosphere Reserve have been defined as follows:

- Conserve and enhance the natural values and resources that constitute the biodiversity and geodiversity (terrestrial and marine) in this territory and contribute to its uniqueness and international relevance;
- Reconcile the restoration and enhancement of ecosystems with the development of traditional economic activities (and associated services);
- Promote the preservation and enhancement of the natural and cultural heritage, fostering the sustainable development of the Reserve and the sustainable use of natural resources;
- Contribute to the development of the local economy by stimulating traditional activities and the quality of regional products, valuing local labour, the tradition-based economy, and the sharing of knowledge and best practices;

- Promote a 'living laboratory' for sustainable development, where innovative solutions can be tested and developed to address the challenges of the green economy, increasing efficiency in the use of natural resources, reducing environmental risks, disorderly human interference in the environment, loss of biodiversity and genetic variability;
- Encourage the production and exchange of knowledge, involving the scientific community and other institutional stakeholders;
- Promote training and awareness-raising among civil society and key territorial and sectoral stakeholders for environmental education and the preservation and enhancement of endogenous resources;
- Promote knowledge and the development of innovative approaches to climate action in a context marked by the effects of climate change and the need to decarbonise the economy;
- Promote active participation in the management of the territory, integrating the local community in the assumption and pursuit of strategic objectives, and strengthen the identity and sense of belonging to the Reserve;
- Strengthen the protagonism and visibility/recognition of Biosphere Reserves as central and distinctive spaces in terms of promoting sustainability and balancing the need to conserve habitats and species with promoting economic dynamism and enhancing human presence;
- Contribute to a healthier, fairer, and more prosperous society.

13.2

DESCRIBE THE SUSTAINABLE DEVELOPMENT OBJECTIVES OF THE BIOSPHERE RESERVE

The guiding principle for the Biosphere Reserve is to enhance Arrábida as a sustainable territory with life, people and activities; a preserved territory with its own economy. And promote Arrábida as an unforgettable example of a way of life and a place to enjoy, based on sharing traditions, values and responsible behaviour as a legacy for the future.

It will enhance current and future projects in the area of sustainable development, based on three interconnected pillars: social, environmental, and economic, in order to promote an integrated management of Arrábida and protect its values.

In terms of sustainable development, this Biosphere Reserve fulfils the objectives set out in the 2030 Agenda for Sustainable Development, namely:

- Protect the existing flora and fauna communities and contribute to halt biodiversity loss, preventing the extinction of flora and fauna species, especially endemic and threatened ones, and encouraging the application of legal mechanisms for nature and biodiversity protection, as well as combating invasive exotic species (**Goal 15: Life on land** - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss);
- Protect the natural marine values derived from the characteristics of the Arrábida-Espichel Coast, on rocky substrates, enhancing the reproduction and growth of marine fauna and flora (**Goal 14: Life below water** - Conserve and sustainably use the oceans, seas and marine resources for sustainable development);
- Promote sustainable tourism, particularly nature-based tourism that generates employment and promotes local natural and cultural values, while simultaneously contributing to the development of tourism and the local economy. By enhancing the promotion of endogenous resources in rural territories, such as local land and sea products, cultural and natural heritage, it contributes to economic growth and job creation, while also

generating business opportunities and attracting investment (**Goal 11: Sustainable cities and communities** - Make cities and human settlements inclusive, safe, resilient and sustainable);

- Strengthen the resilience and adaptability of the territory to climate-related risks and natural disasters (**Goal 13: Climate action** - Take urgent action to combat climate change and its impacts);
- Improve education, increase the awareness and capacity of the population and institutions regarding mitigation, adaptation, impact reduction, and early warning measures concerning climate change (**Goal 13: Climate action** - Take urgent action to combat climate change and its impacts);
- Promote the efficient use of resources, with the adoption of environmentally friendly technologies, and strengthen research and innovation, with a view to creating sustainable value and competitive advantages in the medium and long term (**Goal 9: Industry, innovation and infrastructure** - Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation);
- Contribute to the protection and sustainable use of natural resources through sustainable management and efficient use of natural resources (**Goal 12: Responsible consumption and production** - Ensure sustainable consumption and production patterns);
- Enhance the activities from the primary sector of the mountain range, namely agriculture (wine, cheese, and honey production) and livestock farming (sheep farming), in harmony with environmental conservation and sustainability, avoiding the loss of biodiversity and contributing to the continuous use of agricultural lands, respecting the conservation and promotion of sustainable agriculture systems. Similarly, ensure sustainable production and consumption patterns with regard to fishing (**Goal 12: Responsible consumption and production** - Ensure sustainable consumption and production patterns);

- Encourage and promote partnerships with local and external stakeholders to support the achievement of the sustainable development goals of this Biosphere Reserve (**Goal 17: Partnerships for the goals** - Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development);
- Promote environmental education and sustainable development among the entire local community, particularly focusing on younger generations, in order to encourage healthier lifestyles resulting in improved quality of life, greater longevity, and harmony with nature (**Goal 4: Quality education** - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all).



Lastly, it is worth highlighting the availability, dedication, and commitment, as well as the ongoing investment in environmental education and awareness, both among the local population and among the political and economic decision-makers who constitute the universe of stakeholders responsible for nature conservation and management of the Arrábida territory. This dynamic and engagement have allowed, and will continue to allow, the proactive involvement and participation of all stakeholders in decision-making processes related to nature conservation and the promotion of sustainable development in the Biosphere Reserve.

These areas aim for a Biosphere Reserve in Arrábida that meets the objectives of preserving, enhancing and promoting this territory, based on a framework of economic, social, and environmental sustainability, with greater participation and involvement of all partners and organisations working in the territory, encouraging and promoting ongoing environmental education and training.

The proposed Biosphere Reserve will truly be a 'living laboratory' of sustainable development and the 'driving force' of a green economy, resulting in improved well-being of the population, increased efficiency in the use of natural resources, while significantly reducing environmental risks, disorderly human interference in the environment, and the loss of biodiversity and genetic variability.

13.3

INDICATE THE MAIN STAKEHOLDERS INVOLVED IN THE MANAGEMENT OF THE BIOSPHERE RESERVE

The main organisations involved in the management of the future Biosphere Reserve are primarily those responsible for promoting this application, namely: AMRS - Associação de Municípios da Região de Setúbal, Municipalities of Palmela, Sesimbra, and Setúbal, and ICNF, I.P. - Instituto da Conservação da Natureza e das Florestas. As per the cooperation agreement signed between the parties (Annex III), they will allocate the necessary resources (human and financial) to ensure the management, implementation, and monitoring of the strategies and actions outlined in the Action Plan for this reserve.

The coordination, as well as the implementation of the actions outlined in the Action Plan, will also involve organisations that, due to their territorial expression, are closer to the populations, such as Parish Councils (Junta de Freguesia de Palmela, Junta de Freguesia de Quinta do Anjo, Junta do Castelo, Junta de Santiago, Junta de Freguesia de Azeitão, and União das Freguesias de Setúbal), or have jurisdiction over the territory, such as the Comissão de Coordenação e Desenvolvimento Regional de Lisboa e Vale do Tejo (CCDR-LVT) and the Agência Portuguesa do Ambiente (APA).

Other organisations, whether public or private, from different sectoral areas, are also involved, with a notable emphasis on the role of the ICNF, through the Departamento de Conservação da Natureza e das Florestas de Lisboa e Vale do Tejo, with competence in environmental quality, nature conservation, land planning, water and forest resources, marine affairs, and scientific research; the Entidade Regional de Turismo da Região de Lisboa - ERT-RL, in the tourism sector; and civic and business associations, namely ADREPES - Associação de Desenvolvimento Regional da Península de Setúbal, ENA - Agência de Energia e Ambiente da Arrábida, the Instituto Politécnico de Setúbal (DRAT - Departamento de Recursos Naturais, Ambiente e Território), among others whose territorial expression unites and brings together the populations therein, particularly cooperatives, agricultural associations, fisheries associations, and cultural and environmental associations, such as:

Parish Councils

- União de Freguesias de Setúbal
- Junta de Freguesia de Azeitão
- Junta de Freguesia do Castelo
- Junta de Freguesia de Santiago

- Junta de Freguesia de Palmela
- Junta de Freguesia de Quinta do Anjo

Universities, Higher Education Institutes, and Research Centres

- ISA - Instituto Superior de Agronomia
- IPS - Instituto Politécnico de Setúbal
- FCSH.UNL - Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa
- FCT.NOVA - Faculdade de Ciência e Tecnologia da Universidade Nova de Lisboa
- CICS.NOVA - Centro Interdisciplinar de Ciências Sociais -FCSH.UNL
- FC.UL - Faculdade de Ciências da Universidade de Lisboa
- Departamento de Geologia da FCUL
- UNIARQ - Centro de Arqueologia da Universidade de Lisboa
- CEG.IGOT - Centro Estudos Geográficos do Instituto de Geografia e Ordenamento do Território
- Universidade de Évora
- MED-Instituto Mediterrâneo para a Agricultura, Ambiente e Desenvolvimento da Universidade de Évora
- CHANGE- Instituto para as Alterações Globais e Sustentabilidade da Universidade de Évora

National and Regional Environmental Organisations

- ENA - Agência de Energia Arrábida
- LPN-Liga para a Proteção da Natureza
- ZERO - Associação Sistema Terrestre Sustentável
- NECA - Núcleo de Espeleologia Costa Azul
- Ocean Alive, Cooperativa para a educação criativa marinha, CRL
- K-Evolution

Organisations under the direct or indirect administration of the State, State Business Sector

- ERT-RL Entidade Regional de Turismo da Região de Lisboa
- APSS - Administração dos Portos de Setúbal e Sesimbra
- Capitania Porto de Setúbal
- SIMARSUL
- Docapesca-Portos e Lotas, SA
- SEPNA.GNR- Serviço de Proteção da Natureza e do Ambiente da Guarda Nacional Republicana
- ULS Arrábida - Unidade Local de Saúde da Arrábida

Civil Protection

- Serviço Municipal Proteção Civil Sesimbra
- Serviço Municipal Proteção Civil Setubal

- Serviço Municipal de Proteção Civil Palmela
- Associação Humanitária de Bombeiros Voluntários de Setúbal
- Real Associação Humanitária de Bombeiros Voluntários de Sesimbra
- Associação Humanitária dos Bombeiros de Palmela

School Groups and Schools

- Agrupamento de Escolas Lima de Freitas
- Escola Secundária Du Bocage
- Agrupamento de Escolas de Palmela
- Escola Secundária de Palmela
- UNISSETI - Universidade Terceira Idade Setúbal
- UNIV Sénior de Palmela

Associations and Producers in the Agricultural, Viticultural, Livestock, and Fishing sectors

- ADREPES - Associação para o Desenvolvimento Regional da Península de Setúbal
- AADS - Associação de Agricultores do Distrito de Setúbal
- ARCOLSA - Associação Regional de Criadores de Ovinos Leiteiros da Serra da Arrábida
- Associação da Rota dos Vinhos da Península de Setúbal
- CVRPS - Comissão Vitivinícola Regional da Península de Setúbal
- Quinta de Alcube
- Venâncio da Costa Lima
- José Maria da Fonseca
- Queijos Santiago
- Queijaria Simões
- Sindicato dos Trabalhadores da Pesca do Sul
- Mútua dos Pescadores

Associations and Operators in the Tourism sector

- ADREPAL- Espaço Fortuna, Artes e Ofícios
- AHRESP - Associação da hotelaria, restauração e similares de Portugal
- Associação Baía de Setúbal
- Pousada de Palmela
- Biovilla
- À Vela Passeios
- Haliotis, Lda
- Lima & Limão Cycling Services, Lda,
- Biotrails
- Dolphin Bay Lda
- ADN Sesimbra

- YACM Setúbal
- Clube de Montanhismo da Arrábida

Associations and Operators in the Cultural and Social sectors

- Federação das Coletividades do Distrito de Setúbal
- Sociedade Musical e Recreativa União Setubalense
- Passos e Compassos - Associação
- Experimentáculo Associação Cultural
- TAS - Teatro Animação Setúbal
- Teatro o Bando
- Teatro Cais 21
- Associação Cinematográfica 50CUTS
- FIAR Associação Cultural
- Sociedade Filarmónica Palmelense "Os Loureiros»
- MAEDS - Museu de Arqueologia e Etnografia do Distrito de Setúbal
- Associação de Escoteiros de Portugal, Grupo 40 de Palmela
- Corpo Nacional de Escutas - Junta Regional de Setúbal
- Agrupamento 504 Escuteiros - Quinta do Anjo
- Associação Festas Quinta do Anjo

Associations of Property Owners, Residents, and Related Groups

- António Xavier de Lima
- Secil, Companhia de Cal e Cimento
- Sobrissul
- Associação de Proprietários e Moradores dos Vales de Alcube e Barris do Parque Natural da Arrábida
- Associação de Moradores e Amigos da Quinta da Torre - Marquesa 2
- Associação de Moradores Olhos de Água

Media

- Jornal Regional O Setubalense
- Radio Popular FM

13.4

WHAT CONSULTATION PROCEDURE WAS USED FOR DESIGNING THE BIOSPHERE?

To kickstart the preparation of the application for the Arrábida Biosphere Reserve, a working team was formed comprising professionals from the promoting organisations (AMRS, municipalities of Palmela, Setúbal, and Sesimbra, and the ICNF), who undertook the responsibility of executing the tasks necessary for the successful implementation of the application.

This working team began by establishing a broad platform, inviting professionals from various fields and sectors including land use planning, environment, culture, tourism, education, economic development, among others. This approach aimed to facilitate a more comprehensive reflection on the objectives of the application and gather insights that would enable it to be designed.

As a result of this process, a number of partners and stakeholders were identified, whose involvement was deemed necessary, initiating the consultation process.

The first public initiative took place on 14 April 2016 in Setúbal, consisting of a public presentation of the Arrábida Biosphere Reserve project. The initiative was widely publicised in the media (see Annex II), aiming to inform stakeholders and the general community about the significance of a Biosphere Reserve, as well as the entire application process.

A total of 105 organisations and personalities associated with the Arrábida territory attended the event, which facilitated the collection of experiences and contributions to enrich the application. Most importantly, it mobilised stakeholders for its development.



In the construction of the Arrábida Biosphere Reserve nomination form, stakeholders were repeatedly involved, answering questions, providing data, records, proposing initiatives, establishing partnerships, thus becoming active collaborators in its development at all stages of the process.

For this purpose, several technical meetings were held with regional organisations, including ADREPES - Associação de Desenvolvimento Regional da Península de Setúbal, ARCOLSA - Associação de Criadores de Ovinos Leiteiros da Serra da Arrábida, ENA - Agência de Energia e Ambiente da Arrábida, ERT-LVT Entidade Regional de Turismo, a Associação Rota dos Vinhos da Península de Setúbal, and the Instituto Politécnico de Setúbal, among others. These meetings aimed to gather inputs for developing the application form.

In 2019, once the application was structured, it was necessary to move on to a broader consultation process. To this end, the first cycle of Sectoral Workshops was held, which made it possible to organise the participation of organisations by thematic area, enabling a more fruitful debate on topics such as: Administration and Local Government; Agriculture and Fisheries; Industry; Education, Culture, and Heritage; Tourism, Sport, and Leisure; Environment, Science, and Health.

1st CYCLE OF SECTORAL WORKSHOPS

THEME	DATE	VENUE
Administration and Local Government	18 June	Setúbal Livramento Market Auditorium
Agriculture and Fisheries	25 June	Espaço Fortuna - Palmela
Extractive Industry	9 July	Sesimbra Business Incubation Support Centre
Education, Culture, and Heritage	8 October	Palmela Municipal Library Auditorium
Tourism, Sport, and Leisure	15 October	Casa da Baía - Setúbal
Environment, Science, and Health	22 October	Conde Ferreira Auditorium Sesimbra

These Workshops were attended by around 80 participants, including 68 organisations/companies (See attendance list - Annex III), enabling the collection of specific proposals and contributions to build a common vision of the Arrábida Biosphere Reserve, with the aim of identifying potentials, but also threats, by asking specific questions, such as:

- (i) What values do you identify in Arrábida and what are the main threats to those values?
- (ii) What ideas/projects would you like to see implemented in Arrábida?
- (iii) How would your organisation participate in the aforementioned projects?

In these workshops it was possible to validate, through the knowledge and critical sense of all the participating organisations, the concept of Arrábida as a sustainability laboratory. This stems from the diversity of the work conducted and the profound respect for its natural and cultural values, both tangible and intangible.

Between 2020 and 2023, this community engagement effort involving local populations and stakeholders in building the application for Arrábida to become a Biosphere Reserve was constrained due to the COVID-19 pandemic.



1st cycle of sectoral workshops

In November 2023, a new cycle of sectoral workshops began, this time focusing more on gathering inputs for the Biosphere Reserve Action Plan. Five sessions were held, focusing on the topics Territory and Local Government, Economic Activities, Education, Culture and Heritage, Tourism, Sports and Leisure, and Environment, Science, and Health, attended by 31 organisations.

2nd CYCLE OF SECTORAL WORKSHOPS

TEMA	DATA	LOCAL
Territory and Local Government	14 November	Palmela Municipal Library Auditorium
Economic Activities	21 November	Palmela Municipal Library Auditorium
Education, Culture, and Heritage	12 December	Casa da Cultura - Setúbal
Tourism, Sport, and Leisure	9 January	Sesimbra Conde Ferreira Auditorium
Environment, Science, and Health	16 January	Casa da Baía - Setúbal

As a result of this consultation, contributions were gathered to design actions and measures to be included in the Action Plan, a fundamental planning instrument for the territory of the Arrábida Biosphere Reserve. Additionally, possibilities for potential partnerships for its implementation were explored.



2nd cycle of sectoral workshops

Lastly, there was a period of public consultation between 14 and 29 May 2024, during which the Form and the Action Plan were available on the arrabida.amrs.pt website. On 21, 27, and 28 May 2024, in Setúbal, Palmela, and Sesimbra, respectively, there were public sessions to clarify and discuss the application file.

The public consultation involved around a hundred participants and its report is included in Annex III.



13.5

HOW WILL STAKEHOLDER INVOLVEMENT IN IMPLEMENTING AND MANAGING THE BIOSPHERE RESERVE BE FOSTERED?

In this process of building and promoting the application for Arrábida to become a Biosphere Reserve, many public and private organisations representing the community's populations and economic and social sectors were involved and invited to participate in bilateral and sectoral meetings, or thematic workshops cycles (see Chapter 13.4). Throughout this process, questions regarding the significance of establishing the Arrábida Biosphere Reserve were clarified, but, more importantly, significant contributions were collected for the construction of the application.

Around 85 organisations took part in these meetings, including the scientific community, represented by the Instituto Politécnico de Setúbal, Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa, Faculdade de Ciências da Universidade de Lisboa, Instituto Superior de Agronomia, Universidade de Évora and Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa. Similarly, associations of property owners, tour operators, cultural associations, national and local non-governmental organisations (NGOs), school groupings in the region, organisations representing the National Health Service and civil protection, sectoral administrative authorities, among many others, were involved (List in Chapter 13.3).

As a result of this involvement, the organisations were invited to become stakeholders in the management of the Biosphere Reserve by signing letters of commitment to the Arrábida Biosphere Reserve (see Annex III).

By signing these letters, the organisations demonstrated their support for the creation of the Biosphere Reserve and acknowledged that its implementation depends on the involvement of all stakeholders. They showed their willingness to contribute to these objectives, either through participation in the future **Advisory Commission or Scientific Commission**, as deemed most appropriate (see Chapter 17.1.7), or through the establishment of partnerships for the implementation of the actions outlined in the Action Plan.

From the outset, the promoters of the application realised that only with a participatory and active, diverse and plural management, involving all relevant local and regional stakeholders for the territory, will it be possible to implement the Action Plan and fulfil the three fundamental functions of the Arrábida Biosphere Reserve: Conservation; Sustainable Development; Research, monitoring, education, and environmental awareness platform.

13.6

WHAT ARE THE EXPECTED MAIN SOURCES OF RESOURCES (FINANCIAL, MATERIAL AND HUMAN) TO IMPLEMENT THE OBJECTIVES OF THE BIOSPHERE RESERVE AND PROJECTS WITHIN IT?

Regarding the human resources to be allocated to the Reserve, it will have its own staff consisting of at least two technicians equipped with the necessary resources for its management. Initially, and until the governing bodies are established, the promoting organisations will provide the necessary resources for the immediate management of the Biosphere Reserve.

It is also worth noting that the Technical Committee, comprised of two technicians from each organisation on the Executive Committee, will convene as necessary to assist the Biosphere Reserve Managing Entity.

The Technical Committee will include technicians from various domains, including biology, geology, tourism, culture, communication, economy, among others, in order to provide the Managing Entity with the knowledge and resources necessary to properly implement the Action Plan.

The Reserve will have its own budget, consisting of income from the sources described below, and will have a set of resources provided by the organisations of the Executive Committee, which we refer to as indirect contributions.

The Biosphere Reserve will be financed through various sources, namely:

- Direct contributions from the partners constituting the Executive Committee;
- National public or private funds, patronage and/or donations;
- European Community funds;
- Own revenues from the sale of goods.

14

CONSERVATION FUNCTION

14.1

AT THE LEVEL OF LANDSCAPES AND ECOSYSTEMS (INCLUDING SOILS, WATER, AND CLIMATE)

The proposed area for the Arrábida Biosphere Reserve, whose common element is the Arrábida mountain range that gives it its name, is located within the municipalities of Palmela, Setúbal, and Sesimbra. It has unique characteristics due to the fact that it is bordered to the west and south by the sea and the Sado estuary, and to the north by a plain also bordered by the Tagus estuary. Due to its morphological characteristics and Mediterranean climate, as well as the easy access to endogenous natural resources, the region has experienced continuous, albeit not dense, human occupation that remained consistent until the mid-20th century. The population subsisted primarily from agricultural production, livestock, fishing, and other natural resources.

The large estate of the Arrábida mountain range, historically linked to a single family - the Palmella family, which over the centuries largely kept it indivisible and preserved from many of the most common disturbances, was a crucial factor that influenced the integrity of the area.

The Arrábida region has always been a symbol of balanced use, admiration, and inspiration for poets, artists, anthropologists, and other scholars. It is also a precious scientific field and uniquely valuable area of knowledge in the country, due to its geological, botanical, archaeological, and speleological richness, which has been the subject of numerous studies. For academia, it is therefore a valuable

asset whose preservation is fundamental. Demonstrating this importance and historical interconnection, the founding act of the Liga para a Proteção da Natureza (LPN) - the oldest national NGO - was the sending of a letter by the well-known poet from Setúbal, Sebastião da Gama, in 1947, to Engineer Miguel Neves¹⁹, urging for the

***'Help! Help! Help! José Júlio da Costa has commenced (and is already well underway) the destruction of half of Mata do Solitário, which he owns. I ask you to take action immediately. If necessary, reinstate the death penalty.
HELP!'***

(Letter from Sebastião Gama, 1947)

¹⁹ Entomologist at the Direção-Geral dos Serviços Agrícolas (Directorate-General for Agricultural Services)

preservation of Mata do Solitário, in response to the construction of a lime kiln. In turn, he forwarded the letter to Professor Carlos Manuel Baeta Neves, who was then teaching at the Instituto Superior de Agronomia (ISA) and intervened to prevent the destruction of the forest. A year later, in 1948, the LPN was founded by this Professor²⁰.

The development of the extractive industry in the region during the first half of the 20th century, and the growth of heavy manufacturing in the country and also in the Setúbal region during the second half, brought about changes to the territory, both natural and social. Unplanned construction, clandestine subdivision, and land occupation were on the rise; however, the urban and rural centres of Arrábida remained preserved and protected.

This reason, along with the particular characteristics of the Arrábida massif, led to the first efforts to protect it in the 1970s, culminating in the creation of the Arrábida Botanical Reserve²¹, encompassing little more than the southern slope of the aforementioned mountain range and the Risco escarpments. In 1976, that classification naturally led to the creation of a Natural Park²², extending its borders to include the three municipalities of Setúbal, Palmela, and Sesimbra, which would partially integrate the protected area. In 1998 the Arrábida Natural Park²³ was extended with the creation of a marine protected area, thus complementing the conservation objectives of the terrestrial area with those of the marine environment. The value of the marine fauna and flora along the Arrábida coast was thus encompassed by the Professor Luiz Saldanha Marine Park²⁴, contiguous to the previously classified terrestrial area. In the Cape Espichel area, protection is aimed at marine cliffs, endemic plant species, bird nesting sites, and the preservation of ichnofossils.

Following this path, and in close collaboration, the three municipalities and the state administration, through the nature park, contained the division of land in the territory, controlled and regulated specific activities that generate impact, such as the extractive activity and clandestine construction.

As a result of this journey, which began decades ago, traditional economic activities, with a focus on agriculture, livestock farming, and fishing, nature conservation, scientific and academic research, along with cultural and nature tourism, have been fostered.

²⁰ <https://www.lpn.pt/>

²¹ Decree no. 355/71, of 16 August.

²² Decree-Law no. 622/76, of 28 July.

²³ Regulatory Decree no. 23/98, of 14 October.

²⁴ Created by Regulatory Decree no. 23/98, of 14 October.

14.1.1

DESCRIBE AND GIVE THE LOCATION OF ECOSYSTEMS AND/OR LAND COVER TYPES OF THE BIOSPHERE RESERVE

The Arrábida mountain range is one of the most beautiful and significant natural areas of Mediterranean influence, constituting a landscape of exceptional aesthetic value. Along its mountains, or through the shadows of its valleys and peaks, the horizon presents itself as one of the most beautiful landscapes in Portugal and the world, where the mountain range forms an orographic barrier between the coast and the hinterland. From the summit of Formosinho, standing at 501 meters, one can enjoy a sweeping panoramic view of the entire surrounding region. The southwestern massif of Arrábida has the tallest coastal cliffs in mainland Portugal, with Risco being the highest limestone coastal escarpment in Europe, dropping into a calm, crystal-clear, emerald-green sea. Renowned authors and artists from various fields attest to the unique and unmistakable beauty of this territory.

The interest and scenic qualities of the Arrábida mountain range derive from the exceptional beauty conferred by the unique nature of a mosaic of landscapes where the contrast between the mountains and the sea is striking, the juxtaposition of rocky escarpments and crystalline water, of impressive slopes and welcoming beaches, the combination of dense forests and tranquil valleys, the impact of the visible morphology, and the surprise of unexplored caves. In this relatively small area one can observe a remarkable variety of landscapes, combined with meteorological phenomena and atmospheric conditions that contribute to an exceptional scenic setting, enhanced by changing textures and tones and a 'sea of clouds' that forms an impressive backdrop to the mountain range.



The territory has an extraordinary ecological and landscape diversity, associated with the occurrence of areas of high natural value. It thus reveals a mixture of patterns where there is an important presence of **scrublands and shrublands**, which account for around 23% of the area and are concentrated in topographically higher areas, such as ridgelines and slopes. Good coverage is ensured by low scrublands of heather and/or gorse, as well as dense shrublands dominated by kermes oaks (*Quercus coccifera* subsp. *coccifera*) in whose clearings gorse and thymefields may appear. The occurrence of patches of arborescent *Quercus coccifera* stands out, with relatively stable morphological characteristics that differ from the *Quercus coccifera* shrublands.

The core areas of the proposed Biosphere Reserve correspond to these unique vegetation formations of arboreal kermes oak, areas of occurrence of local and national endemisms and avifauna with special conservation status, corresponding to Mata do Vidal, Mata do Solitário, Mata Coberta Nascente, and Mata Coberta Poente.



In the easternmost areas of the reserve, the forest patch formed by native deciduous trees is somewhat significant, albeit somewhat scattered. In the Arrábida Mountain Range, the Core Area includes small areas of oak forests, which constitute pre-climactic formations. These are woodlands consisting of large trees, such as *Quercus faginea* subsp. *broteroi*, *Quercus coccifera*, *Phillyrea latifolia*, *Pistacia lentiscus*, *Rhamnus alaternus*. In the oak forests on the northern slope of the mountain or in sheltered valleys, there is also *Acer monspessulanum*, corresponding to the southern limit of their distribution in mainland Portugal. It is also possible to identify patches of arborescent *Quercus coccifera*, which due to their relatively stable morphological characteristics and differences from the characteristic *Quercus coccifera* shrublands, have led some authors to consider a new subspecies *Q. coccifera* L. subsp. *rivasmartinezii*²⁵, and subsequently to propose the classification of the species *Quercus rivasmartinezii*²⁶. The unique forests of wild olive trees (*Olea europaea* var. *sylvestris*) and carob trees (*Ceratonia siliqua*) are also of great interest.

The presence of coniferous forests is also well represented, comprising about 18% of the area. In and around the São Luís mountain range, the Core Area includes an area occupied by lightly managed pine forests, with natural scrubland underneath, dominated by *Quercus coccifera*, along with various other shrub species. It is possible to identify a mosaic that includes areas with rainfed crops and pastures, associated with close human intervention, which allow for the maintenance of ecological niches for certain species and prevent the emergence of homogeneous vegetation cover.

It is an extremely important area for numerous calcicolous communities and species, often distributed across **rocky outcrops** or 'terra rossa' soils, including limestone slabs arranged on platforms with fissures, outcrops colonised by chasmophytic communities, and limestone gravel pits. Highlights include **rupicolous meadows** with succulent plants, perennial grasslands often rich in orchids and the occasional presence of *Juncus valvatus* in waterlogged soils derived from dolomitic limestone.

²⁵ Capelo and Costa, 2001

²⁶ Capelo and Costa, 2005

The portion defined as the Core Area is also occupied by semi-natural grasslands consisting of grasses, along with a wide variety of other herbaceous species. These habitats are very rich in orchids (both in number of species and abundance), mainly from the *Orchis*, *Ophrys*, *Barlia*, and *Anacamptis* genera.

Along the coastal areas, it is home to majestic **ledges** and **cliffs** where there are communities of endemic plumbaginaceae or, on limestone, juniper and holm oak scrublands dominated by *Juniperus turbinata subsp. turbinata*. Vegetation of a relict nature, in a good state of conservation, is of deserved importance, including plant formations with Macaronesian elements, a magnificent example of which are the scrublands dominated by *Euphorbia pedroi*, the only place where it occurs in mainland Portugal.



The Core Area located to the west of Sesimbra includes maritime slopes with very unique habitats, home to most of the flora species of high conservation value, including the aforementioned endemism, *Euphorbia pedroi*, and others such as *Convolvulus fernandesii*, which represent the most dramatic living remnants of a semi-desert palaeotropical flora that once had a more widespread distribution.

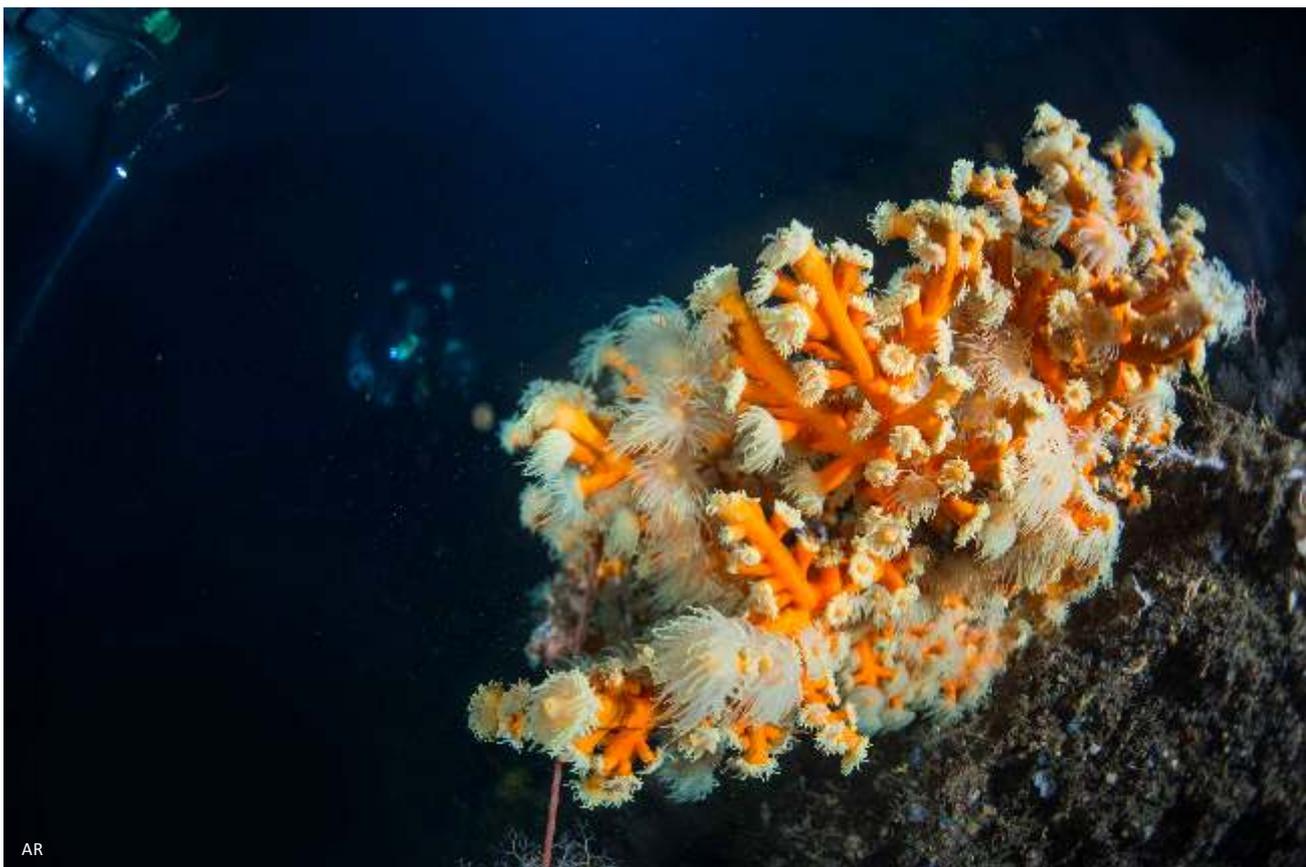
On the **dune sands**, there are shrub communities of *Juniperus spp.*, along with dunes with maritime pine (*Pinus pinaster subsp. atlantica*), with undergrowth not recently disturbed.

Agricultural lands are also an important feature of the landscape, as together with the agroforestry mosaic, they account for more than 23% of the total area. The Setúbal Peninsula is also known for its agricultural and livestock farming traditions. In the terrain, these areas predominantly appear on flat plains and base slopes, places marked by the presence of a few perennial water lines, in contact with patches of forest and/or scrublands and shrublands. The meadows and pastures, also adjacent to the aforementioned areas, are scattered throughout the reserve, but account for less than 4% of its total area.

The artificialised territories mainly include urban areas (on the outskirts of the city of Setúbal and the town of Sesimbra, or in clusters of rural origin or more recent occupation), quarries, and industrial areas.

In the **coastal marine area**, marine habitats also harbour significant natural and ecological values, hosting high biodiversity and well-preserved populations of various species of scientific or commercial interest. There are three types of habitat known to be important for marine biodiversity - **sandbanks** permanently covered by shallow seawater with and without grasslands, and **reefs**. In partially or permanently submerged rocky areas there are **submerged or semi-submerged sea caves**, one of the best representations in Portugal.

The marine flora is particularly notable for its populations of usually very exuberant algae, including cases that should be a priority for conservation at national level. Both algae and marine plants, when they are especially well-developed, are particularly important because of the special habitat they create, as they give rise to exceptional refuge and breeding areas for juveniles of numerous species of fish and crustaceans.



14.1.2

DESCRIBE THE STATE AND TRENDS OF THE ECOSYSTEMS AND/OR LAND COVER TYPES DESCRIBED ABOVE AND THE NATURAL AND HUMAN DRIVERS OF THE TRENDS

With regard to the status and trends of ecosystems and types of vegetation cover, the PGZEC Arrábida - Espichel (2020)²⁷ was used as a reference, as it covers the majority of the territory of the BR and includes the Core Area, Buffer Zone, and Transition Area, providing recent data. The selection of target values in the PGZEC Arrábida-Espichel, whether habitats or species of fauna or flora, is based on the relevance of this area for the conservation of those values. They are chosen from among the types of habitat listed in Annex I and the species listed in Annex II to the Habitats Directive, which are significantly present in the classified area. These are values of community interest whose conservation requires the designation of special conservation areas. Therefore, considering its coverage and distribution nationwide, as well as its degree of conservation, isolation, rarity, and sensitivity in the area in question, and the urgency of action for its conservation, it was considered that this ZEC is relevant to achieve (or, in certain cases, maintain) a favourable conservation status for 15 types of habitat. These are the target values that should be considered in the conservation function of the BR, which are listed below.

- 1110 Sandbanks which are slightly covered by sea water all the time
- 1170 Reefs
- 1240 Vegetated sea cliffs of the Mediterranean coasts with endemic *Limonium spp.*
- 2270 Wooded dunes with *Pinus pinea* and/or *Pinus pinaster*
- 5210 Arborescent shrublands with *Juniperus spp.*
- 5320 Low formations of *Euphorbia* close to cliffs
- 5330 Thermo-Mediterranean and pre-desert scrublands

²⁷ Provided for in Article 5 of Regulatory Decree no. 1/2020, of 16 March. Pending publication following public discussion. Available at: <https://participa.pt/pt/consulta/plano-de-gestao-da-zec-arrabida-espichel-repeticao>

- 6110 Rupicolous calcareous or basophilic grasslands of *Alyso-Sedion albi*
- 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*)
- 8130 Western Mediterranean and thermophilous scree
- 8210 Calcareous rocky slopes with chasmophytic vegetation
- 8240 Limestone pavements
- 8310 Caves not open to the public
- 8330 Submerged or partially submerged sea caves
- 9320 *Olea* and *Ceratonia* forests

The coastal strip between Setúbal and Cape Espichel is home to majestic **ledges and cliffs**, where there are communities of endemic plumbaginaceae (1240) or, on limestone, juniper and holm oak groves dominated by *Juniperus turbinata* subsp. *turbinata* (5210). Habitat 1240 occurs throughout high coastal cliffs, and is particularly well represented in the area near Cape Espichel. Its conservation status is currently favourable and the trend has not been assessed. It is known that the main pressures it is subject to are the trampling of vegetation resulting from the opening of trails at the top of the cliffs, where visitors circulate, and the expansion of invasive exotic species, such as the sour fig (*Carpobrotus edulis*).

On the dune sands there are also dunes with maritime pine (*Pinus pinaster* subsp. *atlantica*), with undergrowth not recently disturbed (2270). Its habitat conservation status is classified as unfavourable, with a stable trend. The main pressures relate to invasive exotic species (*Acacia longifolia* and *Carpobrotus edulis*) and urban construction, as well as excessive clearing of scrubland and soil plowing.

The **scrublands and shrublands** present in the ZEC harbour distinct shrub communities, among which habitat 5210 stands out, occurring in areas dominated by juniper formations. The main threats to this habitat are trampling by people and vehicles, the opening of new paths along the coast, and invasion by exotic species. It currently has an unfavourable conservation status and a declining trend.

Vegetation of a relict nature, in a good state of conservation, is of deserved importance, including plant formations with Macaronesian elements, a magnificent example of which are the **scrublands** dominated by *Euphorbia pedroi*, the only place where it occurs in mainland Portugal. They grow on limestone cliffs near the sea, in the Arrábida Mountain Range, Sesimbra, and Cape Espichel. These shrub communities typically do not exceed 1.5 metres in height and are dominated by the endemic species *Euphorbia pedroi*.

Good coverage is also ensured by dense **shrublands** dominated by kermes oaks (*Quercus coccifera subsp coccifera*) in whose clearings gorse and thyme fields may appear (5330). It has a favourable conservation status and trend. The unique forests of wild olive trees (*Olea europaea var. sylvestris*) and carob trees (*Ceratonia siliqua*) (9320) are quite interesting. They currently have an unfavourable conservation status and a declining trend, due to historical factors.

Highlights include rocky outcrops and rupicolous meadows with succulent plants (6110) and perennial grasslands often rich in orchids (6210). With an unfavourable conservation status and a stable trend, the main pressure on habitat 6110 in the ZEC is its direct destruction, especially due to quarrying in the vicinity of its area of occur-

rence and the construction of houses, which involves excavating slopes in limestone hills. Habitat 6210, on the other hand, has a favourable status and an unevaluated trend, facing threats such as ecological succession, changes in land use, and invasion by exotic species.

Located in the greater Lisbon metropolitan area, the **marine area** covered by the proposed Reserve faces intense and varied demands and pressures, such as fishing, recreational boating, or tourism. Despite the potential conflict between this array of human pressures and natural values, what is observed is a balance that serves as an example to other places with similar characteristics. In addition to existing legal protection instruments, the local community is highly aware of the importance of preserving the region's natural values, thanks also to investment and projects in this area, which are reflected in the aforementioned initiatives.

Marine species currently benefit from weak protection under national and international legislation, with the exception of marine mammals and reptiles (all of which are included in Annex II to the Bern Convention). However, in the proposed area for the Biosphere Reserve there is the Professor Luiz Saldanha Marine Park, which has specific protection regulations, limiting human activities in the area.

The pressures exerted on the marine area are essentially controlled, and there are currently no disruptive impacts on the ecosystems that could be of significant importance. The creation of Partial Protection and Total Protection areas under the PNA (see following Chapter) has ensured the integrity of vast regions of the seabed, particularly the seabed south of Risco, which is part of the Total Protection Area.

14.1.3

WHAT KIND OF PROTECTION REGIMES (INCLUDING CUSTOMARY AND TRADITIONAL) EXIST FOR THE CORE AREA(S) AND THE BUFFER ZONE(S)?

A large part of the area of the Arrábida Biosphere Reserve coincides with the territorial area of the Arrábida Natural Park (see Figure 4.1) - approximately 72.9% of the total area, including priority areas for nature conservation in both terrestrial and marine environments, subject to different levels of protection and use.

The areas defined as **Core Area** coincide with areas classified as Total Protection (PT), Partial Protection type I (PPI) and type II (PPII).

- Total Protection (PT) - areas that include vegetation formations of arboreal kermes oak and areas of endemic flora and avifauna with special conservation status, aiming to:
 - I. Ensure the maintenance of natural values and processes;
 - II. Preserve examples of exceptional value that, from an ecological perspective, represent a dynamic and evolving state.
- Partial Protection Type I (PPI) and Type II (PPII) - correspond to areas with relevant natural and landscape values from a conservation perspective, as well as moderate ecological sensitivity.

The **Buffer Zone** coincides with areas of the PNA classified as PPI and PPII and as Complementary Protection Type I (PCI).

- Complementary protection type I (PCI) - sites where the aim is to reconcile social and economic development with natural, landscape, and nature conservation values.

The area of the Arrábida Biosphere Reserve also coincides with the Natura 2000 Network (see Figure 4.1), namely with the Arrábida-Espichel Special Conservation Area²⁸ (ZEC) - overlapping in about 83.5% of its area, and with most of the Cape Espichel Special Protection Area (ZPE)²⁹ overlapping in about 10.1% of its area.

It is also classified as a Biogenetic Reserve of the Council of Europe, under the designation 'Serra da Arrábida'. The Biogenetic Reserve overlaps entirely with the area proposed for the Biosphere Reserve on land, covering 55.3% of it.

²⁸ Classified by Resolution of the Council of Ministers no. 142/97, of 28 August

²⁹ Classified by Decree-Law no. 384-B/99, of 23 September, amended by Decree-Law no. 204/201, of 17 September.

Correct planning and management of the forest, taking into account in particular the maintenance of existing areas of natural and semi-natural vegetation cover and the gradual replacement of ageing forest stands consisting of exotic species with plantations of native species.

Planning of grazing practices in order to ensure the conservation of the existing natural values;

Proper planning of urban and tourist uses, preventing the proliferation of dispersed buildings in rural or natural areas, as well as of infrastructure.

Planning of recreational and nature sports activities and practices in order to protect the natural values most vulnerable to the impacts of these activities.

Proper planning of inert extraction activities and minimisation of their main impacts on natural values.

Protection of watercourses and associated riparian formations.

Control invasive species such as the sour fig (*Carpobrotus sp.*), *Ailanthus sp.*, *Oxalis sp.*

Monitoring the harvesting of threatened plant species.

The **management guidelines for the ZPE** are aimed at maintaining the habitats of migratory species and cliff-nesting bird species.

Maintenance of the agricultural mosaic, based on extensive agricultural systems with traditional rotations, and the conservation of coastal systems (heathlands, dunes, coastal scrublands, and cliffs).

Preservation of marine habitats, ensuring water quality and fishing resources in this region.

The area also includes the nationally recognised natural monuments Pedra da Mua³⁰ and Lagosteiros³¹ - located in the terrestrial **Buffer Zone**, and the site of speleological interest - Gruta do Zambujal³² - located in the terrestrial **Transition Area**. The classification of a natural monument aims to protect natural values, particularly remarkable occurrences of geological heritage, in the integrity of their characteristics and in the immediately surrounding areas, and to adopt measures compatible with the objectives of its classification, namely:

- Limitation or prevention of forms of exploitation or occupation that could alter its characteristics; and
- The creation of opportunities for research, education, and public fruition.

³⁰ Classification diploma: Decree-Law no. 20/97, of 7 May

³¹ Classification diploma: Decree-Law no. 20/97, of 7 May

³² Classified as a site of speleological interest by Decree-Law no. 140/79, of 21 May, and currently without classification status under Decree-Law no. 142/2008, of 24 July, republished by Decree-Law no. 242/2015, of 15 October.

14.1.4

WHICH INDICATORS OR DATA ARE USED TO ASSESS THE EFFICIENCY OF THE ACTIONS/STRATEGY USED?

The management reports of areas with protected status and the results of specific programmes for the conservation of species and habitats are used as tools for assessing the efficiency of actions in the field of nature conservation and biodiversity.

The inventory of natural values and the preparation of lists of species and habitats with their respective conservation statuses complement the set of instruments used as indicators in monitoring.

The indicators that allow assessing the current situation and trends in natural and heritage values and land use dynamics are as follows:

- Area occupied by habitats;
- Diversity and abundance of fauna and flora species;
- Area occupied by forests;
- Area occupied by meadows and pasture;
- Land use and occupation;

With regard to the areas defined as **Core Areas**, no significant changes in natural values are expected given the robustness of the planning and preservation tools to which they are subject, i.e. they are included in the protected area of the PNA as Total Protection and Partial Protection type I (PPI) and type II (PPII), and also in the Cape Espichel Special Protection Area (ZPE).

14.2.

AT THE LEVEL OF SPECIES AND ECOSYSTEM DIVERSITY

14.2.1

IDENTIFY MAIN GROUPS OF SPECIES OR SPECIES OF PARTICULAR INTEREST FOR THE CONSERVATION OBJECTIVES, ESPECIALLY THOSE THAT ARE ENDEMIC TO THE THIS BIOSPHERE RESERVE, AND PROVIDE A BRIEF DESCRIPTION OF THE COMMUNITIES IN WHICH THEY OCCUR

The proposed Reserve is a biodiversity hotspot and is home to a large number of rare or endemic species that are of special conservation interest, as can be seen in Annex III, which presents a representative list of flora and fauna occurring in Arrábida.

In the area covered by this application, there are over 70 species of flora whose populations in the Arrábida region are considered important for regional and/or national species conservation due to their rarity and/or endemism. The most favourable biotopes are cliffs and maritime escarpments, scrublands, oak forests, and outcrops³³. Among the species considered relevant, 9 are included on the Red List of Vascular Flora of mainland Portugal, of which two species are

classified as 'Vulnerable' (VU) and 7 species are classified as 'Endangered' (EN).

In the **maritime cliffs** and **escarpments**, highlight goes to *Euphorbia pedroi*, an endemic species of the Setúbal Peninsula, where it is confined to the limestone maritime cliffs and escarpments between Sesimbra (Cape Ares) and Cape Espichel. It is classified as 'Endangered' due to its limited extent of occurrence and area of occupancy (both 32 km²), with only three known locations, and due to a continued decline in population size.



³³ Porto *et al.*, 2011.



In this biotope we also find the bindweed, *Convolvulus fernandesii*, a species endemic to mainland Portugal and restricted to the coastal limestone cliffs along the south-facing coast between Sesimbra and Cape Espichel. It has very specific ecological requirements that limit its distribution to a very small area, with its area of occupation and extent of occurrence being restricted to 32 km². The population is small, consisting of a small number of mature individuals (around 500), and only two locations are estimated. It is classified as 'Endangered'.

Fagonia cretica is a species representative of a semi-desert flora, which in mainland Portugal is only found in a very restricted area of the Arrábida Natural Park, where only two populations are known to exist. The inaccessibility of its sites of occurrence - maritime cliffs and escarpments - helps minimise the effects of human disturbance. It is assessed as 'Endangered' because it is estimated to have a regional population of less than 250 individuals, and because some threats and apparent difficulties in its regeneration have been identified.

Patellifolia patellaris is a species distributed along the coastal areas of the Iberian Peninsula, Northwest Africa, and the Macaronesian archipelagos, except for the Azores. In mainland Portugal, its occurrence is restricted to the south-facing cliffs between Cape Espichel and Portinho da Arrábida, and at the tip of Sagres, where it occurs in somewhat nitrate-enriched locations, usually at the base of coastal cliff escarpments. It is assessed as 'Endangered' because the national population is estimated to be of less than 250 mature individuals and is considered to be severely fragmented.

Withania frutescens is distributed along the western area of the Mediterranean basin to the Canary Islands. In mainland Portugal, the species occurs very sporadically along the coastal strip around Sesimbra, in rock crevices, gravel deposits, and at the base of coastal limestone cliffs and ledges. It is assessed as 'Endangered' due to the small number of mature individuals estimated to make up the national population, less than 250.

Volutaria crupinoides occurs in mainland Portugal along the maritime escarpments of the Arrábida mountain Range, which is the only record of the plant on the European continent. It was first recorded in 1978 and already indicated as very rare at that time; it was seen in another location in 1985. Despite targeted survey efforts over the past few years, only five individuals are currently known in a small, isolated population. It is assessed as 'Endangered' because the national population is not expected to exceed 250 individuals.

Lavatera maritima has a wide Mediterranean distribution, and in mainland Portugal it only occurs on the coastal cliffs between Cape Espichel and Arrábida. This is a subpopulation far removed from the nearest one, which is located in Gibraltar. The small estimated size for the national population (less than 1,000 mature individuals) and the limited number of identified locations (four) make the national population susceptible to degradation by adventure sports activities (climbing, rappelling, etc.) and any other unforeseeable threats that could cause the disappearance of locations in a short period of time. Therefore, it is assessed as 'Vulnerable'.

On the edges of **scrublands** and **rocky areas**, the silver bindweed, *Convolvulus lineatus*, stands out. It has a wide Mediterranean distribution but is only known in Portugal in three very distant locations (Bemposta-Mogadouro, Cape Espichel, and Sagres), with small population clusters occupying very limited geographical areas on the edges of very dry scrublands and rocky areas. It is assessed as 'Endangered' due to having an occupied area of only 12 km², the severe fragmentation of the national population, and the identified ongoing decline in the quality and area of its habitat.

Crepis pusilla, a small, stemless, completely prostrate annual herb endemic to the Mediterranean, also occurs in Portugal only along the edges of paths and clearings in holm oak groves in the limestone regions of Lisbon and Arrábida. It is assessed as 'Vulnerable' because it has a restricted extent of occurrence and occupied area, as well as a limited number of locations (six).

In terms of faunal communities, within the group of **vertebrate** animals, 12 species of amphibians, 17 of reptiles, 136 of birds, and 34 of mammals have been identified for the Arrábida Mountain Range to date (see Annex III). These high levels of biological diversity and the occurrence of several threatened species, both nationally and internationally, among birds and mammals, make the Arrábida Mountain Range one of the most important areas for nature conservation in Portugal.

Birds of prey include the Bonelli's eagle (*Hieraetus fasciatus*) and the peregrine falcon (*Falco peregrinus*), assessed as 'Endangered' and 'Vulnerable', respectively, according to the LVVP. The escarpments of the Arrábida Mountain Range are highly favourable locations for the peregrine falcon, due to the large availability of nesting sites as well as the abundance of prey. Similarly, in the Arrábida Mountain Range, Bonelli's eagles continue to nest due to the availability of escarpments and food, making it the only nesting site for the species on marine cliffs in Portugal.

The caves, especially in the cliffs, are home to important populations of cave-dwelling **bats**. Many of these species feed along watercourses and wood areas. In the area of the nomination, there are 5 species of protected bats, assessed as 'Vulnerable' (3 species) – *Myotis myotis*, *Myotis mytacinus* and *Myotis escalerai* – and 'Endangered' (2 species) – *Rhinolophus euryale* and *Rhinolophus mehelyi*, according to the Red Book of Mammals of mainland Portugal (2023). Bat species have a limited capacity for recovery (due to late sexual maturity and a low reproduction rate) and also due to their colonial nature, especially during the breeding season, which makes them sensitive to issues that may occur in the few shelters they occupy.

Other groups of mammals have also had their vulnerability recognised by the same source, such as two carnivores classified as 'Endangered' - the wildcat (*Felis silvestris*) and the European polecat (*Mustela putoris*). And two prey species were classified as 'Vulnerable' - the Granada hare (*Lepus granatensis*) and the European rabbit (*Oryctolagus cuniculus*).



INVERTEBRATES

The presence of five species of **coleoptera** endemic to Portugal and new to science in the Arrábida Mountain Range deserve special mention (*Geocharis boeiroi*, *G. moscatelus*, *Typhocharis sarria*, *Iberodorcadion lusitanicum*, *Cneorhinus serranoi*). It is worth noting that *Geocharis boeiroi* and *Cneorhinus serranoi* (weevil) occur exclusively in the Arrábida Mountain Range³⁴.

In the Arrábida Mountain Range there are also two endemic species of **snails**, *Xeroplexa setubalensis* and *Xeroplexa arrabidensis*. Specimens of both species are found in sclerophyllous shrublands, and all known populations occupy the area of the Arrábida Natural Park. The species are classified as Endangered according to IUCN criteria.

The smallest **spider** in Europe and one of the smallest in the world is also in the area of nomination. The *Anapistula ataecina* species of the *Symphytognathidae* family has only been identified in a few caves in the Frade System in Sesimbra. This species appears to be parthenogenic, as no males have been identified. Its distribution area is just 1 to 2 km², and it is classified as Critically Endangered (CR) by the IUCN.

Regarding the diversity of **butterflies** already inventoried, the presence of an Iberian endemism (*Pseudophilotes panoptes*) and *Euchloe tagis*, initially considered a Portuguese endemism (referred to as Portuguese dappled white), is noteworthy for its high ecological specificity and vulnerability, and is currently considered endangered. Also worth highlighting are other butterfly species that, due to their rarity, should be regarded as conservation priorities (*Anthocaris euphenoides*, *Cupido minimus*, *Melitaea didyma*, and *Lasiommata maera*). This priority is particularly relevant in the case of the first species, as it is believed to be locally extinct since the 1970s³⁵.



³⁴ Alonso-Zarazaga 1988, Serrano & Aguiar 2001.

³⁵ E. Marabuto, personal communication.

14.2.2

WHAT ARE THE PRESSURES ON KEY SPECIES?

The proposed Reserve faces pressures that could translate into potential threats to the preservation and conservation of certain habitats and species.

Excessive human activity in certain parts of the territory, if not regulated, could increase trampling outside of trails and contribute to the degradation of natural and semi-natural ecosystems. This could potentially lead to the extinction of local endemisms (e.g., some plant species), negatively affect bird nesting areas, increase soil nitrification and litter deposition, and enhance the proliferation of infesting and invasive species.

The populations of **flora** species relevant for conservation are subject to various pressures, including the following: trampling; the improvement of roads and car parking areas; the expansion of shrub vegetation (successional progression) and the erosion of coastal cliffs; colonisation by invasive exotic species; the effect of extreme climatic events, particularly intense and prolonged droughts, as well as abnormally high temperatures; and the possibility of unpredictable and catastrophic events, such as cliff collapses.

Trampling puts pressure on the majority of plant species. Therefore, more intense visitation to sensitive sites requires increased vigilance, leading to compliance with management measures and control of human impact, with efforts focused on mitigating potential impacts on species and habitats. We should point out the case of *Herniaria maritima*, a Portuguese endemism which inhabits dune environments.

On the coastal cliffs, species limited to these environments, such as the Arrábida endemism *Convolvulus fernandesii*, are susceptible to illegal climbing and the numerous invasive climbing plants. An exotic vascular plant with significant distribution (not only on cliffs, but also in other environments such as dunes) is the sour fig (*Carpobrotus edulis*), which hinders the development of native species, particularly endemic ones.

The modification of traditional agricultural practices and changes in land use also put pressure on plant species such as *Pseudarrhenatherum pallens*, which is heavily affected by forest expansion, but also by ecological succession, through the development of shrublands.

In the last decade, quarrying has also led to the reduction of favourable habitats for certain species, such as *Arabis sadina*, a Portuguese endemism, which occurs in crevices in limestone outcrops or on rocky soils in clearings of scrublands and basophilic woodlands, associated with habitat 6110 (Rupicolous calcareous or basophilic grasslands), but also on coastal cliffs in the Arrábida Mountain Range.

The PG for the Arrábida-Espichel ZEC identifies 4 species of **fauna** as target values to be considered in the conservation function of the BR. These include two species of invertebrates, a bat and a marine mammal, which are described in detail below.

Euphydryas aurinia is a common butterfly species in Portugal, occurring in most of the mainland territory. Although declining in some European countries, it has stable populations predominantly in the Mediterranean region, and is classified at regional level (Mediterranean region) as Least Concern (LC) by the International Union for Conservation of Nature (IUCN). In principle, it is not threatened in Portugal, but it is declining in urban areas and along the coast, where human pressure is greater.

The preferred habitat of the species includes biotopes with a certain degree of humidity, where host plants grow (*Lonicera periclymenum* and *L. Etruscan*, *Succisa pratensis*, *Plantago lanceolata*, *Scabiosa sp. Pl.*), found in damp meadows, peatlands, fallow lands, and roadsides. It is a species that generally requires an open forest mosaic (for reproduction) and meadows (adult stage), a structure that is maintained through traditional management.

The loss of connectivity between suitable habitat areas, which can result from the destruction of native vegetation, the introduction of invasive non-native species or fire (which acts both in terms of direct destruction of individuals and host plants), are the main threats to the survival of the

***Euplagia quadripunctaria* (syn. *Callimorpha quadripunctaria*)** species, a daytime moth widely distributed in the Iberian Peninsula and common in the Mediterranean region, although in Portugal the species has a clearly fragmented distribution. The species occurs in a wide variety of habitats with a certain level of humidity, such as crops, forests, meadows, mountainous areas, and urban areas, preferably in areas associated with watercourses with tree and shrub vegetation. It is common in cool, shady biotopes with a certain level of humidity.

The main threats to the species are associated with the destruction of its preferred habitat, resulting from the elimination of riparian vegetation and the consequent reduction of shelter, breeding, and feeding sites. It is also worth mentioning the introduction or expansion of non-native plants and pollution resulting from the intensification of pesticide and fertiliser use.

***Miniopterus schreibersii* (common bent-wing bat)** is a bat species whose global distribution was generally described as widespread, including Europe, Asia, Africa, and Australia. Recent genetic studies have allowed the separation into 4 distinct species, with *Miniopterus schreibersii* being associated only with a Mediterranean distribution

area, which includes Portuguese populations. In Portugal, it can occur throughout the mainland territory, but its populations are generally concentrated in karstic regions and others with good availability of underground shelters.

It is a typically cave-dwelling species, which breeds and hibernates both in natural cavities and in mines or tunnels, usually in large colonies, which are often mixed colonies with species of the *Rhinolophus* or *Myotis* genus. Refuges can be located in a wide variety of environments, from woodland areas to coastal areas. The Arrábida/Espichel ZEC includes three shelters (caves) of national importance for this and other species of cave-dwelling bats in Portugal.

In Portugal, the species is classified as 'Least Concern' (LC), according to the Red Book of Vertebrates of Portugal (2023), and at international level - IUCN, as 'Vulnerable' (VU). Its main threats include the destruction and disturbance of shelters, as well as the reduction in the availability of prey, due to factors such as changes in the landscape, changes in agricultural practices, the use of pesticides, and pollution of water bodies used as feeding areas, among others.

Tursiops truncatus (bottlenose dolphin) is a highly mobile cetacean, and its populations are widely distributed along the coast up to 200 nautical miles, featuring several hotspots (areas of high concentration of cetaceans). Despite the small marine area covered by the Arrábida/Espichel ZEC compared to the area of occupation and distribution of the species, it remains a relevant area, either as a feeding ground due to its proximity to the estuary, or as a transit zone.

The bottlenose dolphin is an opportunistic species with enormous adaptive capacity and environmental plasticity, with its highest concentration areas appearing to be associated with feeding zones. The bottlenose dolphins population that frequents the Arrábida/Espichel ZEC is part of a wider population that spans the entire Iberian coast. The area adjacent to the ZEC is also crucial for the resident population occurring in the Sado estuary, which coexists with the non-resident coastal bottlenose dolphin population, although there seems to be no genetic exchange taking place. The national assessment of the bottlenose dolphin takes into account the total number of individuals in the Atlantic Biogeographical Region and does not discriminate information for the resident population of the Sado estuary, which frequents the Arrábida/Espichel ZEC.

In Portugal, the species is classified as 'Least Concern' (LC) according to the Red Book of Mammals of mainland Portugal (2023). Its main threats include fishing, both through the accidental capture of individuals and the reduction of stocks of its prey species, as

well as exposure to different types of pollution. In particular, the population occurring in the Sado estuary is exposed to a heavily industrialised and agricultural area, which increases the risk of exposure to chemical pollution. This population is also exposed to high levels of acoustic pollution, in the vicinity of fishing and recreational ports, and to increased human pressure, due to the growing disturbance caused by cetacean-watching vessels and motorised water sports. At international level - IUCN - it has the same status.

With regard to other faunal groups, such as **birds**, it is known that the loss of favourable habitats in the occurrence and nesting areas of some species has led to a sharp decline in several species, especially in Europe, with some facing global extinction. The main threats to birds of prey mentioned in Chapter 14.2.2 include the degradation and alteration of nesting and/or feeding habitats (e.g., due to the abandonment and alteration of various traditional agricultural practices, inappropriate afforestation, fires, quarrying); human disturbance in nesting areas; the increased use of agrochemicals (e.g., pesticides) and human disturbance in colonies/nesting areas (e.g., tourism and leisure activities). The presence of the Cape Espichel ZPE is therefore essential for the conservation of this faunal group, given that the management guidelines for the classified area are aimed at maintaining the habitats of migratory species passing through and bird species nesting on the cliffs.

Climate change also poses an increased threat to some species. The increased frequency of extreme and out-of-season weather events (such as droughts and heat-waves) leads to greater degradation of habitat quality (in terms of vegetation structure and cover), higher mortality rates among offspring, and even changes in migration patterns (resulting in the early arrival or departure of migratory birds).

14.2.3

WHAT KIND OF MEASURES AND INDICATORS ARE CURRENTLY USED, OR PLANNED TO BE USED TO ASSESS BOTH SPECIES GROUPS AND THE PRESSURES ON THEM?

The proposed Biosphere Reserve will continue to benefit from the minimisation and prevention measures currently in place in the various regulatory instruments, aimed at controlling the existing threats and pressures.

Surveillance and enforcement actions in forested areas and all protected spaces are part of an established mechanism, overseen in the field by ICNF Nature Rangers, and may involve other organisations with jurisdictional competence in the matter within their respective areas of authority.

At present, the ICNF monitors priority habitats and species in the PNA, as well as in the Natura 2000 Network, in scheduled campaigns every decade and every year. The Arrábida/ Espichel PGZEC, currently under public consultation (pending approval)³⁶ includes as indicators of key species the conservation status of the habitat area and the number of individuals present. Examples of conservation indicators include the following:

- Area of habitat suitable for the *Arabis sadina*, *Pseudarrhenatherum pallens* species, among others (ha);
- Proportion of restored area of habitats suitable for bat prey populations (%);
- Proportion of shelters (of common bent-wing bat, *Miniopterus schreibersii*) restored (%);
- Area of habitat suitable for lepidopteran species *Euphydryas aurinia* and *Euplagia quadripunctaria* (ha);
- Resident population of bottlenose dolphins (*Tursiops truncatus*) in the Sado Estuary (No.).

Analysis of literature data and academic theses are also indicators of the conservation status of species and the pressures on them. Creating a database of these studies will be a measure to adopt.

³⁶ Under public consultation, pending approval.

In terms of pressure factors, the following indicators can be used:

- Family farming population
- Area subject to forestry regime
- Licensed boats in the national fleet by port
- Licensed fleet for the Marine Park
- Tourist entertainment agents with activities recognised as nature tourism
- Beach demand

Tourism will also be evaluated using data from agents on visitors and tourism activities.

The Action Plan for the Biosphere Reserve will include the promotion and continuation of some monitoring actions that are regularly underway, as well as the production of specific follow-up indicators. Environmental education and awareness-raising are part of the package of measures to be regularly used as a tool for engaging the entire community in the pursuit of a common good: preserving the values of Arrábida as applicant for Biosphere Reserve status. For example, raising awareness of the issue of invasive exotic species, such as the weevil (*Carpobrotus edulis*), and their negative impact on natural habitats; and outlining a plan to control these species, is a goal for the management of the Arrábida Biosphere Reserve to be achieved by involving public organisations, the cooperation of associations, and social participation.

14.2.4

WHAT ACTIONS ARE CURRENTLY UNDERTAKEN TO REDUCE THESE PRESSURES?

Given that the territory to be nominated coincides with the Arrábida Natural Park and the Natura 2000 Network - Arrábida-Espichel ZEC and Cape Espichel ZPE - classified areas aimed at the protection of species and habitats, many of the constraints and measures proposed in these instruments are naturally aimed at reducing the main identified pressures, including:

- i. Restricting urban sprawl and dispersed construction;
- ii. Restricting the opening and improvement of roads and the construction of infrastructure;
- iii. Restricting recreational activities and promoting awareness-raising activities aimed at those who practise them;
- iv. Restricting economic activities related to the exploitation of aggregates, agriculture, pastoralism, and fishing;
- v. Restricting motorised sports activities and light vehicle traffic;
- vi. Contributing to strengthening surveillance and monitoring of adventure sports activities that may occur in the distribution area of the populations to be protected;
- vii. Encouraging the collection of seeds and their conservation in seed banks.

Indeed, the Sectoral Plan for the Natura 2000 Network, as a management tool, sets out strategic guidelines aimed at maintaining species and habitats in a favourable conservation status, as well as measures to reduce other anthropogenic pressures that public organisations should adopt. It should be noted that the PGZEC (under public consultation, pending approval) addresses and considers the pressures on target values and provides for the introduction of regulatory measures aimed at reducing pressures and threats, and maintaining or improving the conservation status of the target values.



14.2.5

WHAT ACTIONS DO YOU INTEND TO REDUCE THESE PRESSURES?

In addition to the actions identified in the previous section relating to the protection and safeguarding of species and habitats, it is possible to identify measures and projects geared towards specific species or groups.

Regarding the protection of flora habitats and species, since 2015, **control of invasive exotic species**, notably *Carpobrotus edulis* and *Senecio angulatus*, has been carried out through volunteer actions aimed at schools, associations, and companies. These actions not only allow for the control of invasive species, but also facilitate the dissemination of information and community involvement in the protection and conservation of natural heritage.

Preserving and protecting a region's genetic heritage necessarily involves controlling the existing invasive species and identifying new species at an early stage. In addition to control measures, which include cutting and removing invasive plants, the population's knowledge and involvement should be promoted through volunteer actions and citizen science, such as those described in section 16, as citizens play an important role not only in preventing biological invasions, but also in mitigating their impacts.

The classification as a Biosphere Reserve validates the already identified need to promote and implement monitoring programmes, particularly for species classified as Endangered and Vulnerable. In particular, for the 9 endangered or vulnerable flora species, measures should be implemented to preserve the genetic marriage, namely:

- Protecting identified population clusters *in situ*;
- Searching for new populations near the site of occurrence;
- Repopulation actions in sites of historical occurrence;
- Harvesting and storing seeds;
- Preserving living plant collections in botanical gardens;
- Restricting recreational activities such as climbing and rappelling and raising awareness among participants.

Monitoring is underway on the cliffs of Cape Espichel to protect endemic flora (*C. fernandesii* and *E. pedroi*), for semi-automatically detecting population clusters using images obtained by drones. The project was developed by the *Mossy Earth* association with the support of the Portuguese Botanical Society, and also includes actions to remove clusters of the invasive species *Carpobrotus edulis*.

The only cluster of *Convolvulus lineatus*, located near the Cape Espichel lighthouse, was subject to protective measures, including the **delimitation of the area of occupation** to prevent trampling and vehicle circulation. Therefore, it is expected that the specimens present will have the capacity to bloom, produce seeds, and increase their area of occupation.

With regard to other forestry practices, the production of local native forest species is currently being developed in two nurseries (associated with Secil and FCT) to be used in the region.

Since 2020, **monitoring of butterfly species** in the Louro Mountain Range has been ensured as part of the Portuguese Butterfly Census project³⁷. This project aims to obtain data to allow for the detection of trends in the conservation status of butterflies and their habitats.

In the PNA area, monitoring of certain groups of insects, peregrine falcons, Bonelli's eagles, and bat colonies is ensured by ICNF technicians. This allows for early detection of signs of decline and the effects of threats.

The Biomares Programme³⁸ ensures **monitoring of species** and **habitats** in the Professor Luiz Saldanha Marine Park. This contributes to a better understanding of the area, increasing knowledge about certain species and allowing management measures to be geared towards solving the problems identified.

These actions will continue and may give rise to new projects and initiatives in order to contribute to greater understanding of the species, their area of occupation, and the early identification of vulnerabilities. This will further enhance the implementation of even more effective management measures.

³⁷ <https://butterfly-monitoring.net/pt-pt/portugal-bms>

³⁸ http://biomares.ccmr.uaig.pt/conheca_projecto_biomares.html

14.3 AT THE LEVEL OF GENETIC DIVERSITY

14.3.1 INDICATE SPECIES OR VARIETIES THAT ARE OF IMPORTANCE (E.G. FOR CONSERVATION, MEDICINE, FOOD PRODUCTION, AGROBIODIVERSITY, CULTURAL PRACTICES, ETC..)

The area of the Biosphere Reserve includes a large number of biological and genetic resources, mostly associated with native species of fauna and flora that are relevant to conservation and are present in the area of the PNA. In floristic terms, around 1,450 species have been inventoried, corresponding to 40% of the Portuguese flora, with 90 species classified as being of high value as a genetic heritage. In terms of natural flora, the most noteworthy are wild and typically Mediterranean species of aromatic, culinary, and medicinal plants. These include species still used in popular tradition, which enhance biodiversity in the plant landscape and are a valuable resource for the future, such as lemon verbena (*Aloysia triphylla*) and lemon balm (*Melissa officinalis*), used for common digestive and nervous ailments, and the lemon tree (*Citrus limon*), used for respiratory ailments and general body purification.

Popularly used to obtain rennet (from the dehydrated flower) in the production process of Azeitão DOP cheese, the cardoon (*Cynara cardunculus*) also has great ornamental, medicinal, and gastronomic potential, and is now receiving increasing attention and appreciation.

The wealth of biological and genetic resources is not only relevant for nature conservation, but also for agricultural and fisheries resources. Among the agricultural varieties, it is possible to identify two regional varieties of apple trees, found in two of the municipalities in the Biosphere Reserve - Palmela and Sesimbra. Preserving regional fruit varieties should be regarded as an economic asset for the region in terms of agriculture and related industries, but also as a contribution to the protection of genetic and cultural heritage.

The 'Riscadinha' variety of apple tree is said to have appeared in the 19th century in the hamlet of Barris, in the municipality of Palmela. **The 'Riscadinha' Apple of Palmela** is one of the region's highlights and is known for its excellent and characteristic flavour. It is also recognised for its use in perfuming houses due to its intense and unmistakable aroma, as well as its widespread inclusion in regional culinary recipes.

The **Camoesa apple**, also known as *Férrea Azoia*, is found particularly in the Cape Espichel area, where a very specific microclimate with clayey and iron-rich soils gives it unique properties that set it apart from other national apple varieties. A study conducted by Professor Agostinho de Carvalho, from the Universidade Egas Moniz in Monte da Caparica, compares the Camoesa da Azoia apple with the Starking, Fuji and Golden apples, concluding that its levels of antioxidants and polyphenols are significantly higher than those of the others.



In terms of wine production, two grape varieties stand out: the **Moscatel de Setúbal variety**, which holds extraordinary importance throughout the region and is essential in the Palmela/Setúbal area for the production of white wines and the fortified wine marketed under the same name.

It has a golden colour ranging from light topaz to amber and an exotic floral aroma, usually described as offering '*hints of honey, dates, and orange*'.

In addition to the Moscatel de Setúbal grape variety, which reaches its highest maturity and richness on the slopes of the Arrábida Mountain Range, there is also the nearly extinct *Moscatel Roxo variety*, which oenologist Ferreira Lapa³⁹ in the 19th century qualified as the '*quintessence of muscatels*'.

As far as livestock farming is concerned, we highlight the Saloia sheep, whose milk is used in the production of Azeitão Cheese. Descended from the **Bordaleira breed**, common in the Beira Baixa region and whose milk is used in the production of Serra Cheese, the story goes that when trying to reproduce Serra Cheese using the same method, the unique characteristics of the local pastures resulted in a different product, giving rise to **Azeitão Cheese**. While there is no single plant species that characterises the type of pastures in the region, the existing diversity contributes to its specificity and the unique characteristics of products made from animals that graze in this territory.

The designation of the territory as a Biosphere Reserve will contribute to and validate the importance of protecting this relevant genetic heritage, as its preservation is considered an essential asset for current and future generations. Combating the factors that cause biodiversity loss and ecosystem degradation is a cornerstone to achieving the objectives outlined in the 'EU Biodiversity Strategy for 2030'.

³⁹ Professor at the Instituto Geral de Agricultura, whose work stood out in the dissemination of agronomic science among all producers in the country, and distinguished oenologist.

14.3.2

WHAT ECOLOGICAL, ECONOMIC OR SOCIAL PRESSURES OR CHANGES MAY THREATEN THESE SPECIES OR VARIETIES?

The potential risks in terms of threats to natural heritage (biodiversity and geodiversity) primarily arise from activities that do not comply with regulations in force, both in terrestrial and marine natural areas and in the other areas of the proposed Reserve.

The phenomena associated with **climate** change and **forest fires** are aspects to be taken into account in the management of the Biosphere Reserve, especially because the Arrábida region is considered susceptible to wildfires. The **abandonment of rural areas**, coupled with the inefficient management of natural and forested areas, and the reduction in extensive grazing practices, have led to increased combustibility in a large part of the area of the PNA. Adding to this factor is the seasonal increase in population in beach areas during a period that naturally corresponds to the peak fire risk season. Climate change exacerbates this situation by increasing the occurrence of extreme events.

At the environmental level, according to the *Global Assessment Report on Biodiversity and Ecosystem Services* (IPBES), **invasive species** are the fifth largest threat to biodiversity globally, in addition to causing other significant environmental and socioeconomic impacts.

Within the proposed Biosphere Reserve area, some invasive species listed in Decree-Law no. 92/2019, of 10 July, have been identified, with the main ones in terrestrial environments being: sour fig (*Carpobrotus edulis*), giant reed (*Arundo donax*), Indian fig opuntia (*Opuntia ficus-indica*), and acacia (*Acacia sp.*)

In the specific case of Mediterranean cliffs, colonised by open rupicolous vegetation typical of these environments - dominated by sea fennel, *Crithmum maritimum* usually accompanied by different species of the *Limonium* genus, most of which correspond to endemisms with a restricted distribution, subject to pressure from invasive exotic species such as *Carpobrotus edulis*.

In the marine environment as well, the threat to natural habitats is identified by the **proliferation of invasive exotic species**, such as *Asparagopsis armata*, an algae capable of altering the environments it colonises through the release of phytochemicals.

The ageing of the population, leading to the abandonment of land and agriculture, with consequent **changes in land** use and **traditional agricultural practices**, may increase the distribution area of infesting and invasive species, jeopardising the balance of ecosystems and even the survival of wild species. Moreover, there could be potential effects on soil dynamics, the protection of which must be ensured, as it is a finite resource that underpins terrestrial biodiversity.

In terms of **recreational activities**, particularly rock climbing and rappelling, another vulnerability has been identified related to the occurrence of plant species with unfavourable conservation status (classified as endangered and vulnerable) on limestone sea cliffs. The undertaking of these activities exposes the species to pressures and threats related to the activities themselves.

Urban development, tourism, along with the construction of infrastructure, poor vegetation management practices, and agroforestry activities, also emerge as pressures on the habitats and flora species present in the Biosphere Reserve.

The Action Plan of the Arrábida Biosphere Reserve takes these aspects into account, reflected in a set of actions primarily aimed at the strategic objectives related to 'Conservation and enhancement', 'Promotion and enjoyment', and 'Climate action'.

14.3.3

WHAT INDICATORS, AT THE LEVEL OF THE SPECIES, ARE USED, OR WILL BE USED, TO ASSESS THE EVOLUTION OF POPULATION STATUS AND ASSOCIATE USE?

The updated checklists of endemic fauna and flora, as well as the monitoring of exotic and invasive species, allow tracking developments in species conservation status trends and their updating (e.g., red lists), ensuring an appropriate management.

In terms of fauna, the monitoring of target species will be ensured through periodic sampling and censuses, allowing for the collection of data on spatial distribution, areas of occurrence, and population growth estimation.

In terms of agriculture, potential impacts caused by agriculture on the territory will be monitored using the indicators provided for in the Rural Development Programmes (PDR), which allow obtaining information on the impacts of agricultural activity on the territory. With regard to the two regional species of apples (Riscadinha from Palmela and Camoesa from Sesimbra), production will be monitored in collaboration with producer associations.

The sheep population will be monitored through censuses conducted with producers and data provided by the Direção-Geral de Alimentação e Veterinária (Directorate-General for Food and Veterinary).

14.3.4

WHAT MEASURES WILL BE USED TO CONSERVE GENETIC DIVERSITY AND PRACTICES ASSOCIATED WITH THEIR CONSERVATION?

At the national level, the use of biological resources and genetic resources is governed by the principles established by the United Nations Convention on Biological Diversity (CBD)⁴⁰ the Nagoya Protocol⁴¹ and the ABS (Access and Benefit-Sharing) Regulation⁴². These instruments aim to promote the sustainable use of biological diversity components, ensure the fair and equitable sharing of the benefits arising therefrom, and minimise the adverse impacts of economic activity on biodiversity.

In Arrábida, the capacity building and training among various stakeholders (such as farmers, tourism agents, among others) for the sustainable use of natural resources, as well as the awareness and mobilisation of the general public for the active conservation of local biodiversity, will continue to be key components for the proper use and management of habitats and species with high conservation status.

To disseminate and consolidate information on the management of access to and use of genetic heritage, especially by the main activity sectors interacting with natural heritage, the development of various communication materials, such as good practice manuals (agricultural, visitation) has helped to preserve, maintain, and even enhance environmental quality and biological diversity.

In terms of agricultural practices, the ancient practice of saving seeds from previous crops to use for new plantings allows maintaining a germplasm bank of high biological value. This process ensures the existence of native varieties unique worldwide and well-adapted to the region's characteristics, which would otherwise have disappeared, and it should be promoted and strengthened.

⁴⁰ The CBD is the international legal instrument for the conservation and sustainable use of biological diversity, and Portugal approved it for ratification through Decree-Law no. 21/93, of 29 June, which entered into force on 21 March 1994.

⁴¹ The Nagoya Protocol is an international treaty with legally binding effects that extends the overall framework of the CBD and entered into force in October 2010.

⁴² The ABS Regulation (Regulation (EU) no. 511/2014 on access to genetic resources and the fair and equitable sharing of benefits arising from their utilisation in the European Union) aims to implement the mandatory elements of the Nagoya Protocol within the European Union.

With regard to the agricultural varieties of apples, the Palmela city council has supported their commercialisation in recent years with marketing campaigns. Aware of the reduction in production and lacking competencies in the agricultural sector to encourage the planting of new orchards, the municipality has been promoting domestic cultivation of the 'Riscadinha' apple as a strategy to preserve the species. Some of the latest initiatives include the following:

- Planting a small orchard of 70 apple trees at Espaço Fortuna, with the aim of making this facility an educational centre focused on apple trees.
- A training course entitled 'Plant Riscadinha' was organised for residents with backyards, where they learned how to plant and care for apple trees and received an apple tree to take home. Sixty apple trees were distributed during this training course.

Measures should be taken to promote the two specific regional apple varieties, the Camoesa from Sesimbra and the Riscadinha from Palmela, among small-scale producers and consumers. This would enable small-scale, family-based production to develop complementary activities associated with the processing of these varieties, adding value to the agricultural sector.

Lastly, with regard to livestock farming, we should highlight the work carried out at the Sheep Museum⁴³, which maintains a small flock of sheep from the Saloia breed, an autochthonous species at risk of extinction, on a permanent basis. This flock serves as a genetic reserve for the species, with the possibility of providing specimens to anyone wishing to develop new flocks.

⁴³ Museum located in S. Gonçalo, in the parish of Quinta do Anjo, municipality of Palmela, since 2008. It is the result of a partnership between the municipality and the Associação Regional de Criadores de Ovinos Leiteiros da Serra da Arrábida (ARCOLSA).



AC

15

DEVELOPMENT FUNCTION

15.1

POTENTIAL FOR FOSTERING ECONOMIC AND HUMAN DEVELOPMENT WHICH IS SOCIO- CULTURALLY AND ECOLOGICALLY

15.1.1

DESCRIBE HOW AND WHY THE AREA HAS POTENTIAL TO SERVE AS A SITE OF EXCELLENCE/MODEL REGION FOR PROMOTING SUSTAINABLE DEVELOPMENT

The human occupation of Arrábida, favoured by the region's morphological characteristics and Mediterranean climate, as well as easy access to endogenous natural resources, spans centuries of history, tradition, and culture. This is evident in the customs and expressive traits of a resilient people, as well as in the characteristic duality of the landscapes bordering between mountains and sea, which glorify the scenery of the Arrábida Biosphere Reserve.

The extended period of continuous occupation, the geographical location, and the unique characteristics of the territory have shaped a historically and culturally rich and remarkable identity at all levels. This identity will be showcased and valued as part of the UNESCO Biosphere Reserve.

The proposed reserve offers exceptional conditions in terms of natural, cultural, and heritage resources for promoting sustainable development. Arrábida incorporates elements of high identity value whose authenticity is indisputable. The promotion of this identity serves not only the purpose of preserving intrinsic historical and cultural values, which contribute greatly to the social sustainability of the resident population, but also emerges as a preponderant factor for the growth of the local economy with high potential for generating value.

As a result of this historical journey that began centuries ago, traditional economic activities, particularly agriculture, livestock farming, and fishing, nature conservation, scientific and academic research, along with cultural and nature tourism, have been fostered.

With regard to the economic activities currently taking place in the proposed area, we highlight pastoralism; agriculture, with particular emphasis on viticulture; the production of wine, cheese, and honey; fishing; nature tourism and environmental activities; the collection of forestry products; and the extractive and processing industry (cement and quarries). With less prominence, there is also organised hunting.

Among the region's products, of great quality and most with PDO certification, we highlight the **Azeitão cheese**, a cured semi-soft cheese made from raw sheep's milk from sheep grazing in Arrábida; the **wines** from the demarcated region of the Setúbal Peninsula, with vineyards mainly located in Palmela and Setúbal, including the notable Moscatel wine; the **honey** from Arrábida, originating from the pollen collected by bees from rosemary, one of the many aromatic plants characteristic of Arrábida's flora; the bread produced in Sesimbra and Palmela, made with flour that still comes from local mills and is baked in wood-fired ovens, and the conventual and traditional confectionery, such as the cakes from Azeitão, the 'fogaças' from Palmela, and the toasted flour from Sesimbra.

The territory of the Biosphere Reserve has been growing as a high-quality **tourist destination** and leisure spot, primarily based on its natural heritage. Recreational boating, scuba diving, snorkelling, coasteering, stand up paddle, kayaking, climbing, and hiking are the most representative activities in this area, along with beach tourism and activities associated with regional gastronomy and products.

In terms of **cultural** heritage, the Arrábida territory is strongly marked by traditions that have persisted over the centuries, on land and at sea, such as the Arrábida and Cape Espichel Pilgrimages and the Harvest Festival in Palmela, among other events linked to the patron saints of the various traditional activities and other popular summer events. The castles of Sesimbra and Palmela and the Fort of St. Philip in Setúbal are also landmarks of great historical interest and popular visiting sites in the region.

The entire region maintains an identity, as well as the potential for maintaining the balanced development it has adopted. The entire economic and tourist strategy is based on the various experiences that the mountain and the sea provide. This allows Arrábida to be recognised as a territory of excellence and a living laboratory of sustainability. Therefore, it is now our voluntary intention to have it designated as a Biosphere Reserve, valuing this integration between activities and nature and its active role in sustainable development for future generations.

The natural and cultural values and resources present in this territory make it a region with high potential for promoting sustainable development, based on the promotion of regionally-based economic-traditional activities. Therefore, the interaction and relationship between the experiences and activities occurring between urban and rural areas, with respect for the integration and enhancement of natural, cultural, and landscape heritage, as well as the requalification and regeneration of areas of high environmental value, are key elements of this application, which we intend to deepen and preserve.

15.1.2

HOW DO YOU ASSESS CHANGES AND SUCCESSES?

The changes and successes in the proposed Biosphere Reserve will be assessed using economic, cultural, social, and environmental indicators, respecting the three functions of the Biosphere Reserve zoning and aligning with Portugal's Action Plan for Biosphere Reserves, specifically defined within the management framework of the Reserve. The indicators that will allow assessing the changes and successes of the proposed Reserve are as follows:

- Initiatives and projects presented (no.) to promote a sustainable economy;
- Enhancement and promotion actions carried out (no.) to promote a sustainable economy;
- Regional products (no.);
- Cultural and artistic actions and initiatives carried out (no.);
- Participants in cultural and artistic actions and initiatives (no.);
- Visitors to cultural and artistic actions and initiatives (no.).

It is also worth noting the monitoring of the implementation of the Action Plan and the evaluation of the impact or degree of incidence of the actions included therein (see Annex III).

15.2 IF TOURISM IS A MAJOR ACTIVITY

15.2.1 DESCRIBE THE TYPE(S) OF TOURISM AND THE TOURIST FACILITIES AVAILABLE

Tourism is one of the main economic activities in the proposed Reserve, so its performance is crucial for the sustainability of the territory.

Access to the Reserve is ensured by a main road network that connects the municipalities and provides access to the main urban centres. To the northeast of the Reserve there are two motorways - A2 (Lisbon-Albufeira) and A12 (Setúbal-Montijo), as well as three railway stations on the Southern Line - Setúbal, Praça do Quebedo, and Setúbal-Mar. In addition to the access roads already mentioned, the area of the Reserve is marked by a relatively dense network, which includes secondary roads, local access roads, beach access ways, forest paths, or properties access roads. The density of this network is more significant in the flatter areas of the territory, associated with the agricultural land use and the development of urban centres.

The development and sustainability strategy that underpins the application to become a Biosphere Reserve is based on the sustainable growth of tourism, focusing on the quality of services, the enhancement of local heritage, the mitigation of seasonality, and the creation of local added value and long-lasting employment, rather than mass tourism associated with the summer months. Therefore, we do not expect the road network to need to be expanded in the coming decades, nor a significant increase in its use during the peak season.

As far as the tourist offer is concerned, the relief of Arrábida and the flatness of the Atlantic Ocean take us into the realm of nature tourism (either for enjoyment or for engaging in activities within it) and nautical tourism. A vast and rich natural heritage, which encompasses multiple protected areas with unique biodiversity (fauna and flora), including unique native species, and a unique geodiversity, invites to enjoyment in multiple ways. The main tourism products are grouped into segments, with emphasis on the following:

- Sun and sea: beach.
- Active sports: climbing, cycling, mountain biking, sailing, windsurfing, , kitesurfing, canoeing, stand-up paddle, coastering, paragliding.
- Nature: hiking, cycling, and equestrian trails, birdwatching, scuba diving, dolphin watching, boat trips.
- Cultural and gastronomic: cultural, regional products, and gastronomic tours.



In this context, the remarkable coastline stands out, where the combination of sun and sea offers a series of unforgettable beaches and marinas, ports, and recreational docks of recognised quality. We should highlight the various **Blue Flag beaches**, especially the Ouro, Moinho de Baixo, and Figueirinha beaches, which in addition to flying the European Blue Flag have also been awarded the Accessible Beach Flag, an award that recognises bathing areas with facilities for people with reduced mobility, and the Gold Quality Beach, a distinction given to bathing areas with excellent water quality. In addition to these, the Galapos, Galapinhos, and Portinho da Arrábida beaches were also awarded this water quality excellence award.



It is also worth mentioning the Lagosteiros Beach (Cape Espichel), whose scenery of great beauty is complemented by the **observation of the footprints and tail tracks of dinosaurs, sauropods, and theropods, dating back approximately 150 million years.** The Galapinhos beach (whose unique beauty has earned it the title of one of the best beaches in Europe, awarded by the Europe's Best Destination website⁴⁴ in 2017) is also worth a visit.



Trail of dinosaur footprints and tracks

⁴⁴ www.europeanbestdestinations.com

According to the survey conducted using the GPS track-sharing platform GPSies, in terms of the technical characteristics of the hiking trails, it was possible to identify the following:

- Circular trails are the most popular ones;
- The most popular average distance is 15 km;
- The most popular preferred distances are up to 10 km.

Consultation with companies and associations shows that natural beauty, technical quality, safety conditions, and ease of access are the main factors considered when choosing a location for practising various sports. Consequently, there has been an increase in environmental impacts, mainly related to trampling, degradation of vegetation and soil, accumulation of waste, introduction of invasive species, and disturbance of fauna.

In addition to environmental concerns, it is worth mentioning the issue of land ownership and the need to classify public footpaths and/or establish agreements with landowners in order to ensure passage. This has proved to be decisive for the implementation of the hiking trails network.

Arrábida has an important and consistent hiking trails network, the result of a collaboration between the ICNF and local authorities. According to the 'Nature Sports Charter Project of the PNA - Diagnosis of the current situation' report from 2015, in terms of sports practice in the Arrábida Natural Park, hiking and mountain biking are the outdoor activities with the highest number of participants. With regard to hiking, the data collected shows that the PNA is mostly used freely and that there has been a massive increase driven by associations, city councils, and parish councils. It was possible to identify trails throughout the entire area of the PNA, including total protection areas, with Palmela and Azeitão being the most prominent areas and the most used trails being Moinhos (Louro Mountain Range), Espichel, Risco Mountain Range, and Formosinho.

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According to the report that was consulted, in 2015 the strong potential of tourism based on hiking trails was already evident. This type of tourism was seen as a means of enhancing the value of territories associated with sustainability and as a driving force for regional tourism. It was considered an excellent strategy for reducing seasonality.

The need to respond to the increase in recreational and sports activities, as well as the need to preserve habitats and regulate visitation, was combined with the desire to establish a tourist product that would promote and enhance the local heritage. This led to the creation of a network of trails throughout the Arrábida territory, consisting of 12 short routes (PR) and one long route (GR11), with a total length of 170 km. The following table provides some details about the network of trails.

Short Routes			
Municipality	ID/Type/km	Start	End
Setúbal	PR1–circular, 3.9km	PUA	PUA
	PR2–linear, 8.3 k	VN Azeitão	Portinho Arrábida
	PR3–linear, 3km	Portinho	Alpertuche
	PR4–circular, 17km	V.N. Azeitão	V.N. Azeitão
	PR4.1–variant, circular, 11.2km	V.N. Azeitão	V.N. Azeitão
	PR5–circular, 12.7km	Parque S. Paulo	Parque S. Paulo
Palmela	PR1–circular, 11.8km	Start Louro	Inicio Louro
	PR2–circular, 9.8km	Espaço Fortuna	Espaço Fortuna
	PR3–circular, 5.6 km	Cabanas	Cabanas
	PR4–circular, 15km	Biovilla	Biovilla
Sesimbra	PR1–circular, 8.6 km	Pedreira Cape	Pedreira Cape
	PR2–circular, 7.8 km	Espichel Cape	Espichel Cape
	PR3–circular, 5 km	Espichel Cape	Espichel Cape
Arrábida Great Route			
Setúbal, Palmela, Sesimbra	Gr11 E9 - Arrábida Great Route, crossing, 59 km Link Setúbal (Doca-)Palmela - Sesimbra (Cape Espichel) Stages: 1 - Setúbal / Palmela; 2- Palmela/ VN Azeitão;- 3VN Azeitão/ Sesimbra 4 - Sesimbra/ Cape Espichel		

Table 15.2.1-1 - Hiking trails network in the PNA

In defining the network, each municipality was responsible for analysing and restructuring the trails proposed by the team coordinated by the ICNF, adapting them to their vision of the territory. Promotion has been ensured by the municipal teams of each municipality, and a joint communication plan is currently being developed.

The project was named 'Grande Rota da Arrábida' (Arrábida Great Route) as a national brand and 'Arrábida Walking Trails' as an international promotion name. Information on the existing trails is available in a field guide and on the dedicated website: Arrábida Walking Trails (www.arrabidatrails.com).

The following figure shows the geographical distribution of the entire trails network planned for the PNA.



Figure 15.1 - Geographical distribution of the Arrábida hiking trails network (GR and PR)
(Base map: *Google Earth*, 2022)

The great route crosses all the municipalities of Arrábida and runs longitudinally across virtually the entire mountain range (see figure below).

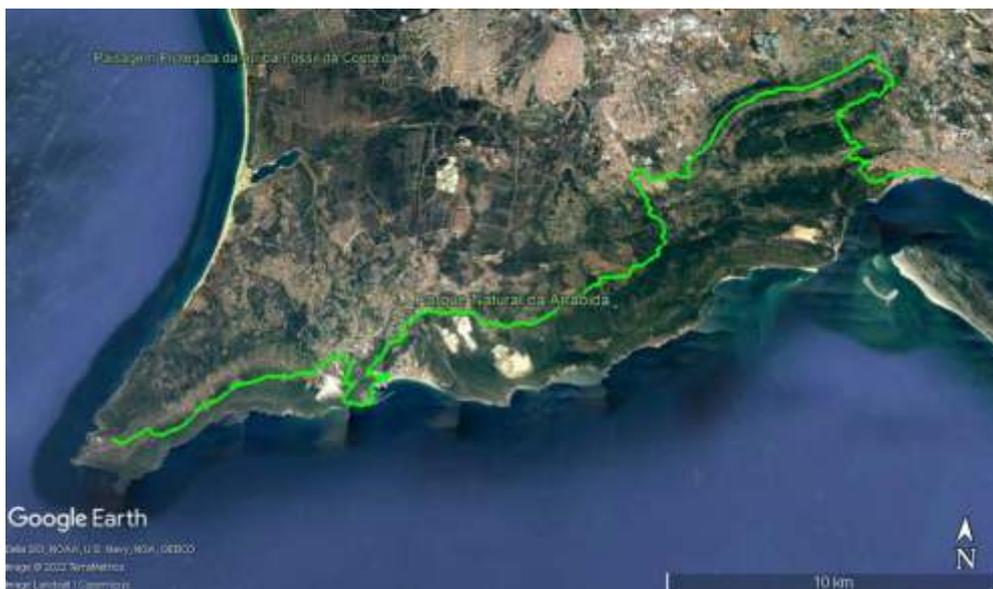


Figure 15.2 - Arrábida Great Route (Base map: *Google Earth*, 2022)

The trails network by municipality is shown in Figures 15.3, 15.4, and 15.5.



Figure 15.3 - Geographical distribution of the trails network in the municipality of Setúbal (Base map: Google Earth, 2022)



Figure 15.4 - Geographical distribution of the trails network in the municipality of Palmela (Base map: Google Earth, 2022)



Figure 15.5 - . - Geographical distribution of the trails network in the municipality of Sesimbra (Base map: *Google Earth*, 2022)

Scuba diving is also quite relevant, featuring various sites for this purpose, identified with varied reliefs and bottoms, crevices, and shipwrecks, along with various species of fauna and flora, promoted by several Diving Centres.



Cape Espichel is one of the most interesting spots in mainland Portugal for **observing migratory land birds**, and undoubtedly one of the best birdwatching destinations in the Lisbon and Setúbal region. The site is famous both for the diversity of species and the spectacle provided by passing migratory birds, and for the occurrence of rarities, species that deviate from their normal migration route and appear occasionally, allowing for observations that would otherwise be impossible in our country.

In a second dimension, the rural world with its small villages (Azóia, Azeitão, Quinta do Anjo), the vineyard and wine culture, cheese, and local products, lead us to a Human landscape, with its world, and its history, where tourism linked to **gastronomy and wine**, as well as **cultural and landscape** tours are the means of understanding and appreciating these places and their traditions.

With a cultural and religious heritage, both tangible and intangible, of undeniable value, Arrábida offers its visitors multiple resources and experiences through visits to its historical monuments - castles and fortresses, convents, churches, chapels, renowned archaeological sites, museums (some award-winning ones) - the Maritime Museum of Sesimbra, the Oceanographic Museum, and various Interpretation Centres.

Within the walls of the Castle of Palmela we find the Municipal Museum of Palmela, which has a multi-nucleated structure and includes various visitable areas: the Archaeological Area, the Military Communications Area, and the São Tiago Visitable Reserve of Sculpture. It is also possible to visit the Church of Santiago, the ruins of the Church of Santa Maria (where the Study Office on the Order of Santiago is located) and the Historic 'Pousada' of Palmela, housed in the former convent of the Order of Santiago.

The Oceanographic Museum of Portinho da Arrábida, named after Professor Luíz Saldanha, is located near the village and beach of the same name, Portinho da Arrábida. It is housed in the Fortress of Santa Maria da Arrábida, located within the Arrábida Natural Park. This museum keeps the collection of naturalist Luiz Gonzaga do Nascimento, born in Setúbal, which dates back to the 20th century. Through its collection and temporary exhibitions, it showcases the biodiversity of the Professor Luiz Saldanha Marine Park.

The Interpretive Centre of the Sado Estuary Bottlenose Dolphin, located at Casa da Baía - Setúbal Tourist Promotion Centre, was inaugurated in 2018. It hosts a permanent exhibition about this population residing in the Sado Estuary, providing information on its life cycle, habits, the region where it lives, and threats it faces.

The Maritime Museum of Sesimbra is located in the Fortress of Santiago. Inaugurated on 31 May 2016, symbolically on National Fishermen's Day, the museum's permanent exhibition includes fishhooks from the Chalcolithic period, which are around five thousand years old, material testimony to the earliest evidence of fishing in the Arrábida region.

Consisting of a collection entirely donated by the community, it is currently the only Portuguese museum nominated for the European Museum of the Year award, given the relevance of its museographic discourse, which tells a story spanning over two hundred million years, using innovative multimedia solutions.



Home to various religious manifestations, Arrábida invites visitors to experience its Festivals and Pilgrimages. Throughout the year, there are several opportunities to visit and discover, alongside unique examples of religious architecture (Arrábida Convent, Espichel Sanctuary, and an extensive itinerary of Churches and Chapels), the various ritual manifestations that recall the inseparable relationship between natural and cultural, tangible and intangible heritage.

History, Culture, and Identity are the driving forces behind the creation of various tourist products, which simultaneously aim to regenerate and revitalise the Historic Centres of the Arrábida territory.

It is worth mentioning the Chapel of the Holy Spirit, built in the 15th century as the headquarters of the Brotherhood of the Holy Spirit of the Seafarers of Sesimbra, which had a chapel and a hospital, both ruined by the 1755 earthquake. The hospital was closed and the Chapel remained until the mid-20th century. It was classified as a Property of Public Interest by Decree-Law no. 129/77, of 29 September, and in 2000, the Sesimbra City Council, in partnership with the Direção-Geral dos Edifícios e Monumentos Nacionais (Directorate-General for National Buildings and Monuments), began its restoration. The intervention was completed in December 2004, when it opened to the public as part of the Municipal Museum of Sesimbra. Its assets include an important Sacred Art collection, notably the 16th-century painting 'Nossa Senhora da Misericórdia' (Our Lady of Mercy), attributed to Gregório Lopes, which underwent conservation and restoration work between 2014 and 2015.



Gastronomy and wine have come to occupy a prominent place in this territory of the Castles and Fortresses of Arrábida, materialised in an offer of quality local products from both the land and the sea.

Fish plays a very strong social, economic, and also tourist role.

Between May and October, 'Arte Xávega', a traditional seine fishing method with human traction, is carried out in Sesimbra within a tourist-cultural context. This activity takes place under an agreement between the Sesimbra City Council, the Instituto de Conservação da Natureza e das Florestas - Arrábida Natural Park, and the owners of the boats. During the summer, one of the fishing sessions is even conducted by tourists, allowing them to experience the art first hand.

The Livramento Market, awarded in 2015 as one of the best fish markets in the world by the newspaper *USA Today*, highlights the importance of the quality of fish and regional products in general.

Local products include cheese, homemade bread, honey, and local confectionery such as 'Tortas' from Azeitão, 'Fogaça' from Palmela, and 'Farinha Torrada' from Sesimbra, alongside an increasing diversity of high-quality and award-winning wines (including Moscatel de Setúbal) and liqueurs like Arrabidine and Pescador.

It is worth mentioning the offer promoted by the various wineries in the region, most of which are part of the Associação da Rota dos Vinhos da Península de Setúbal, an offer that goes beyond simple wine tasting; nowadays, there is a wide variety of activities available in wineries, vineyards, or even in unconventional facilities. This reflects the visitors' interest in activities that combine oenology, nature, gastronomy, and culture (grape stomping, vineyard hikes, wine cruises, among others).

The main tourist attractions are currently organised into a combined product offer, ranging from visiting monuments or dolphin watching to a wine-tasting experience with local products, either at a winery or on a cruise along the River Sado or in front of one of the cliffs along the beaches of the Arrábida coast.



As far as **handicrafts** are concerned, tiles stand out as a centuries-old tradition that has maintained hand-painting techniques since the 18th century. These tiles have adorned various buildings, churches, and palaces in the region, employing not only techniques of European origin but also drawing from Islamic and Chinese traditions existing as early as the 16th century. 'Azulejos de Azeitão' is one of the places where visitors can learn about this art and experiment with the painting technique.

Also within the Arrábida Natural Park, between Palmela and the village of Quinta do Anjo, we find Espaço Fortuna, Artes e Ofícios. Given the history and architecture of the complex, it invites visitors to an encounter with the tradition of clay, an ancient art that individualises the roots of a people; here, they can appreciate and buy handmade ceramic pieces, artistic and traditional tilework, handmade terracotta tiles, and traditional brickwork. It is also possible to take part in pottery and tile painting workshops.

In this context, there is a structured offer in terms of tourist entertainment in general, particularly related to maritime and nature tourism.

Also in terms of visitor/tourist services, the territory has several Tourist Information Offices geared towards welcoming visitors in various languages; there are 12 service centres distributed throughout the territory and managed by the municipalities and the Regional Tourism Authority of the Lisbon Region. The latter, in particular, provides a space entirely dedicated to discovering the various heritages, geography, and geology of Arrábida - *Ask Me Arrábida*.

In addition to several visitor service centres, the territory overall features improved support infrastructure such as accommodation and restaurants.



15.2.2

HOW MANY VISITORS COME TO THE PROPOSED BIOSPHERE RESERVE EACH YEAR?

Separating two distinct realities - tourism and **visitation**, we begin by analysing visitation. In 2015, the FCSH conducted a study on 'Monitoring the Carrying Capacity of Arrábida, providing important data on this matter, particularly associated with mountain biking, hiking activities, and beach users. The study estimated that there were approximately 300,000 beach users, 60,000 to 70,000 mountain bikers, and 30,000 to 45,000 hikers. Other activities such as trail running, geocaching, paragliding, caving, climbing, cycling, and cycle touring were not included in these estimates., Although most of these users come from the region, many visitors come from further afield and stay overnight in the area. So, according to PorData, the average number of overnight stays per 100 inhabitants in the three municipalities was 196 in 2001, rising to 282.3 in 2022.

In addition, the number of visits to tourist information offices shows the importance of visitation, with around 88,000 visits in 2019 (according to the municipalities of Sesimbra, Setúbal, Palmela, and the Regional Tourism Authority of the Lisbon Region).

In addition to these figures, there is a significant group of Arrábida users, particularly linked to touring (trips, usually by car, with the aim of exploring and enjoying the scenic beauty), which cannot be quantified.

With regard to **tourism**, the following table provides an overview of the size and weight of tourism in Arrábida. Evaluated from both a demand and supply perspective (2018-2022).

TERRITORIES	2018	2020	2022
PORTUGAL	67.662.103	25.798.299	69.694.791
LISBON	17.516.975	5.254.354	17.917.731
ARRÁBIDA CENTRALITY	614.024	333.750	682.341

Table 15.2.2-1 - Overnight stays (no.) in Accommodation Establishments (demand). Source: Statistics Portugal. PORDATA, March 2024

The table shows how Arrábida's tourism dimension fits within the tourism dimension of the region in which it is located (Lisbon Region) and with the tourism dimension of the country as a whole. The analysis of the table reveals two main evidences - first, the relatively low weight of Arrábida both within the context of the Region (Arrábida accounts for only 3.6% of the region's tourism) and within the context of the country (around 1.0%). The second evidence, despite the first, is the recent growth in tourism in Arrábida. Between 2018 and 2022 (despite the covid-19 pandemic affecting the country between 2019 and 2020), Arrábida grew by approximately 10%, with an increase, in absolute terms, of around 68,000 overnight stays in accommodation establishments (including Hotels, Rural Tourism, and Local Accommodation).

As can be seen in the table below, in 2020 the number of beds available in tourist accommodation was 4,216 in Arrábida, a figure 4.98% lower than in 2019 (4,437). It can also be seen that the municipality of Setúbal (2,334) has the highest number of beds, followed by Sesimbra and Palmela (both 1,821).

TERRITORIES	2018	2019	2020
PORTUGAL	423.152	443.157	344.757
LISBON (NUT II AML)	84.184	92.174	60.047
ARRÁBIDA CENTRALITY	4.181	4.437	4.216

Table 15.2.2-2 - Accommodation Capacity (no.) in Accommodation Establishments (supply) Source: Statistics Portugal. PORDATA, March 2024

The figures also show that the weight of the Arrábida Centrality within the AML remained on a downward trend until 2019, with an average of around 4% of overnight stays and number of guests. This figure increased in 2020 to over 6%. On the supply side, the situation remains unchanged, with an average of 6% of the total number of beds in the Lisbon Region, increasing only in 2020 to 7%.

By relating the number of guests to the number of overnight stays, it is possible to determine that between 2011 and 2020, the average length of stay in the Lisbon Metropolitan Area was 2.3 nights, a figure that remained more or less constant throughout the decade. Regarding Arrábida's Centrality, the average length of stay is 2 nights, with an upward trend since 2011 when this figure was 1.8 nights.

In February 2022, according to data from the National Registry of Tourist Entertainment Agents, there were

296 tourist entertainment companies and/or maritime tourist operators distributed across the three Arrábida municipalities - Setúbal, Palmela, and Sesimbra. With regard to the number and specialisation in nature tourism related to Arrábida, it is noted that tourist entertainment companies in the region play a central role in selling tourist 'experiences' linked to the values of Arrábida. Considering only the 88 companies recognised as Nature Tourism businesses, a survey of the activities offered by these companies was conducted, cross-referencing the information available in the commercial registry, on their websites, and social media (Table below).

Activity	Nº	%	Activity	Nº	%
Boat tours/rentals	34	18%	Coasteering	6	3%
Dolphin watching	19	10%	Bicycle tours	6	3%
Hiking tours	16	8%	Horseback riding tours	6	3%
Stand up paddle (SUP)	16	8%	Climbing and rappelling	5	3%
Kayaking	15	8%	Visits to wineries	5	3%
Sport fishing	10	5%	Birdwatching	5	3%
Scuba diving	10	5%	Adventure circuits	3	2%
Snorkeling	9	5%	Surf/Kitesurf/Widsurf	2	1%
Thematic tours/routes	9	5%	Speleology	2	1%
Events	7	4%	Photography/cinema settings	2	1%
Jipes TT	6	3%	Tree climbing	1	1%

Table 15.2.2-3 - Activities carried out by tourist entertainment companies in Arrábida in 2022

The association of products with territories is noticeable despite the generalisation. For example, Setúbal stands out for dolphin watching and stand up paddle; Sesimbra offers scuba diving and surfing/kitesurfing/windsurfing, which are not available in Setúbal; and Palmela offers land-based products such as hiking.

It is worth highlighting the growing number of miscellaneous product offers, which combine various tourism products with each other and with experiences, such as yoga, oyster tasting, onboard fish stews, or wine tasting.

In terms of nature tourism offers, there is not only a significant number of companies in Arrábida (close to three hundred), but also a significant number of those linked to outdoor, nature, and landscape activity 'experiences'. The remaining tourist entertainment companies are maritime tourism companies with a direct relationship with the River Sado and the observation of the resident community of bottlenose dolphins. In other words, always associated with the values of the Arrábida Biosphere Reserve.

The following table adds the weight, in Arrábida, of all the companies in the various sub-sectors (accommodation, catering, bars, cafés) that make up the tourist 'experience'. This summary reveals a limited 'presence' of the sector in the regional economy, but one that is adapted to the set of constraints and specificities that characterise Arrábida.



In 2019, the business fabric of the 'Accommodation, Catering, and Similar Services' sector consisted of 2,441 companies, which had a total turnover of around EUR 218 million (PORDATA, 2021).

In Arrábida, there is a pondered and progressive increase in the size and significance of tourism.

The years 2020 and 2021 were deeply affected by the effects of the pandemic (COVID-19) and the measures taken to mitigate it, leading to abrupt and very significant declines in tourism occupancy at national level. In Portugal, tourist occupancy fell to just over a third during 2020 and experienced a slight recovery in 2021. The Lisbon region and the surrounding area of the Biosphere Reserve were not immune to this downturn.

Come 2023, after the pandemic, there will certainly be a readjustment and reconfiguration of some of the business fabric aimed at tourism, accommodation, and catering, as a result of the demands caused by the lockdown situation and other social and logistic constraints. However, the situation is tending towards normality and recovery, resuming the path that had been followed until 2019.



15.2.3

HOW ARE TOURISM ACTIVITIES CURRENTLY MANAGED?

Tourist activity, from the visitor's perspective, is managed locally by the three municipalities that make up the Arrábida, through service, reception, and information centres.

In general, the promotion of the tourist offer - resources in general, activities with tourist potential, products developed by tourist entertainment companies - is distinctly managed by the municipalities that make up the Arrábida region. There are clear strategic development objectives based on promoting the territory and its associated brands (*'Palmela Conquista' (Palmela Conquers)*, *'Sesimbra é Peixe' (Sesimbra is Fish)*, *'Setúbal é um Mundo' (Sesimbra is a World)*).

On the other hand, there is a persistent encouragement for the pursuit and creation of distinctive tourism products among the various companies operating in the territory, with which there is a strong, close relationship. In this context, the role played by the Associação da Rota dos Vinhos da Península de Setúbal and Setúbal Bay also stands out. These are organisations dedicated to promoting tourism in general and wine tourism in particular, with the aim of organising a distinctive tourism offer.

In line with the 2027 Tourism Strategy (RCM no. 134/2017, of 27 September), which highlights Nature as a distinctive asset, the ERT-RL and the Strategic Plans for Tourism in the Lisbon Region 2014-2019 and 2020-2024, adopt the concept of Arrábida Centrality/Hub, aware of the specific tourist potential of each territory, establishing it as a 'developing hub'. In short, Arrábida should focus on developing nature tourism as a key asset and lever for its sun and sea vocation.

Within this framework, Marketing and Sales Plans were developed, offering opportunities for co-financing and support for priority tourism products in the Arrábida Centrality (nature tourism, wine tourism, nautical tourism), developed by groups of companies or individual enterprises.

Specifically concerning Nature Tourism, it is worth mentioning the Registo Nacional de Turismo (RNT), which, in response to the Law on Tourism (Decree-Law no. 191/2009, of 17 August), seeks to centralise and provide information for consultation regarding tourist enterprises and companies operating in the country.

The completion and updating of the RNAAT⁴⁵ is the responsibility of entertainment companies, travel agencies, and tourist enterprises. Their recognition as Nature Tourism is a 'seal' of good environmental practice, which implies a code of conduct to which these organisations undertake to adhere to, conducted in coordination with the ICNF. Given that the Arrábida Natural Park is a classified area, the various tourist activities are also governed by the provisions of the respective management plan (POPNA), approved by RCM no. 141/2005, of 23 August.

We therefore highlight the following framework legislation:

- **NATURE TOURISM**

- **Resolution of the Council of Ministers no. 51/2015**, approving the new National Nature Tourism Programme.
- **Decree-Law no. 242/2015**, which makes the first amendment to Decree-Law no. 142/2008, of 24 July, approving the legal framework for nature conservation and biodiversity.

TOURIST ENTERTAINMENT

- **Decree-Law no. 186/2015**, which establishes amendments to the legal framework for the installation, operation, and functioning of tourist enterprises, as well as to the legislation on the conditions for access to and exercise of the activity of tourist entertainment companies and maritime-tourism operators.
- **Ordinance no. 651/2009**, which sets out the Code of Conduct to be adopted by tourist entertainment companies and maritime-tourism operators engaged in activities recognised as nature tourism, and approves the logo that identifies them.

MARITIME-TOURISM ACTIVITIES

- **Decree-Law no. 24/2013, of 20 March**, which establishes the legal framework applicable to recreational diving throughout Portugal, in accordance with

⁴⁵ www.europeanbestdestinations.com

Decree-Law no. 92/2010, of 26 July, which transposed Directive no. 2006/123/EC, of the European Parliament and of the Council, of 12 December, on services in the internal market, with Law no. 9/2009, of 4 March, which transposed Directive no. 2005/36/EC, of the European Parliament and of the Council, of 7 September, on the recognition of professional qualifications, and with Decree-Law no. 92/2011, of 27 July, which establishes the System for Regulating Access to Professions (SRAP).

- **Ordinance no. 342/2015, of 12 October**, which approves the fees and respective amounts to be charged by the Direcção-Geral de Recursos Naturais, Segurança e Serviços Marítimos (DGRM) for the provision of public services and the issuance of licences, certificates, and similar titles within the scope of the regulation, supervision, and inspection of the maritime-port and recreational boating sector.
- **Ordinance no. 14/2014, of 23 January**, which regulates recreational fishing.
- **Ordinance no. 6/2014, of 13 January**, which regulates recreational diving experiences.

15.2.4

INDICATE POSSIBLE POSITIVE AND/OR NEGATIVE IMPACTS OF TOURISM AT PRESENT OR FORESEEN AND HOW THEY WILL BE ASSESSED

The analysis in Chapter 15.2.2 shows Arrábida's low tourism weight within the tourism sector in the Lisbon Region (accounting for only 3.5 % of tourist demand measured by the overnight stays in accommodation establishments indicator), a reality associated with the territorial distribution of the accommodation offer, predominantly concentrated in the urban centres of Palmela, Sesimbra, and Setúbal. The territory of the Arrábida Biosphere Reserve will not have negative impacts resulting from tourism as long as its current, planned management and legal status are maintained.

Any potential negative impacts, albeit very limited and localised, could originate from visitation rather than tourism. Even these potential impacts are being managed in advance through regulation and control programmes for access to Arrábida, a prime example of which is the 'Arrábida sem Carros e em Segurança' (Arrábida without Cars and in Safety) programme and the establishment of properly identified pedestrian routes on the ground, ensuring responsible and orderly use.

The Arrábida Biosphere Reserve will promote local natural and cultural values, encouraging the creation of regional products and differentiated, quality services, attracting new audiences throughout the year, boosting trade and job creation, and hopefully having a positive impact on the local economy. The enhancement of local particularities, not only historical and cultural but also in terms of biogeodiversity, as well as the creation of thematic routes, will enable new discoveries of the territory, attracting more visitors to Arrábida.

In view of the above, the Action Plan aims to develop a sustainable visitation strategy for the reserve, within which it will monitor the impact of tourism on the natural and historical-cultural heritage, as well as developments in the territory.



15.2.5

HOW WILL THESE IMPACTS BE MANAGED, AND BY WHOM?

The impacts of visitation (not from tourism, which has significantly limited impacts) is currently managed through programmes run by City Councils with the clear aim of persuading visitors to use public transport and limit their access to Arrábida.

The regulations of the Arrábida Natural Park, managed by the ICNF, also provide a tool that applies across much of the Arrábida Biosphere Reserve, determining a level of land visitation and use compatible with a protected area.

It should also be noted that the municipalities of Palmela, Sesimbra, and Setúbal offer a range of tourist publications on Arrábida that inform and clarify the main values and resources of this territory, warning against irregular use. In addition, the Regional Tourism Authority of the Lisbon Region has published a tourist map dedicated to Arrábida.

In the marine environment, the above also applies at the regulatory level. Sustainable visitation and respect for values are shared concerns among the municipalities covered by the Biosphere Reserve, as well as other organisations, and is reflected in initiatives and clarifications undertaken by them (see example in footnote)⁴⁶.

Also noteworthy is the case of cetaceans, for which there is a code of conduct. It resulted from an initiative promoted by Sonae-Tróia in partnership with the ICNF⁴⁷, and aims to raise awareness among those navigating the river's waters about the uniqueness of the population of bottlenose dolphins that live there.

In short, managing the positive and negative impacts of tourism in the Reserve requires a focused approach and close collaboration with the various development promoters, local authorities, tourism agents, and local groups or associations. To achieve this, representatives will be involved in the Management and Coordination Structure of the Arrábida Biosphere Reserve, seeking to address and mitigate negative impacts and optimise positive ones for the sustainable development of the territory.

The Biosphere Reserve Action Plan outlined for the 2025-2035 period includes several measures that can be adjusted and even improved, if necessary, in the following years.

⁴⁶ <https://presspoint.pt/golfinhos-do-sado/>

⁴⁷ Clarification on dolphin watching visits on the Sado River - VisitSetubal

15.3

AGRICULTURAL (INCLUDING GRAZING) AND OTHER ACTIVITIES (INCLUDING TRADITIONAL AND CUSTOMARY)

15.3.1

DESCRIBE THE TYPE OF AGRICULTURAL (INCLUDING GRAZING) AND OTHER ACTIVITIES, AREA CONCERNED AND PEOPLE INVOLVED (INCLUDING MEN AND WOMEN)

Activities associated with the primary sector have a relevant historical significance in the area of the reserve and have been the reason for human occupation of this territory since the Palaeolithic era.

Small-scale family agriculture is a **traditional activity that, although on a reduced scale and showing a decline, has persisted through different historical periods. Rainfed and irrigated crops are currently dominant (covering 5.1% of the total area of the reserve, approximately 701.8 ha), followed by vineyards (occupying 4.02% of the total area, 551.4 ha), complex parcel mosaics (3.6%, 492.7 ha), and olive groves (3.3%, 457.1 ha). There are also orchards, with less significant areas.**

Practised using traditional or environmentally responsible methods that differentiate their production, family agriculture has been responding to a growing share of demand, which is more demanding in terms of food safety and sustainability. As a result, some agricultural products have gained notoriety among the local population and visitors, as is the case with the 'Camoesa' or 'Férrea' apple from Azóia and the 'Riscadinha' apple from Palmela.

Livestock farming, particularly sheep farming, is one of the region's most characteristic activities. Practised based on a silvopastoral system, it is a traditional activity and an identity factor for the region, being primarily focused on milk production. Due to its proven relevance in the manufacturing and distribution of the well-known Azeitão Cheese and other cheeses, it is now a sector of great economic and social importance for the region. Most of the production is now semi-industrialised, although it is still possible to find some artisanal production. The establishment of the **Demarcated Region of Azeitão Cheese**, centred in Arrábida and

covering the municipalities of Setúbal, Palmela, and Sesimbra, was a determining factor in the survival of this traditional activity.

The production and specificities of this product are closely related to the unique characteristics of the territory, being associated with environmental factors specific to the Arrábida massif, such as the climate and the limestone nature of the soil. On the other hand, this activity is fundamental for Arrábida's biodiversity, as it keeps agricultural soils in good condition, reducing the risk of erosion, producing raw materials for soil fertilisation, reducing the risk of fire, and ensuring breeds of high genetic value for the region.

Sheep grazing is currently predominant in an area of approximately 2.9% of the total area of the reserve, equivalent to around 395.7 ha. The livestock population in the region is around ten thousand animals, with the predominant breeds being Lacaune and Assaf. The grazing areas are distributed across Palmela - Quinta do Anjo; Cabanas, Palmela, and Poceirão; Setúbal - Azeitão and Gambia, Pontes and Alto da Guerra, and Sesimbra - Cape Espichel, Azoia, and Aiana.

Between 2017 and 2019, the production of Azeitão Cheese consistently exceeded 200 tons, showing a growing trend both in product quantity and in turnover. There was a slight decrease in 2020, possibly as a result of the pandemic. It is estimated that currently around a hundred people work directly in the cheese dairies, of which there are currently four active ones. The fifteen dairy farms employ around 80 people.





Viticulture, which has been practised since ancient times due to the appropriate soil and climate conditions, enables the **production of a variety of highly regarded** wines. The Setúbal region is recognised worldwide for its quality and is one of the most prominent viticulture regions in Portugal, with renowned wines that have won several awards. Its quality is due to the appropriate soil and climate conditions, which enable the production of a variety of wines from which the **Moscatel de Setúbal** variety stands out as an important emblem of the region.

Most of the vineyards are located in flat areas, except for those located in the Arrábida Mountain Range, which are low-leveled. Viticulture in the region has evolved considerably in recent years, enabling winegrowers to obtain higher-quality grapes, with economically viable, environmentally sustainable production, and wines with a unique quality/price ratio.

It is estimated that, in Arrábida, there are around 500 hectares of vineyards for the production of certified wine - DO Palmela, DO Setúbal, and Vinho Regional Península de Setúbal, with a production of around 40,000 hectolitres.

The proposed area is home to 11 companies registered with the Setúbal Peninsula Regional Viticulture and Wine Commission connected to the wine sector, which together account for approximately 80 wine brands/references. It is worth mentioning producer José Maria da Fonseca, a company that renewed its Fair'n Green sustainability certification in 2024.

The **Fair'n Green certification** allows winegrowing companies to measure and verify the achievement and progress of sustainability objectives, such as reducing energy consumption and CO₂ emissions, reducing water consumption, increasing biodiversity, and committing to social responsibility, among others. In the assessment process, companies are analysed on around 200 criteria, and after the annual audit, a continuous improvement plan is drawn up to assist producers on the path to holistic sustainability.

Also closely linked to this sector is another activity: **Wine Tourism**. In line with the national landscape, the Arrábida region has a valuable cultural heritage associated with wine, with a strong winemaking tradition that has been passed down from generation to generation. Known for its centuries-old tradition as a winegrowing region (demarcation of the Moscatel de Setúbal Region on 1 October 1908) and home to the Associação da Rota dos Vinhos da Península de Setúbal (Main Office of the Wine Route in the town of Palmela), the territory offers a diverse palette of wines, awards, and distinctions, promoted through a high-quality wine tourism offer.

There are 10 companies whose estates, wineries, and museums offer proposals ranging from wine tastings, oenogastronomic dinners, and visits to wineries, to more creative proposals such as thematic cruises on the River Sado or sports and leisure activities in the vineyards. From the visitor's perspective, the offer includes various programmes and routes for discovering vineyards and wines associated with other local products (Azeitão Cheese and 'Torta', 'Fogaça' from Palmela, 'Farinha Torrada' from Sesimbra), integrated into an annual calendar of events.

At the heart of the town of Palmela lies the Main Office of the Wine Route, a former winery converted into a wine tourism information point and booking centre. It also serves as a wine shop and sells traditional products such as regional cakes, honey, jams, sheep butter, and Azeitão Cheese.



Beekeeping is another significant activity in the region, playing a key role in broader agricultural endeavours beyond honey production and marketing. This is due to the essential role of bees in pollinating and fertilising entomophilous plants, such as fruit trees. The honey produced in the region, which has a velvety and highly distinctive flavour, is rightfully renowned for the rich floral diversity of the mountain range. The abundance of wild aromatic plants, such as rosemary *Rosmarinus officinalis*, myrtle *Myrtus communis*, rockrose *Cistus ladanifer*, lavender *Lavandula spp.*, thyme *Thymus vulgaris*, and gorse *Ulex densus*, among others, combined with the temperate nature of the winters, offer favourable conditions for beekeeping. As they are not subject to the use of pesticides, they ensure a high-quality product.

15.3.2

INDICATE THE POSSIBLE POSITIVE AND/OR NEGATIVE IMPACTS OF THESE ACTIVITIES ON BIOSPHERE RESERVE OBJECTIVES

Activities related to the primary sector, particularly agriculture and extensive livestock farming based on traditional, small-scale production methods, respecting and enhancing the landscape and biodiversity, and complying with high standards of conservation and sustainable management of natural resources, inevitably have **positive impacts** on the fulfilment of the Biosphere Reserve's objectives. Compliance with these premises, whether by habit or by force of law, leads us not to foresee significant negative impacts on the activities undertaken.

These activities, whether biological or organic, are crucial from the perspective of the sustainability of the territory and its people, not only ecologically but also in terms of the development of local economy. They contribute to the creation and promotion of local products and differentiated tourist services where traditional gastronomy and historical-cultural values stand out. It is also worth highlighting the importance in terms of protecting people, values, and heritage as a preventive agent in forest fire management (e.g., the role of livestock grazing in biomass control).

Systematic training and technical support for local producers will play a fundamental role in obtaining quality crops and promoting respect for and protection of our natural resources among the community at large.

Thus, these activities contribute to ensuring the harmonious balance of the territory and its natural values, namely the **Core Area**, and ensure a sustainable relationship between the environment and the human community.

15.3.3

WHICH INDICATORS ARE, OR WILL BE USED TO ASSESS THE STATE AND ITS TRENDS

The indicators used to assess the current situation and trends in agriculture and livestock farming are as follows:

- Utilised Agricultural Area by type of crop
- Family farming population
- Production of PDO Azeitão Cheese - farms supplying milk and production
- Livestock in agricultural production
- Wine production - total

15.3.4

WHAT ACTIONS ARE CURRENTLY UNDERTAKEN, AND WHICH MEASURES WILL BE APPLIED TO STRENGTHEN POSITIVE IMPACTS OR REDUCE NEGATIVE IMPACTS ON THE BIOSPHERE RESERVE OBJECTIVES?

The proposed area is covered by several land use planning and nature protection instruments - the Regional Spatial Planning Plan for the Lisbon Metropolitan Area, the Arrábida Natural Park Management Plan, the Municipal Master Plan for the municipalities of Palmela, Sesimbra, and Setúbal - which provide the rules for use and intervention in the territory, its planning and conservation, and resource management.

Keeping part of the active population in the primary sector, through more environmentally friendly production methods and a connection to the land and its resources, with an emphasis on training and support for sustainable production methods, ensures the transmission to future generations of culture, tradition, and passion for the Arrábida region. This is of paramount importance in achieving the proposed objectives for the Reserve.

The communities inhabiting the reserve area, through the municipalities and the associative structures that represent them, have been pursuing the implementation of good practices across various dimensions of agricultural and livestock activities in the territory. This determination and broad consensus is reflected in numerous projects and programmes aimed at nature conservation, the enhancement of traditional activities and local products and gastronomy, the promotion of cultural practices and expressions of identity, the use of soft transportation modes, and responsible and conscious enjoyment of the territory.

Several associations - AADS, ARCOLSA, AVIPE, ARVPS, ADREPES, APISET, Cooperativa União Novense, among others - have been making efforts to inform/train local producers, organising various initiatives throughout the year to promote their empowerment and local products themselves.

Within the scope of this application and as outlined in the Action Plan, we highlight the following actions from a general perspective: organising initiatives that contribute to revitalise and enhance local products, traditions, and heritage throughout the year; surveying local traditions (singing, dancing, harvesting, sowing, gastronomy, ethnobotany, legends); developing a campaign to promote Arrábida's identity values, among others.

15.4

OTHER TYPES OF ACTIVITIES POSITIVELY OR NEGATIVELY CONTRIBUTING TO LOCAL SUSTAINABLE DEVELOPMENT, INCLUDING THE IMPACT/INFLUENCE OF THE PROPOSED BIOSPHERE RESERVE OUTSIDE ITS BOUNDARIES

15.4.1

DESCRIBE THE TYPE OF ACTIVITIES, AREA CONCERNED AND PEOPLE INVOLVED (INCLUDING MEN AND WOMEN)

FISHING

Fishing is an ancient economic activity within the area covered by the proposed Reserve. Evidence found in caves indicates that fishing practices date back to the Palaeolithic, with the oldest hooks discovered in the territory dating to the Chalcolithic period. From the point of view of an actual fishing industry, the discovery of archaeological remains of cetariae from the Roman era is currently the oldest evidence indicating a significant fishing activity, likely associated with the export of fish products to Rome.

Today, fishing remains a highly important economic activity, as evidenced by the national significance of the ports of Setúbal and Sesimbra. The territory is home to a significant fishing community dedicated to artisanal sea fishing. Nearly half of this fleet operates with small wooden boats (known as 'aiolas') measuring less than 5 meters in length, primarily engaged in fishing with lines and hooks, targeting fish and cephalopods such as octopus, cuttlefish, and squid. The remaining fleet operates with boats up to 7 metres long, using gillnets to catch fish and traps primarily for octopus, which is the most commonly caught resource in the Park.

To analyse this activity, data provided by the Direcção-Geral de Recursos Naturais, Segurança e Serviços Marítimos (DGRM) regarding the fleet, licenses, sales, and fish catches were consulted. From analysing the information, it was concluded that since the approval of the POPNA, there has been a reduction in the fishing fleet licensed to operate in the PMLS: the number of boats decreased from 111 in 2006 to 67 in 2015, corresponding to boats registered in the port of Sesimbra with a total length of less than 7 metres. However, this decrease is offset by an increase in the volume and value of fish sold by that fleet, justifying the increase in the 'value' attributed to Marine Park licences.

However, it can also be seen that the number of licensed boats in the national fleet at the port of Sesimbra (regardless of whether or not they have a PMPLS licence) fell sharply between 2006 and 2020, decreasing by -34.2%, from 476 to 313 boats.

In terms of the quantity of fish traded in all fish markets and sales outlets in mainland Portugal, Sesimbra comes first with 29.9 thousand tonnes, and in terms of sales value it ranks second, with EUR 29.4 million, showing an increase of 4.5 million compared to the previous year (data from 2019).

It is worth noting the presence of two Producer Organisations operating in the proposed area, both aiming to enhance the value of sustainably and artisanally caught seafood products: **ARTESANALPESCA - Organização de Produtores de Pesca, CRL** and **SESIBAL - Cooperativa de Pesca de Setúbal, Sesimbra e Sines, CRL**. Established in 1986, these two cooperatives operate in two key areas - the way fish is caught, through artisanal fishing - and through fair trade, directly selling the fish caught by their associated fishermen.

The union and centralisation of their catches allows them to position themselves in the market, with a scale and security in defending shipowners and fishermen that would otherwise be difficult to achieve, shortening the marketing chain by eliminating intermediaries, consequently making it fairer, which also benefits consumers.

Forestry

Forestry plays an important role in land use planning, fire protection, and, of course, in the production of raw materials, food, and other products.

The presence of extensive forested areas results in the collection of **forest products** (e.g. timber, firewood, among others). Land occupation associated with this activity represents approximately 30% of the total area of the Reserve, including cork oak agroforestry: 0.98% (34.7 ha), stone pine agroforestry: 0.24% (33.4 ha), cork oak forests: 8.14% (1,115.5 ha), eucalyptus forests: 0.88% (121.0 ha), maritime pine forests: 5.77% (791.42 ha), stone pine forests: 13.79% (1,890.29 ha).

The number of forestry and logging companies based in the municipalities covered by the PNA increased from 63 to 124, between 2005 and 2022. This corresponds to a 96.8% increase, higher than the increase seen in the AML. In the PNA, an extensive area remains subject to forestry regime, totalling 1,654.6 ha.

Extractive and manufacturing industry

Another activity with very ancient references in the territory is the **extractive and manufacturing industry**. With the growth of the construction sector in the mid-20th century, underground raw materials began to be in greater demand, both in the region and in neighbouring regions. The most important materials extracted are limestone, sands, and clay, all primarily intended for the construction industry (in the case of clay, after prior transformation into bricks).

This activity is present in the **Transition Area**, representing a small area of the territory of around 128.38 ha, divided between the extraction area (40.54 ha) and the industrial transformation area (87.84 ha). Annual production from extraction and transformation in 2023 was 1,060,000 tonnes. These operations are regulated at both the national and local levels, integrated into land use planning instruments, and implementing the best techniques for the environmental framing and recovery of quarries. The region, whether part of the Reserve or its surroundings, benefits from employment.

The main company present in the territory, SECIL, has taken on an innovative role in the operation of the production process, as well as in the landscape recovery and reforestation of the areas it exploits, earning several recognitions in the area of sustainability. It currently supports a total of 26 direct jobs and 49 indirect jobs in the areas of extraction, transformation, and services.

In the two currently active operations - located in Santana (Sesimbra) and Calhariz (Pedreiras) - limestones are quarried in large and medium-sized quarries for the production of aggregates (crushed stone) primarily intended for civil construction and public works, purposes for which they show great technical suitability and are indispensable, especially for the aforementioned industries. These limestone quarries have been responsible for a significant portion of the production in the Lisbon and Tagus Valley region as well as for national limestone production, reflecting the importance of this activity. Some of these quarries have already been decommissioned, and some of them are in the recovery phase under the conversion plan to which they are subject.

15.4.2

INDICATE THE POSSIBLE POSITIVE AND/OR NEGATIVE IMPACTS OF THESE ACTIVITIES ON BIOSPHERE RESERVE OBJECTIVES

Fishing is duly regulated, and as such, no negative impacts are expected from this activity on the fulfilment of the objectives of the proposed Biosphere Reserve. This activity is not permitted in the marine Core Area, as it functions as a no-take zone leading to larger and larger stocks in the surrounding area. However, fishing is regulated in adjacent sea areas.

On the other hand, fishing leads to **positive impacts**, assuming great social and economic relevance for the territory, both in terms of the number of workers involved and the wealth created, which has been growing in recent years.

In terms of **forestry**, it should be noted that the territory is mostly covered by the PNA, with specific regulations, and various values covered by other natural protection regimes, such as the National Ecological Reserve.

Regarding the **extractive industry**, a negative consequence is its impact on the landscape. However, its expansion (in terms of area) is prohibited by law, indicating that its impact will not lead to negative developments.

All mines currently in operation have mining plans aimed at minimising environmental and landscape impacts and ensuring their future recovery through landscape recovery plans.

15.4.3

WHICH INDICATORS ARE, OR WILL BE USED TO ASSESS THE STATE AND ITS TRENDS

The indicators to be used in assessing the current situation of fishing, forestry, and the extractive industry are as follows:

- Licensed boats in the national fleet by port
- Fish catches by port
- Licensed fleet for the Marine Park
- Licences by gear group for the fleet licensed for the Marine Park
- Area occupied by forests
- Area subject to forestry regime
- Licensed quarries
- Consolidated extraction area by substance
- Recovered quarry area

15.4.4

WHAT ACTIONS ARE CURRENTLY UNDERTAKEN, AND WHICH MEASURES WILL BE APPLIED TO STRENGTHEN POSITIVE IMPACTS OR REDUCE NEGATIVE IMPACTS ON THE BIOSPHERE RESERVE OBJECTIVES?

The licensing regime and mandatory activity requirements ensure mechanisms to encourage the use of best practices, increasing efficiency, and minimising negative impacts.

Among these projects/procedures, the following stand out:

- The production of Azeitão Cheese with Protected Designation of Origin (PDO).
- The promotion of the Alambre Environmental Park, education and awareness-raising among the population for nature conservation and biodiversity, as well as habitat management and implementation of measures to prevent forest fires in this environmental park.
- The POPNA, through its regulations and mapping, sets out a model and a set of rules to organise the activities that take place in the territory as well as its sustainable use.
- The protection regimes laid down in the POPNA establish a set of rules aimed at reconciling different uses. Monitoring and enforcement actions contribute to assessing compliance with the rules on the ground. However, it is noteworthy that recreational and tourist activities have been increasing significantly, and in certain situations they are practised in a disorderly manner, violating the rules established in the POPNA.
- In the marine area, it is worth highlighting the Biomares project and some of its initiatives, such as the installation of stations for boats belonging to Park users.
- Dias Verdes' (Green Days) is a cleaning campaign carried out in various locations within the PNA before the start of the bathing season.
- The 'Nossa Arrábida Limpa 2011' (Our Clean Arrábida 2021) initiative.

With regard to other forestry practices, the production of local native forest species is currently being developed in two nurseries (associated with Secil and FCT) to be used in the region.

15.5

BENEFITS OF ECONOMIC ACTIVITIES TO LOCAL PEOPLE

15.5.1

FOR THE ACTIVITIES DESCRIBED ABOVE, WHAT INCOME OR BENEFITS DO LOCAL COMMUNITIES (INCLUDING MEN AND WOMEN) DERIVE DIRECTLY FROM THE SITE PROPOSED AS A BIOSPHERE RESERVE AND HOW?

The geographical, environmental, historical, and cultural characteristics of the region, particularly the area within the proposed Reserve, as well as its surroundings, provide a vast and diversified array of resources for the economic and social development of the region. They also enhance its capacity to attract new activities and businesses, residents, workers, and visitors. Those resources are essentially related to the presence of water in the estuarine, marine, and aquifer spaces; the Arrábida Natural Park, the Sado Estuary Natural Reserve, and other areas of special environmental and landscape interest such as riverfronts and beaches; the agroforestry area; historical and cultural heritage; the road, rail, and river transport networks.

These conditions foster the development of economic activities associated with the use and management of natural resources, such as the 'blue economy' and tourism, thereby enabling the guidance and reinforcement of projects aimed at improving the quality of life of populations and ensuring environmental sustainability. They also generate significant impulses, such as the marketing of regional products, environmentally sustainable tourism, and balanced agriculture that protects the environment.

All the activities mentioned above provide economic income to the population residing in the Biosphere Reserve, resulting in job creation, the implementation of new small and medium-sized businesses, and the promotion of entrepreneurship and innovation. From a cross-cutting perspective, it can be seen that in 2019, the business fabric of the 'Accommodation, Catering and Similar Services' sector consisted of more than 2,400 companies, which managed a total turnover of around EUR 218 million (see Chapter 15.2.2).

The following are some of the most important activities - agriculture, viticulture, livestock farming, and fishing:

Agriculture

Agriculture, developed throughout the proposed transition area and in some areas of the proposed buffer zone, in its various expressions, constitutes a significant asset for the region. The local population benefits from the presence of a regional production capacity, minimising transportation costs and improving the quality of agricultural and livestock products.

Viticulture

Viticulture and wine production benefit the region economically and culturally, both by attracting new audiences and by spreading the region's name. Today, wine production in the Setúbal region is recognised worldwide for its quality and it is one of the most prominent viticulture regions in Portugal, with renowned wines that have won several awards.

Viticulture in the Setúbal Peninsula is distributed across virtually all the municipalities that compose it. However, with a total area of around 9,500 ha, the municipality of Palmela has the largest viticulture area in the region, followed by Montijo, Setúbal, and Sesimbra. It is estimated that there are around 500 hectares of vineyards for the production of certified wine - DO Palmela, DO Setúbal, and Vinho Regional Península de Setúbal, 400 hectares of which within the Natural Park, with a production of around 40,000 hectolitres. The region currently produces around 503,470 hectolitres, according to the IVV.

The appropriate soil and climate conditions allow for the production of a variety of wines. Most of the vineyards are located in flat areas, except for those located in the Arrábida Mountain Range, which are low-leveled. Viticulture in the region has evolved considerably in recent years, resulting in higher-quality grapes, with economically viable, environmentally sustainable production, and wines with a unique quality/price ratio.

Within the Arrábida Natural Park, there are around 11 companies registered with the CVRPS connected to the wine sector, which collectively offer more than 76 wine brands/references.

ECONOMIC AGENT	BRANDS	WINE TOURISM
José Maria da Fonseca	30	X
Bacalhôa– Vinhos de Portugal, S.A.	16	X
Venâncio da Costa Lima	18	X
João Gomes Serra	3	X
Jorge Manuel Matos Francisco	2	-
António Francisco Avillez	1	-
Sociedade Agrícola Vale Silva	0	-
Rogério Tavares	0	-
Casa Agrícola Ruano Pinto	2	-
Quinta do Piloto	2	X
Xavier Santana	2	X

Table 15.5.1-1 - Companies registered with the Setúbal Peninsula Regional Vine and Wine Commission. Source: CVRPS, 11 July 2016

Some data provided by the Instituto da Vinha e do Vinho and the Comissão Vitivinícola Regional da Península de Setúbal (Source: Harvest and Production Declaration for the 2015/2016 Campaign) allow us to estimate that the vineyard area within the Arrábida Natural Park is between 400 ha and 500 ha. The estimated production within the Arrábida Natural Park was around 40,000 hectolitres in 2015/2016, surpassing the regional average.

Wine production in the Arrábida area is closely linked to tourism, which is namely reflected in the existence of a 'Wine Route'. In fact, out of all the companies based here, 10 are perfectly qualified to receive visitors. In 2015, the Setúbal Peninsula Wine Route organised 67 wine tourism activities, involving 4,341 participants.

The Strategic Plan for Tourism in the Lisbon Region 2020 - 2024 designated Arrábida as one of the region's five centres of interest and the Setúbal Peninsula Wine Route as a resource for developing the wine tourism product.

Livestock farming

Sheep farming is one of the region's most characteristic activities, supporting the production of PDO Azeitão Cheese (with its distinctive and highly appreciated flavour) made from sheep's milk, particularly in Palmela, Sesimbra, and Azeitão. Most of the production is now semi-industrialised, although it is still possible to find some artisanal production, particularly of Azóia Cheese. The establishment of the Azeitão Cheese Demarcated Region, covering the municipalities of Setúbal, Palmela, and Sesimbra, was a determining factor in the survival of this traditional activity.



Demonstration of sheep milking by Sabino Rodrigues, producer of fresh cheese and Azóia cheese.



PDO Azeitão Cheese

YEARS	KG	APPROXIMATE VALUE
2011	144 875	2 897 500 €
2012	137 000	2 740 000 €
2013	134 438	2 688 760 €
2014	155 500	3 110 000 €
2015	146 250	2 925 000 €
2016	165 000	3 300 000 €
2017	217 662	4 353 240 €
2018	233 623	4 672 460 €
2019	242 124	4 842 480 €
2020	192 510	3 264 970 €

Tale 15.5.1-2 - Quantities of PDO Azeitão Cheese produced between 2011 and 2020. Source: ARCOLSA, March 2024

It is estimated that in 2020, in the post-pandemic period, around 60 people were directly employed in the cheese dairies, with 4 active cheese dairies (Vitor Fernandes; Queijaria Simões; JD Setúbal, and Queijaria da São) and around 20 people were employed in the 12 milk production farms.

Fishing

Fishing, perfectly integrated into a strategy of nature conservation and economic revitalisation and development, results not only in the economic empowerment of the populations directly involved, but also in the creation of a fully developed value chain within the Reserve and its surrounding areas. Moreover, fishing itself enhances hospitality and catering activities while integrating the culture and traditions of the populations, particularly at the two extremes of the Reserve, the town of Sesimbra and the city of Setúbal.

Fishing remains an important activity in the primary sector, especially in Sesimbra, associated with local artisanal, coastal, and purse seine fishing. The main species landed in Sesimbra and Setúbal are sardines, mackerel, and horse mackerel. The boats from Setúbal, due to their different characteristics (smaller size, operating in shallower waters and closer to the coast), also engage in different fishing practices.

The district of Setúbal is very important for Docapesca's activity, both in terms of the volume and value of fish traded in its fish markets. In 2018, the fish markets and outlets in the district accounted for 32,000 tonnes and EUR 46.5 million, or around 32% of the volume and 23% of the total value traded in the fish markets throughout mainland Portugal.

Nationally, in 2018, the Sesimbra fish market ranked first in terms of the quantity of fish traded at all the fish markets and sales outlets in mainland Portugal, with almost 21,200 tonnes, 4.6 tonnes more than in 2017.

In terms of sales value, the Sesimbra fish market ranked third, with EUR 24.8 million, surpassed by Peniche (with EUR 34 million) and Matosinhos (with EUR 26.8 million).

The data released by the Ministry of the Sea indicate that the fish traded at the Sesimbra fish market represented approximately 10.3% of the national total in quantitative terms and 12.2% in terms of sales value, highlighting its importance in this sector.

Professor Luiz Saldanha Marine Park

Developments in fishing licences. With the approval of the POPNA, there was a reduction in the fishing fleet licensed to operate in the Marine Park. According to the information available, the number of boats decreased from 111 in 2006 to 67 in 2015, (corresponding to boats registered in the port of Sesimbra with a total length of less than 7 metres). However, it can also be seen that the number of licensed boats in the national fleet at the port of Sesimbra (regardless of whether or not they have a Professor Luiz Saldanha Marine Park licence) fell sharply between 2006 and 2014, by -24.4%.

The length limitation for vessels licensed to operate in the Marine Park means that the gross tonnage of these boats, around 0.9 GT per boat in 2015, is significantly lower when compared to the gross tonnage of fishing boats licensed in the port of Sesimbra - 4.6 GT per boat in 2014. However, the developments occurred between 2006 and 2015 showed a slight increase in the average gross tonnage of boats licensed to operate in the Marine Park, indicating that the boats that lost their license during that period were generally smaller in size.

An analysis of the developments occurred in fishing gear licences in the Marine Park for the same period (2006-2015) shows that although there was a reduction in the overall number of licenses (-4.4%), this reduction was much smaller compared to the decrease in the number of boats. In general, all fishing gear groups present in the Marine Park in 2006 saw a reduction in the number of licences until 2015, except for traps, which gained one more licence during that period, totalling 36 licences in 2015.

This fishing gear group (traps) is still surpassed in terms of licences by line fishing which, despite experiencing a slight decrease (of 6 licences) between 2006 and 2015, had a total of 245 licences for the Marine Park fleet in 2015.

Volume and species caught. The final evaluation report of the POPNA⁴⁸ (2015), allowed assessing the impact of local fishing protection measures on changes in fishing volumes and revenues with the implementation of the Luiz Saldanha Marine Park, by analysing and processing data on catch volumes and revenues.

Data from 2004 to 2010 were analysed and organised as follows: before the POPNA - 2004; year 1 - between September 2006 and August 2007; year 2 - between September 2007 and August 2008; year 3 - between September 2008 and August 2009; after the POPNA - between September 2009 and August 2010 - after the POPNA.

⁴⁸ Final Evaluation Report of the POPNA (2016), available at: <https://www.icnf.pt/conservacao/ordenamentoogestao/planosdeordenamentodeareasprotegidas>

With regard to landings, five species were excluded from the analysis: Bogue (*Boops boops*), European Green Crab (*Carcinus maenas*), Horse Mackerel (*Trachurus trachurus*), Blue Jack Mackerel (*Trachurus picturatus*), and Atlantic Chub Mackerel (*Scomber colias*), due to inconsistencies in landing data.

Regarding official landings, the study reveals that the total landings from boats operating in the Marine Park increased over time, both in weight and overall revenue, mentioning that the total Revenue per Unit Effort (RPUE), estimated using landing data, increased over time.

It is also mentioned that, although there has been some variability in the relative importance of the landed species, the average monthly landings per boat (in biomass) generally mirrored the total landings pattern, increasing over the study period. Approximately 160 taxa were landed, but 95% of the total landings (in biomass) consisted of only 10 taxa, with the common octopus *Octopus vulgaris* being the most landed species in all periods, accounting for between 71.7% (Year 1 - between September 2006 and August 2007) and 86.5% (Year 3 - between September 2008 and August 2009) of total landings.

The total catches of species targeted by trammel nets (common cuttlefish *Sepia officinalis*, skates *Raja* spp., and soles *Solea* spp.) generally decreased between 2004 and 2010.

The common octopus (*O. vulgaris*) was the most valuable species in terms of total revenue, followed by the gilt-head bream (*Sparus aurata*), the sole (*Solea* spp.) and the cuttlefish (*S. officinalis*), respectively.

Also noteworthy is the increase in common octopus (*O. vulgaris*) landings, alongside the maintenance of sole (*Solea* spp.) and cuttlefish (*S. officinalis*) landings.).

The article also analyses on-board catches and concludes that despite the short duration of the on-board sampling, there are high volumes of unreported catches.

The most important commercial species showed the greatest increase in density after the establishment of the Marine Park, with significantly higher abundances and proportionally larger individuals within the protected marine area. These findings are reinforced by a growing increase in landings that are consistent with the reserve effect.

The three main fisheries management problems were also identified from the respondents' perspective. The foremost issue arises from the prevalence of certain fishing methods within the Marine Park area. The second most significant problem mentioned was illegal fishing, with an emphasis on external poachers operating outside the Marine Park. Lastly, the third problem identified was the excessive presence of boats within the Marine Park.

	Themes/Indicators	Reference period	Developments during the POPNA implementation period		Territorial unit of reference
			MI*	MF*	
B	Fishing				
B1	Licensed fleet for the Marine Park	2006-2015			Professor Luiz Saldanha Marine Park
	- No. of boats		111	67 (-39,6%)	
	- GT		82	60 (-27,3%)	
	- GT/boats		0,7	0,9	
	Licensed boats in the national fleet by port	2006-2014	476	360 (-24,4%)	Port of Sesimbra
			3.202	2.142 (-33,1%)	
	- No. of boats		6,7	6,0	Lisbon Metropolitan Area
	- GT		914	734 (-19,7%)	
	- GT/boat		5.090	3.379(-33,6%)	
		5,6	4,6		
B2	Licences by gear group for the fleet licensed for the Marine Park (no.)	2006-2015			Professor Luiz Saldanha Marine Park
	Catch		1		
	Trawling			3	
	Traps		35	36	
	One-panel Gillnetting		21	19	
	Line Fishing		251	245	
	Gillnet		30	20	
	- Total		338	323 (-4,4%)	
B3	Fish sales by the fleet licensed for the Marine Park	2006-2015			Professor Luiz Saldanha Marine Park
	- kg		324.571	515.999 (59,0%)	
	- €		986.011	1.309.078 (32,8%)	
	Fish catch by port	2006-2014	13.846	21.716 (56,8%)	Port of Sesimbra
	tonnes		18.805	24.168 (28,5%)	Lisbon Metropolitan Area
	€ thousand		28.241	33.172 (17,5%)	Port of Sesimbra
			40.679	39.530(-2,8%)	Lisbon Metropolitan Area

Table 15.5.1-3 - Developments in Activities - Fishing

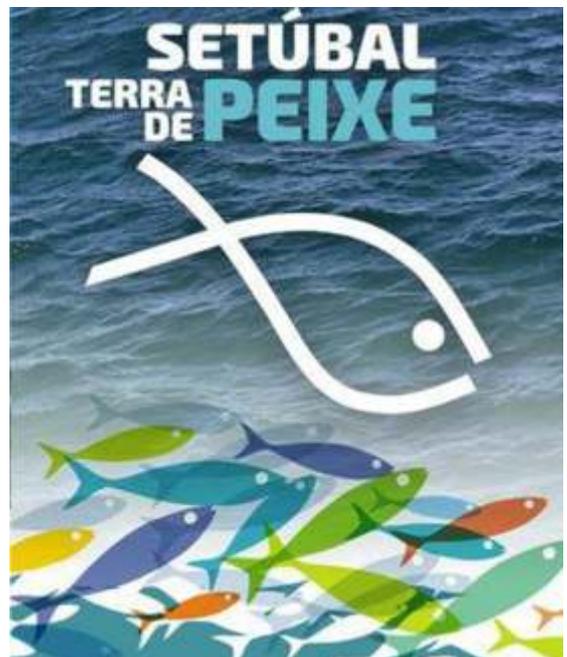
*MI - Initial Moment and MF - Final Moment, as identified in the Reference Period column. Source: Evaluation of the POPNA.

In Sesimbra, it is worth mentioning the '**Cabaz do Peixe**' (Fish Basket) project, which, as a short distribution circuit aims to promote fair trade and increase the income of artisanal fishermen.



Setúbal has been developing the '**Setúbal - Terra de Peixe**' (Setúbal - Land of Fish) project (Setúbal's fish is among the best). This is a tourist promotion brand that involves a wide range of coordinated actions to promote local gastronomy. The most visible aspect of this initiative is the gastronomic festivals dedicated to various fish species important to the Setúbal fishing community, held throughout the year.

In addition to festivals, this event, organised by the Setúbal Municipal Council, includes activities in local schools, a seminar dedicated to the theme of fishing and fish, and the creation of a Fish Route in the municipality of Setúbal.



The Livramento fish market is considered one of the most famous fish markets in the world. The walls of Livramento are covered in 5,700 tiles depicting everyday life scenes, 'such as fishing or agriculture'.



Other activities

There are also beekeeping activities in the Arrábida Mountain Range, albeit with limited economic significance. Other activities are also present, such as the production of fruit and vegetables, bread, and traditional confectionery: 'Tortas' from Azeitão, 'Amores' from Azeitão, 'Queijinho de Ovos', 'Ésses', 'Mimo do Cego', 'Mémés', 'Fogaças' from Palmela, and 'Farinha Torrada'.



Lastly, it is worth mentioning that there are other economic sectors in Arrábida that have developed quite positively, particularly the artisanal production of ceramic materials and tiles.



15.5.2

WHAT INDICATORS ARE USED TO MEASURE SUCH INCOME AND OTHER BENEFITS?

The indicators to be used in assessing the benefits of economic activities for the local population are as follows:

- Companies, employees, and business turnover by economic activity
- Unemployment rate
- Purchasing power per capita

15.6

SPIRITUAL AND CULTURAL VALUES AND CUSTOMARY PRACTICES

15.6.1

DESCRIBE ANY CULTURAL AND SPIRITUAL VALUES AND CUSTOMARY PRACTICES, INCLUDING LANGUAGES, RITUALS, AND TRADITIONAL LIVELIHOODS

The territory included in this application is clearly defined in terms of its unique characteristics compared to the rest of the region. The cultural and spiritual values and customary practices reflect the imposing influence of Arrábida, and the adaptation of communities to its presence is the result of the communion between humans and the land they inhabit.

The Biosphere Reserve preserves a significant set of traditions and ritual practices that the community itself keeps alive and thriving. In recent years, there has been a rejuvenation of some of these moments of collective celebration.

Arrábida is the stage for various religious manifestations. The importance and uniqueness of religious architecture are reflected, among other examples, in the Arrábida Convent, the Espichel Sanctuary, and the various chapels and hermitages that dot the landscape of this region, together with a wealth of ritual manifestations, where the expressiveness of worship is evident, the most notable being Our Lady of the Cape and Our Lady of Arrábida.

The **Core Area** also includes the convent of Saint Mary of Arrábida, classified as a Property of Public Interest and the most emblematic of all the religious heritage in the Arrábida region. The convent was built between 1539 and 1542 on the initiative of João de Lencastre, who gave it to Friar Martinho de Santa Maria, a Castilian of the Order of Saint Francis.

Arrábida manifests itself as an organic, interdependent unit in which natural and cultural heritage, both tangible and intangible, are inextricably linked. The cultural manifestations associated with Arrábida - popular religiousness as well as other expressions linked to agriculture, fishing, pastoralism, and gastronomy - constitute a living and experienced heritage, as they promote self-knowledge, facilitate communication and learning, embody and give meaning to a long cultural tradition. It is an active, dynamic, used, and exercised inheritance - A Living Memory. This really is a magical, unique place. A place of contrasts, of sea and land, of sky and mountains, of the combined works of Human and Nature.

The cultural manifestations associated with Arrábida – popular religiousness, as well as other expressions linked to agriculture, fishing, pastoralism, and gastronomy, including

the notable Azeitão cheese, Moscatel wine, and traditional shipbuilding – constitute an exceptional heritage, which embodies and gives meaning to a long cultural tradition.

Today, as a result of centuries of human interaction with this territory, the mountain range expresses the passing of time, with enduring marks that have always identified it: the Mountain Range as a place of nature conservation, soil cultivation, and worship.

The Arrábida Mountain Range is thus a place of protection, first through the 'couto' system, then through forest regulations, and now through the Natural Park designation. With 12,653 hectares of terrestrial area and around 5,000 hectares of marine area, it encompasses rare geological features and unique fauna and flora. But it is also a place of culture, expressed even today by the importance of the vineyard landscape. Vineyards and wine are one of the region's main assets, etching into the landscape and people's lives.

There are hundreds of hectares of vineyard in the region, forming a mosaic of different grape varieties, where Castelão is predominant. Even today, the **Harvest Festivals** celebrate the prosperity of the region's wine and the importance that vineyards and wine have for the people who live and work in this region. The renowned Moscatel, with its unique aromas, is produced here.

This soil, where flocks of sheep graze, is home to the cardoon (*Cynara cardunculus L.*), which gives the milk its unique characteristics, making the cheese equally unique. The Azeitão Cheese is a renowned national product, with Protected Designation of Origin (PDO).

One of Arrábida's main characteristics is the strong personality of its landscape, serving as a boundary, a frontier *in the land at the end of the world*, a sacred backdrop favourable to contemplation. Arrábida's specificity emerges from its isolation, dictated by its geographic and climatic conditions, embodying the spirit of the place as a geographic, human, and spiritual frontier. In this territory, there is an overlap of worships and legends, forming a religious and symbolic stratigraphy that successively accumulated and reinterpreted very ancient beliefs, bringing them to the present day in a continuous temporal flow, proving to be a centre of religious attraction.

The Mountain Range, with its captivating landscape, the touch of the sea echoing in the mountains, the mixed scent of sea and land, and the absorbing silence, is a place of worship.

Even today, in addition to the **Pilgrimage to Our Lady of the Cape**, other significant pilgrimages take place in this territory, leaving a lasting mark on the memory and daily life of locals. The Festivity of Lord Jesus of the Wounds remains one of the most significant celebrations in the Sesimbra community, taking place between the end of April and the beginning of May.

At the foot of the S. Luís Mountain Range, facing away from the sea, stands the chapel dedicated to St. Louis, the patron saint of shepherds. For centuries, shepherds, farmers, and fishermen have come here seeking protection and fertility, for themselves and their families, for the land and the sea. The **Festivity of St. Louis** takes place on Low Sunday, marking the beginning of the summer cycle, a time cherished for its fertility.

On the weekend after St. Peter's Day, Aldeia Grande (Setúbal) is adorned for the **Festivities of Saint Peter of Alcube**, held at the chapel of the same name, whose existence predates 1596. This is also the time when the June Festivities are celebrated throughout the territory.

In S. Gonçalo, Cabanas, in the parish of Quinta do Anjo, in May, the **Festivities of St. Gonçalo** continue to be held, where devout people seek the protection of the Saint for their herds.

In the Historic Centre of Palmela, on 15 January, St. Amaro's Day, people continue to bring their homemade 'Fogaças' to the Church of St. Peter, with the **Gastronomic Brotherhood of Palmela** and the local authorities, for the ceremony of the **Blessing of the 'Fogaças'**, which traditionally served to fulfil promises, ensure the protection of crops and animals, and ask for good health.

However, it is to the Marian cult that Arrábida dedicates a significant portion of its celebration throughout the year. In addition to the **Pilgrimages to Our Lady of the Cape**, Cape Espichel also celebrates, on the second Sunday after Easter, the **Farmers'**

Festival with the Azóia Pilgrimage, with devotees of Our Lady of the Cape and Lord Jesus of Bonfim.

In the heart of the Mountain Range, the **Festivities of Our Lady of Arrábida** take place in July, at the Convent of the same name. Pilgrims from Setúbal (the old 'Círio', founded in 1839, and the new 'Círio', founded in 1892) and Azeitão (founded in 1845) participate in these festivities.

The Chapel of El Cármem hosts the **Festivities of Our Lady of El Cármem** in mid-August, with the participation of 'Círio das Pedreiras'.

Also in August, the **Festivities in Honour of Our Lady of Escudeira** take place in Vale dos Barris in Palmela, at a Chapel built in 1750 in honour of the Assumption of Our Lady.

In the same month, Azeitão celebrates the **Festivities of Our Lady of Conception, and in September, Vila Fresca de Azeitão celebrates the Festivities of Our Lady of Health**. Our Lady of the Light is celebrated in Sampaio in September, and Our Lady of Consolation in the castle of Sesimbra, since 1166, on the first Sunday of the same month.

Also dedicated to Our Lady of Conception, the **Festivities of All Saints** have been held in Quinta do Anjo since 1756..

In addition to the aforementioned values, the Arrábida mountain range is distinguished by the presence of a diverse array of living traditions, some more closely related to the subsistence of the populations, while others are unique forms of religious expression. Thus, throughout the Arrábida area, traditional forms of exploiting natural resources persist, ranging from the simple use of wind energy in windmills to ancient fishing techniques, some of which have been documented since medieval times and have survived to the present day virtually unchanged. Also, echoes of shipbuilding, which reached its peak during the Age of Discoveries, still resonate. Of more recent tradition, but rooted in centuries-old practices, the culture of vineyards and wine production, as well as the production of Azeitão Cheese, stand out for their strength..

CHEESE

The edaphoclimatic factors of Arrábida, with its relative abundance of pasture, explain why sheep farming has characterised the region's economy since the Neolithic period, with cheese production as a secondary activity. Entirely meeting the standards that define a traditional cheese, the **Azeitão Cheese** dates back only to the first half of the 19th century. It was 'created' by a farmer from Monsanto, in Beira Baixa, who settled in Azeitão around 1830. Longing for his homeland near the Estrela Mountain Range, and the products he had enjoyed in his youth, he had flocks brought from there to reproduce the celebrated Serra Cheese in the heart of the Setúbal peninsula. Throughout the Setúbal Peninsula there were flocks of sheep of the Saloia breed, similar to those in the Lisbon area (Oeiras), which were later crossbred with the Bordaleira sheep commonly found in the Beira Baixa region.

In more recent decades, particularly since 1980, the production of traditional Azeitão Cheese has gained momentum and is currently experiencing a phase of expansion. It is now also associated with the production of sheep butter, a more recent product. It is produced in only four dairies in the Arrábida area, in the municipalities of Sesimbra, Azeitão, and Palmela, primarily in the parish of Quinta do Anjo, between the northern edge of the Arrábida Mountain Range and the Azeitão area.

Produced using the traditional method - with thistle and no artificial refrigeration, it uses raw sheep's milk - an essential characteristic for maintaining its traditional character. It has been preserved to respect the uniqueness of its aroma and flavour, which depend on the specific environmental conditions provided by the Arrábida Mountain Range. Indeed, its peculiar characteristics are attributed to the unique environmental factors of the Arrábida massif, namely its climate and the calcareous nature of its soils. It is one of the most popular and appreciated traditional products in the region, although most of its production is currently semi-industrialised.

WINE

Vineyards and wine are one of the region's main assets, shaping the landscape and people's lives. In terms of the geographical distribution of vineyards in the Setúbal Peninsula, the municipality of Setúbal accounts for 86.35% of all cultivated vineyards, Sesimbra for around 7.62%, and Palmela for 6.03%. Different grape varieties are grown, but **Castelão** is predominant.

Although the region has a long history associated with vineyards and wine, it is the production of **Moscatel** wine that brings it fame and identity. This fortified wine can be obtained from the Moscatel de Setúbal or Moscatel Roxo grape varieties, resulting respectively in Moscatel de Setúbal wine and Moscatel Roxo wine, with a relatively limited production. In the Setúbal Peninsula, around 88.11% of the Moscatel grape variety is grown in the municipality of Setúbal, 10.63% in Palmela, and 1.266% in Sesimbra. In the mountains of Arrábida, grapes yield truly unique wines thanks to the very particular natural characteristics of the area. The uniqueness of the Moscatel wines crafted from grapes grown here stems from the blend of local terroir, prevailing winds, and the skilful touch of the oenologist, but especially from nature.

The production of Setúbal fortified wine requires the Moscatel grape variety to account for at least 67% of the total grapes used in the wine-making process, or 85% in the case of Moscatel Roxo. Wines entitled to the Moscatel de Setúbal designation of origin (traditional designation) are produced in a region delimited by the municipalities of Palmela, Setúbal, Montijo, and part of the municipality of Sesimbra.

Nonetheless, the significance of Moscatel wine remains undiminished as an emblem of the region, a feat owed largely to companies like José Maria da Fonseca, which have always been committed to innovation and conquering international markets. This ensures the existence of many other small vineyard and wine producers who, year after year, manage to find the right buyer for their produce. In the 1990s and 2000s, the area saw an increase in the number of wine producers and hectares of vineyard, particularly those of the Moscatel grape variety. Today, wine production in the region, particularly Moscatel, is experiencing a period of particular prosperity, with widespread and recurring international recognition.

TRADITIONAL FISHING

Fishing is an activity with a long tradition in this fishing area, also associated with the sea salt extraction industry, promoted along with fish products that have been commonplace since the Roman period in the Sado estuary and Sesimbra waters.

Some of the persisting fishing techniques underwent changes due to the technological advances witnessed in recent decades. Others, however, retain their traditional character essentially untouched, such as 'xávega' or 'chinha' (seine fishing using trawl nets or drag nets), 'ferrados' (spear fishing), fishing with 'traps', and some hook-and-line fishing methods. These activities are practised regularly, on a professional basis, in order to supplement fishermen's livelihood.

It is worth mentioning 'xávega', or seine fishing, which is a fishing method that consists of casting nets into the sea from a boat, while leaving one end of the rope on land to facilitate its traction. This method has been used along the Arrábida coast since the early 18th century and allows for sustainable fishing because the net operates at the surface, without damaging the marine prairies, breeding grounds for fish and shellfish and a source of food for all species.

Trap fishing, notably for octopus, stands out as one of the most representative fishing practices in the region. This type of fishing primarily occurs in rocky areas at relatively shallow depths. These traps can come in various sizes and shapes, typically featuring an entrance hole for octopuses and a pouch for bait. The 'covos' (traps) are placed in the water attached to a cable several hundred meters long, spaced about ten meters apart, forming a hunting ground.

Fishing for cuttlefish and squid is done using radar and 'toneira', or 'piteira', small spindle-shaped lead pieces covered in plastic or cotton thread. This type of traditional fishing is carried out near the coast, at shallow depths, and is conducted by one or two fishermen aboard 'aiolas', small traditional boats typical of Sesimbra, with a limited range of action. Fried cuttlefish is a local speciality from Setúbal, highly sought after and considered an icon of local gastronomy. Another famous cuttlefish dish from Setúbal is 'chocos à Setubalense'.

The 'aparelho' (longline, also called 'espinhel' or 'palangre'), as it is known in the fishing community, is one of the most traditional fishing methods in Sesimbra. It consists of a 'hunting ground' made up of several lines that can contain thousands of hooks. The surface longline is especially targeted at swordfish, while the deep-sea longline is intended for species that live close to the seabed, including those typically found in

rocky areas near the coast like sea bass and gilt-head bream, as well as those found at greater depths such as red snapper, grouper, blackspot seabream, and emperor fish, or even those caught in very deep waters, such as black scabbardfish. Fishing is done with the boat in motion, releasing the longline from one point to another, either in a straight line or at an angle. At the beginning and end of the longline, surface buoys are placed to mark the location, tied to the cable that carries the hunting ground to the seabed with the support of stones, in order to settle it in the intended location. Fishermen generally attach buoys and smaller stones alternately along the longline so that it fishes at various depths.



15.6.2

INDICATE ACTIVITIES AIMED AT IDENTIFYING, SAFEGUARDING, PROMOTING AND/OR REVITALISING SUCH VALUES AND PRACTICES

The cultural manifestations associated with Arrábida – popular religiousness, as well as other expressions linked to agriculture, fishing, pastoralism, and gastronomy, including the notable Azeitão cheese, Moscatel wine, and traditional shipbuilding – constitute an exceptional heritage, which embodies and gives meaning to a long cultural tradition. It is an active, dynamic, used, and exercised inheritance.

The traditional activities described above are promoted through events to enhance them and ensure their continuity, such as the fairs, festivals, and pilgrimages (e.g., Harvest Festivals; Pilgrimage to Our Lady of the Cape) held in the municipalities of Palmela, Sesimbra, and Setúbal, which help to keep tradition alive. In terms of gastronomy, many restaurants in the region feature typical dishes, mostly seafood-based, on their menus. The municipal museums of Palmela, Sesimbra, and Setúbal promote the values, customs, and practices identified through memory and identity projects with the local communities.

15.6.3

HOW SHOULD CULTURAL VALUES BE INTEGRATED IN THE DEVELOPMENT PROCESS: ELEMENTS OF IDENTITY, TRADITIONAL KNOWLEDGE, SOCIAL ORGANISATIONS, ETC.?

The identity of the population, their practices, customs, and traditions, as well as their popular enjoyment, are crucial to the region's development process.

This territory preserves a significant set of ritual practices that the community itself keeps alive, with associative structures playing a prominent role in this dynamic. The perpetuation of values and customary practices is passed on to the younger generation, which in turn contributes to their continuation and maintenance, especially through the schools in the municipalities of Palmela, Sesimbra, and Setúbal, as well as their museums, libraries, and interpretive centres. This process also involves the cultural and recreational associative movement, as well as structures involving the senior population, through the municipal active ageing strategies, which the Reserve will also contribute to integrating and coordinating.

The various public and private organisations, associations, or local groups operate in the territory with the involvement of the communities, reinforcing the recognition of the importance of those values and customs. This aims to raise awareness of the potential for promoting local development sustainably. The partners in this application demonstrate the commitment that various grassroots or local organisations have to the values and their proper enjoyment.

The promotion and enhancement of local handicrafts, wine and cheese making, fishing, and traditions are carried out through activities with schools and the organisation of events in the region. This includes major festive events organised by each municipality and permanent facilities in the territory specifically aimed at enhancing local production. Examples include the Sampaio Mill, Casa da Baía, and the Main Office of the Wine Route. Similarly, the promotion of culture, traditions, and the products resulting thereof is consistently carried out - primarily by the municipalities - at national and international events, which will also be integrated into the Arrábida Biosphere Reserve.

15.6.4

SPECIFY WHETHER ANY INDICATORS ARE USED TO EVALUATE THESE ACTIVITIES

The activities described in the previous points are assessed through the analysis of parameters such as fishing licences, wine and cheese production, number of artisans, etc. This provides us with data that allows us to monitor the development of the region and the communities within it. The organisation of local promotion events, activities with schools, and associations are monitored and coordinated to encourage a sense of belonging and cultural identity associated with the Arrábida Biosphere Reserve.

16

LOGISTIC SUPPORT FUNCTION

16.1

RESEARCH AND MONITORING

16.1.1

DESCRIBE EXISTING AND PLANNED RESEARCH PROGRAMMES AND PROJECTS AS WELL AS MONITORING ACTIVITIES AND THE AREA(S) IN WHICH THEY ARE (WILL BE) UNDERTAKEN IN ORDER TO ADDRESS SPECIFIC QUESTIONS RELATED TO BIOSPHERE RESERVE MANAGEMENT AND FOR THE IMPLEMENTATION OF THE MANAGEMENT PLAN (PLEASE REFER TO VARIABLES IN ANNEX I)

Nature conservation and sustainable management of natural resources

The Arrábida region has unique natural characteristics that make it a case study of great ecological interest. The existence of the Arrábida Natural Park since 1976 and the Professor Luiz Saldanha Marine Park since 1998 validated the importance of this territory as a unique space where the interaction between human activity and the environment is balanced. In this context, various research projects have been developed by universities, government institutions, NGOs, and private organisations, often in partnership, contributing to the management and conservation of the proposed area.

Due to the region's proximity to Lisbon, universities and research centres in the capital, such as the Instituto Superior de Agronomia, Instituto Superior de Psicologia

Aplicada, Universidade Nova de Lisboa, and Faculdade de Ciências da Universidade de Lisboa, have been the main contributors to research in the Arrábida region. The Universidade de Évora and the Universidade do Algarve also conduct research work related to the proposed area. There is a long list of master's and doctoral theses focused on various thematic areas related to the Arrábida region over the past decades.

In addition to universities and research centres, there are local associations within the Arrábida region, often with the participation and/or support of the municipalities or in collaboration with the ICNF, which are engaged in activities in areas that contribute to the increased knowledge and preservation of the Arrábida region and its sustainable development.

In the environmental and nature conservation field, several ongoing **scientific research projects** stand out:

- **Marine biodiversity of the Classified Areas of Arrábida:** The INFORBIOMARES - Information Systems project aims to develop an information and monitoring system⁴⁹ to meet the needs of management and planning objectives for the classified marine areas of Arrábida, particularly within the Natura 2000 Network integrated therein. It is coordinated by the NGOE Liga para a Proteção da Natureza and includes the Universidade do Algarve, the ICNF, and the Instituto Superior de Psicologia Aplicada as partners.
- **Speleological systems:** The Núcleo de Espeleologia Costa Azul association, with over two decades of existence, is engaged in a research and investigation project focused on the speleological systems of Arrábida. They have made notable discoveries such as the Frade system and the Utopia cave. They are currently researching and prospecting in the Pinheirinhos and Achada areas.
- **Innovation:** the 'Esmartcity' project, promoted by ENA, aims to improve the innovation capabilities of the municipalities in the MED region by creating innovation ecosystems that involve citizens, businesses, researchers, academics, and public authorities, thus reinforcing the Smart City concept. Cities (or

⁴⁹ <https://www.lpn.pt/pt/conservacao-da-natureza/projetos-cofinanciados-pela-ue/inforbiomares>

municipalities) are not merely seen as subjects for the application of technology, but rather as innovation ecosystems that can generate living and working scenarios.

There are currently programmes and **monitoring activities** underway that are relevant to the objectives of the Reserve, such as:

- **Bathing water quality:** conducted by the Agência Portuguesa do Ambiente and encompassing all bathing water in the Arrábida region.
- **Marine species and habitats:** The Biomares Programme monitors these values in the Luiz Saldanha Marine Park, contributing to a greater understanding of the area.
- **Birds:** In the PNA area, monitoring of certain bird species with unfavourable conservation status, such as the peregrine falcon and Bonelli's eagle, is ensured by technicians from the ICNF. This allows for early detection of signs of decline and threats effects.
- **Bats:** Monitoring programme for resident bat communities conducted by the ICNF in the Arrábida mountain range.
- **Butterflies:** Since 2020, monitoring of this group of insects in the Louro Mountain Range has been ensured as part of the Portuguese Butterfly Census project. This project aims to obtain data to allow for the detection of trends in the conservation status of butterflies and their habitats.

The **Associação Baía de Setúbal (ABS)** was established in 2005 with the mission of engaging the community in the preservation and development of the Setúbal Bay as a heritage for all. This association works in partnership with NGOs and other environmental associations, such as Ocean Alive, the Associação Portuguesa de Lixo Marinho (APLM), Liga para a Proteção da Natureza (LPN), Sociedade Portuguesa para o Estudo das Aves (SPEA), among others, and with them, it promotes research, monitoring, and conservation of natural resources along the coastline and protected areas of Setúbal Bay, namely the Sado Estuary Nature Reserve, Sado/Troia Bay, Arrábida Natural Park, and Luiz Saldanha Marine Park.

Tangible and intangible cultural heritage

In this field, it is worth mentioning a few **research projects** currently underway:

- **Memories Project:** developed at the Michel Giacometti Memory Centre of the Labour Museum, this project has been running for 10 years and is the result of a partnership between the Américo Ribeiro Photographic Archive and the Michel Giacometti Labour Museum. This project aims to collect information about the photographs taken by Américo Ribeiro, with the purpose of identifying the people, places, and events depicted, resorting to a group of elderly volunteers who either lived during the time the photographs were taken or are familiar with individuals who did. This process results in a body of information that translates into extensive captions of utmost importance for future memory.
- **Project for gathering information about the photographs of Américo Ribeiro:** the Azeitão Memory Centre is developing a project aimed at gathering information about the photographs of Américo Ribeiro, focusing on the Azeitão region. This project is now moving into a second phase that involves working with personal archives, with a view to identifying the people, places, and events depicted. To this end, a group of volunteers has been meeting at the Azeitão Library for two years.
- **Oral Sources Archive:** developed at the Municipal Museum of Palmela, this project ensures the creation of an important documentary collection preserving local history and memory. Winemakers, millers, shepherds, and cheesemakers are the protagonists of around a hundred interviews already conducted and available online, which help to understand and value these traditional activities in the Arrábida Biosphere Reserve. Similarly, the 'One Image, a Thousand Memories' project, coordinated with the Palmela Municipal Archive, has promoted, in recent years, the sharing of the archive's photographic collection with the population, through both public sessions and digital media. This sharing has allowed, on the one hand, for the interpretation of many of the photos and the naming of faces, and on the other hand, for the enrichment of the collection with new photos that participants provide or allow to be scanned.
- **Sesimbra, Memory, Identity - Conversations around Sesimbra's intangible cultural heritage' project:** since 2009, the Municipal Museum of Sesimbra has

been spearheading this project, where participants engage in conversations to share knowledge and experiences related to various topics, including rural community life, fishing, gastronomy, and shipbuilding. The project aims to promote and enhance collective memory and local identity while preserving the cultural heritage of the municipality and the region. These meetings are open to the community and are essential for raising awareness of the need to collect and protect cultural and intangible heritage. The information is documented through images and recordings.

- **Survey of the art of traditional timber construction:** included in the Municipal Museum of Sesimbra, the Maritime Museum is carrying out a project to survey the art of traditional timber construction in shipbuilding and produce the Museum's intangible catalogue: 'Maritime Museum of Sesimbra, one piece, one life story'.

In line with the strategic objectives of the Action Plan in this application, there are plans to enhance research lines and projects that promote the management and conservation of the natural and cultural values of the territory. This includes creating a dissemination platform that will serve as an information resource for future projects.

16.1.2

SUMMARISE PAST RESEARCH AND MONITORING ACTIVITIES RELATED TO BIOSPHERE RESERVE MANAGEMENT (PLEASE REFER TO VARIABLES IN ANNEX I)

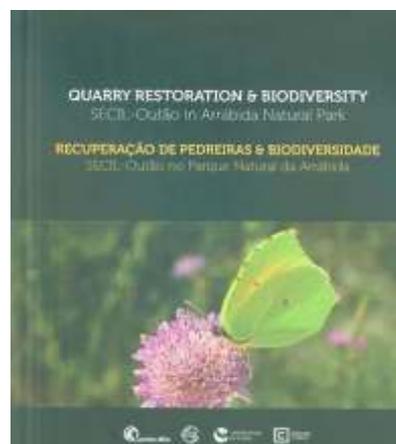
Nature conservation and sustainable management of natural resources

A reference in this line of action is the Biomares project (LIFE 06 NAT/P/0000192). Coordinated by the Centro de Ciências do Mar (CCMAR), the Instituto Superior de Psicologia Aplicada (ISPA), and the ICNF, the project originated from the need to help preserve and restore the biodiversity of the Professor Luiz Saldanha Marine Park. This project has provided the financial and technical resources necessary to reconcile nautical and recreational activities with the conservation of the most sensitive areas Habitat 1170 - 'Reefs' and Habitat 1110 - 'Sandbanks which are slightly covered by sea water all the time', and also enabled collaboration with experts in the field of marine habitat recovery, with the aim of implementing technical measures to restore the marine prairies on the ground.

Within the scope of the recovery and restoration of ecosystems and vegetation, the Secil quarry, in partnership with the Faculdade de Ciências da Universidade de Lisboa, has developed a number of projects aimed at the **recovery of vegetation and landscape in quarry environments**. These efforts resulted in several publications, including books, scientific articles in leading journals, and academic theses covering topics from the biology of plant resources to engineering:

- **Books:**

- Quarry Restoration & Biodiversity - SECIL - Outão in 'Arrábida Natural Park', published in 2018;



- **Articles:**

- Sampaio *et al* (2021). Bottom-up cascading effects of quarry revegetation deplete bird-mediated seed dispersal services. *Journal of Environmental Management*;

- Mexia *et al* (2020). Beyond the green: Assessing quarry restoration success through plant and beetle communities. *Restoration Ecology*;

- Salgueiro *et al* (2020). Enhancing biodiversity and ecosystem services in quarry restoration-challenges, strategies, and practice. *Restoration Ecology*.

- Clemente *et al* (2016). Effect of hydroseeding components on the germination of Mediterranean native plant species. *Journal of Arid Environments*;

- Nunes *et al* (2014). Beneficial effect of pine thinning in mixed plantations through changes in the understory functional composition. *Ecological Engineering*;

- Oliveira *et al* Correia (2014). Suitability and limitations of native species for seed mixtures to revegetate degraded areas. *Applied Vegetation Science*;

- Oliveira *et al* (2013). Limitations to recruitment of native species in hydroseeding mixtures. *Ecological Engineering*;

- Oliveira *et al* (2012). Testing Germination of Species for Hydroseeding Degraded Mediterranean Areas. *Restoration Ecology*;

- Meira *et al* (2011). Post-fire and post-quarry rehabilitation succession in Mediterranean ecosystems: implications for ecological restoration. *Ecological Engineering*

- Oliveira *et al* (2011). Effect of substrate treatments on survival and growth of Mediterranean shrubs in a revegetated quarry: an eight-year study. *Ecological Engineering*

- 'Quarry restoration at Secil-Outão: an overview of the team's work (1998-2014)' (2014) - conference paper;

- 'Biomonitores – uma ferramenta de gestão da qualidade do ar' (2012) – conference paper;

- 'Quarry rehabilitation at Outão: ecological assessment tools' (2012) - conference paper;

- **Academic theses:**

- 'Evaluating ecological restoration success by mapping regulating ecosystem services based on field and remote sensing approaches', master's thesis presented in 2024, Faculdade de Ciências da Universidade de Lisboa;

- 'Study on LiDAR sensor data acquisition techniques and processing' on georeferencing technology applied to the territory, master's thesis presented in 2021 at the Instituto Superior Técnico;

- 'Avaliação do sucesso de uma restauração ecológica em pedreiras calcárias através da resiliência ao fogo', master's thesis presented in 2012, Faculdade de Ciências da Universidade de Lisboa;

- 'Estudo da microbiologia dos solos em pedreiras revegetadas: caso de estudo da pedreira da Secil, no Outão CSIC (Espanha)', doctoral thesis presented in 2011, Faculdade de Ciências da Universidade de Lisboa;

- 'Estudo da microbiologia dos subsolos em pedreiras revegetadas: caso de estudo da pedreira da Secil, no Outão', doctoral thesis presented in 2011, Faculdade de Ciências da Universidade de Lisboa;

- 'Planeamento agregado de produção, distribuição da Secil, S.A.: Um modelo de otimização em Programação Linear Inteira Mista', master's thesis, 2011, Faculdade de Ciências da Universidade de Lisboa;

- 'Revegetação e seus efeitos na sucessão ecológica em pedreiras calcárias após exploração: a pedreira da secil como caso-estudo', master's thesis, 2008.

With the aim of **assessing the anthropogenic pressure on the natural resources** of the Arrábida Natural Park, the 'Study to assess the carrying capacity of the Arrábida Natural Park' project was carried out under the responsibility of the Associação de Municípios da Região de Setúbal.

This project aimed to quantify the use of sites subject to tourist pressure, characterise the socioeconomic profiles of users and their levels of satisfaction, and measure the impacts of tourist use, in order to propose management measures and a monitoring protocol.

Still on the territory's natural vulnerabilities, in 2012, the thesis 'Modelação da suscetibilidade à rotura e propagação de desabamentos na Arrábida' (Modelling the Susceptibility to Rupture and Propagation of Landslides in Arrábida) in the field of geology was published at IGOT. Additionally, in 2014, the Universidade de Coimbra produced the thesis 'A Serra da Arrábida e os riscos naturais' (The Arrábida Mountain Range and Natural Risks).

Framing the natural characteristics of the territory and human activity as harmoniously as possible, we have the 2013 master's thesis in ecology from the Faculdade de Ciências da Universidade de Lisboa, entitled 'Conceção e valorização de um percurso pedestre no Parque Natural da Arrábida: o caso de estudo das terras do risco' ('Design and Enhancement of a Hiking Trail in the Arrábida Natural Park: The Case Study of Terras do Risco'). In 2023, the Universidade de Évora produced a thesis entitled 'Proposta de uma rede de trilhos concertados com ações de proteção e valorização da vegetação e de geossítios, Cabo Espichel. Uma experiência de estágio no Parque Natural da Arrábida' (Proposal for a Network of Trails Coordinated with Actions for the Protection and Enhancement of Vegetation and Geosites, Cape Espichel. An Internship Experience in the Arrábida Natural Park) and the doctoral thesis presented in 2022 at the IGOT, entitled 'Turismo, Serviços Culturais dos Ecossistemas e Saúde' (Tourism, Cultural Services of Ecosystems and Health). Other publications include the 2017 scientific article 'Análise e avaliação do potencial turístico dos territórios: o caso do Parque Natural da Arrábida' (Analysing and Evaluating the Tourism Potential of Territories: the Case of the Arrábida Natural Park) (Almeida *et al*).

Tangible and intangible cultural heritage

The uniqueness of Arrábida's tangible and intangible heritage and its connection to the territory has also been the subject of academic studies. Among others, we highlight the following examples: the master's thesis 'Arrábida, Serra-Mãe' (Arrábida, Mother Mountain Range) presented in 2022 at the Universidade de Évora, and in 2014, the master's thesis 'Arrábida: cartografia do horizonte: considerações sobre a transformação da paisagem no lugar do Outão' (Arrábida: Mapping the Horizon: Considerations on the Transformation of the Landscape in the Hamlet of Outão) was presented at the Faculdade de Arquitetura da Universidade de Lisboa. Also in the field of architecture, the master's thesis 'Percurso arquitetónico na Arrábida: a arquitetura portuguesa como revitalizadora do património e da paisagem' (Architectural Journey in Arrábida: Portuguese Architecture as a Revitalising Force for Heritage and Landscape) was published in 2015, and the thesis 'Projectar com o lugar: reabilitação do Convento dos Capuchos de Alferrara, na Serra da Arrábida: Centro de Investigação e Divulgação da Serra da Arrábida' (Designing with the Place: Rehabilitation of the Capuchos Convent of Alferrara in the Arrábida Mountain Range: Research and Dissemination Centre of the Arrábida Mountain Range) was published in 2017.

Regarding the built heritage, the master's thesis 'Estudo da Evolução do Edificado no Parque Natural da Arrábida utilizando Sistemas de Informação Geográfica' (Study of the

Evolution of Buildings in the Arrábida Natural Park using Geographic Information Systems) was presented at the Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa in 2014.

Research projects in the field of intangible heritage include the **Michel Giacometti Memory Centre**, the **Roman Ruins Memory Centre of Troia**, and the **Azeitão Memory Centre** which, by themselves, function as research projects in collaboration with the community. Other examples are the **Oral Sources Archive of the Municipal Museum of Palmela** and the **'One Image, a Thousand Memories'** project.

In terms of tangible heritage, the **'Vida e morte das freiras clarissas do Convento de Jesus de Setúbal'** (Life and Death of the Poor Clare Nuns of the Convent of Jesus of Setúbal) project was developed in partnership with Dr. Nathalie Antunes Ferreira (anthropologist), focusing on the daily lives and experiences of the nuns, based on the archaeological findings, written sources, and anthropological analyses of the exhumed skeletons.



In 2017, the municipality of Palmela, in partnership with UNIARQ and Arqueohoje, conducted an **archaeological excavation in the artificial caves of Casal do Pardo**, 141 years after the discovery of this Neolithic funerary site, a national monument located within the Biosphere Reserve. This intervention was part of a programme aimed at enhancing and supporting the museological interpretation of the site, as part of the **'PRARRÁBIDA - Enhancement of Archaeological Sites'** programme, promoted by Palmela and co-funded by PORLisboa2020, under the Pact for the Development and Territorial Cohesion of the Metropolitan Area (PDCT-AML). The outcome of the research carried out in this process and the new collection resulting from it led to the publication of 'A necrópole de grutas artificiais do Casal do Pardo - Um guia curto e alguns comentários' (The Artificial Cave Necropolis of Casal do Pardo - A Short Guide and Some Comments).

It is also worth mentioning the archaeological research carried out as part of the **'Structural Intervention to Prevent Landslides on the Slopes of the Castle of Palmela'**. This endeavour, co-funded by Portugal 2020 - Axis 2 of POSEUR - 'Domain (087) Measures to adapt to climate change and prevention and management of risks associated with the weather - Emergency means and preventive actions in the face of serious accidents and disasters', resulted from a partnership between the Municipality of Palmela, the Direção-Geral do Tesouro e Finanças (Directorate-General for Treasury and Finance), the Direção-Geral do Património Cultural (Directorate-General for Cultural Heritage), ENATUR, and the Laboratório Nacional de Engenharia Civil (National Laboratory of Civil Engineering). The artifacts were recovered from various parts of this national monument as part of the construction campaign, are currently being analysed, and resulted in a presentation at the international archaeology conference 'Terra, Pedras e Cacos do Garb al-andalus' (Earth, Stones and Shards of Garb al-andalus) held in Palmela in January 2020.

Also noteworthy is the **'Coastal Cultural Centre | Sesimbra'**⁵⁰ project, developed at the Maritime Museum of Sesimbra, which aims to boost the local economy, promote sustainable fishing and the identity of fishing activity, preserve traditional crafts such as wooden shipbuilding, enhance maritime cultural heritage, implement new technologies for fish processing, and encourage the production of knowledge about the sea, through partnerships with Norwegian and local organisations. The new Cultural Centre includes research offices to support researchers and associated projects. This is a project funded by EEGrants.

⁵⁰ <https://www.eegrants.gov.pt/pt/programas/cultura/projetos/projetos/centro-cultural-costeiro-sesimbra/>

16.1.3

INDICATE WHAT RESEARCH INFRASTRUCTURE IS AVAILABLE IN THE PROPOSED BIOSPHERE RESERVE, AND WHAT ROLE THE BIOSPHERE RESERVE WILL PLAY IN SUPPORTING SUCH INFRASTRUCTURE

The proposed Arrábida Biosphere Reserve has a set of infrastructure facilities that support research activities and serve as crucial support in the strategy for environmentally responsible and sustainable education. In Setúbal, the **ado Estuary Bottlenose Dolphin Interpretation Centre**, located in Casa da Baía and inaugurated in 2018 in a partnership between the municipality and the ICNF, is an important resource for the dissemination and conservation of the community of bottlenose dolphins that inhabits the Sado Estuary.

Also in the field of marine biodiversity, there is the **Oceanographic Museum Professor Luiz Saldanha**, located in the Fortress of Our Lady of Arrábida, in the heart of Portinho, where visitors can observe some of the region's marine fauna species, preserved in liquid or dry form, many of which no longer exist. Visitors can also observe living marine fauna and flora specimens from the coast of Arrábida in saltwater aquariums.

In addition to the Oceanographic Museum, the Fort of Saint Mary also houses a biology field laboratory for the Professor Luiz Saldanha Marine Park of the Arrábida Natural Park, where studies are conducted to protect the coastal marine environment.

Another important infrastructure in the Biosphere Reserve area is the **Sesimbra Maritime Museum**, which is developing the 'Coastal Cultural Centre | Sesimbra' project. It aims to boost local economy, promote sustainable fishing and the identity of fishing activity, preserve traditional crafts such as wooden shipbuilding, enhance maritime cultural heritage, implement new fish processing technologies, and encourage the production of knowledge about the sea, through partnerships with Norwegian and local organisations.

The **Shepherd Museum**, located in S. Gonçalo, parish of Quinta do Anjo, in the municipality of Palmela, since 2008, is the result of a partnership between the municipality and the Associação Regional de Criadores de Ovinos Leiteiros da Serra da Arrábida (ARCOLSA). It has been an important contribution to the knowledge and preservation of the symbolic and functional aspects that comprise the shepherding activity and, ultimately, the production of certified Azeitão Cheese. Especially aimed at schoolchildren, this museum maintains a small flock of sheep from the Saloia breed, a native breed at risk of extinction, on a permanent basis. This flock serves as a genetic

reserve for the species, with the possibility of providing specimens to anyone wishing to develop new flocks. Meanwhile, the 'Adote uma Saloia' (Adopt a Saloia sheep) project seeks to engage the community and businesses by sponsoring an animal, thus helping to support its conservation.

In the cultural area, the **Michel Giacometti Labour Museum** is located in the former Perienes factory building, consisting of five floors and integrated into a former neighbourhood of fishermen, salt workers, and cannery workers. The aim of this museum is to study, preserve, and disseminate techniques and knowledge related to the world of labour in human history. It is predominantly dedicated to industrial heritage and urban crafts related to commerce, services, and the former canning factories and lithography workshops based in the municipality of Setúbal, and also has a collection of agricultural implements (Michel Giacometti) and traditional crafts.

There is also the **Museum of Archaeology and Ethnography of the Setúbal District (MAEDS)**, founded in December 1974 by the District Council of Setúbal, within the context of the country's democratisation process initiated by the 25 April Revolution occurred in the same year. The Museum opened to the public in 1976 and has a valuable archaeological collection representative of the Setúbal District, featuring prehistoric, Roman, and post-Roman collections, as well as ethnographic collections. It includes the **Centre for Archaeological Studies (CEA)**, which is active in the field of archaeological research, carrying out emergency and enhancement archaeological interventions, presenting the results of its research at conferences and congresses, publishing articles in national and international journals, and especially releasing its own publications. Long-term scientific research projects typically involve partnerships with similar national and international institutions. It ensures the conservation and public presentation, along with the production of information materials, of the Creiro and Chibanes archaeological sites.

Inaugurated on 31 May 2016, symbolically on National Fishermen's Day, the **Maritime Museum of Sesimbra** features, in its permanent exhibition, fish hooks from the Chalcolithic period, which are around five thousand years old and material testimony to the earliest evidence of fishing in the Arrábida region.

Consisting of a collection entirely donated by the community, it is currently the only **Portuguese Museum** nominated for the European Museum of the Year award, given the relevance of its museographic discourse, which tells a story spanning over two hundred million years, using innovative multimedia solutions.

The **Municipal Museum of Palmela** began operating in the late 1980s, with the mission of preserving the cultural heritage of the territory administered by the municipality of Palmela. It incorporates collections that represent the memory of each parish in the municipality. It positions itself as a museum of the territory, anchored in the diverse identities/memories that are part of its communities. It publishes or supports the publication of works that reflect research themes related to the territory, and promotes the organisation of meetings and courses on heritage of local, national, and international relevance, such as those dedicated to the Order of Santiago.

16.2

EDUCATION FOR SUSTAINABLE DEVELOPMENT AND PUBLIC AWARENESS

16.2.1

DESCRIBE EXISTING OR PLANNED ACTIVITIES, INDICATING THE TARGET GROUP(S) AND NUMBERS OF PEOPLE INVOLVED (AS 'TEACHERS' AND STUDENTS') AND THE AREA CONCERNED

In the field of environmental education, all the organisations promoting the application are developing pedagogical projects and/or educational services that address themes related to Arrábida, whether in the natural or cultural area, with a clear understanding of the importance of cultural appropriation by the population and raising awareness among visitors.

In a future Biosphere Reserve, both existing projects and actions and new educational projects that will be implemented as proposed in the Action Plan will be developed as a network, taking advantage of the knowledge and experience acquired by each organisation, optimising resources and synergies.

The three municipalities are partners with the Associação Bandeira Azul da Europa (ABAE) (European Blue Flag Association [EBFA]), a non-profit NGO dedicated to Education for Sustainable Development and the management and recognition of good environmental practices, within the framework of the **Blue Flag** and **Eco-Schools** programmes.

The Blue Flag Programme is an initiative promoted by the ABAE, aimed at education for sustainable development on beaches. The awarding of the Blue Flag to a beach guarantees quality and distinguishes the efforts made by various organisations to enable the coexistence of local development with environmental respect. In addition to guaranteeing environmental quality parameters, an annual programme of education and environmental awareness is conducted at each awarded beach, emphasising the need to preserve marine, coastal, and lake ecosystems.

The Eco-Schools programme is an international initiative run by the *Foundation for Environmental Education*. It has been implemented in Portugal since 1996 by the ABAE and aims to encourage actions and recognise the quality work carried out by schools in the field of Environmental Education for Sustainability. Its aim is to encourage actions, recognise, and reward the work developed by the schools to improve their environmental performance, school management, and community awareness. The annual monitoring and evaluation of activities aims to validate the quality of the work

developed by the schools, through the symbolic award of the Eco-Schools green flag. Its methodology is inspired by the local Agenda 21 principles, ensuring the participation of children and young people in decision-making processes, and thus promoting responsible citizenship and a more sustainable school and community. It is implemented across all levels of education, from kindergarten to higher education.

Municipalities are also key partners in the implementation of the Eco-Schools Programme. In recent years, there has been an increase in the number of Eco-schools in the three municipalities, demonstrating both the schools' interest and concern for environmental issues and the efforts of the municipalities in supporting them.

The municipalities of Palmela, Sesimbra, and Setúbal are partners with the ABAE in the Eco-Schools project, with a total of 49 participating schools in the 2019/2020 school year. Since it is a programme that operates through networking and is already implemented in the territory, it will be an important vehicle for enhancing and disseminating environmental education within the Biosphere Reserve, as outlined in the action plan.

Similarly, the Blue School Programme, under the responsibility of the DGPM - Direção-Geral de Política do Mar (Directorate-General for Maritime Policy), is being implemented in several schools in the proposed area, in partnership with municipalities and education establishments. This nationwide educational programme integrates multidisciplinary marine education actions and distinguishes and guides schools that work on topics related to the sea, creating a community that brings together schools, the maritime sector, municipalities, universities, and other organisations with an active role in marine education. Present in the three municipalities of the proposed Reserve, the **municipal markets** are excellent venues for environmental awareness-raising and education, through the responsible and sustainable consumption of regional and seasonal products.

In an educational approach to citizen participation, the municipality of Setúbal is promoting two projects that share the contribution of citizens with ideas for improving the city and then their participation in implementing those ideas. The '**Ser jardineiro por um dia**' (Gardener for a Day) project aims to improve vacant spaces in the city that can be requalified with native vegetation that requires little maintenance. Citizens identify those areas, in schools and across the city, propose the intervention and, depending on their feasibility, they are approved. Subsequently, citizens, along with municipal workers, participate in the action. Along the same lines, there is the '**Setúbal mais bonita**' (A More Beautiful Setúbal) project, in which residents can propose beautification projects for their neighbourhood, schools, or other areas of the city. Upon approval, the municipality provides all the materials for the project to be carried out by the individuals who proposed it.

In the Municipality of Palmela, the **key citizen participation project 'Eu Participo! (I Participate)** develops several initiatives aimed at several audiences. Among them, the **'(A)Gente do Bairro' (People in the Neighbourhood)** initiative enables and empowers projects aimed at enhancing public and natural space presented by the community. The **'2 (de)mãos por Palmela' (2 Hands for Palmela)** initiative organises volunteer activities for the conservation of public space in the Historic Centre of Palmela. Additionally, there are assemblies and clubs under the 'Eu Participo!' (I Participate!) umbrella, held in schools at various levels of education, to foster debate, reflection, and action on human rights and current themes, promoting greater citizen literacy. Climate change is the theme being addressed in the current school year.

With regard to the enhancement and conservation of the natural resources of the proposed Reserve, in partnership with the NGO Ocean Alive, there is the **'Mariscar com uma guardiã do mar'** (Gathering Shellfish with a Guardian of the Sea) programme, in which the school community is invited to gather shellfish with a fisherwoman from the Sado estuary in an interactive, authentic, and traditional experience. Additionally, the Ocean Alive team offers students a marine science lesson in the middle of the estuary, the ideal place to learn about estuarine marine life, the richest in biodiversity in our country. This activity addresses the degradation of the marine prairies of the Sado estuary by involving fisherwomen in eliminating three causes of their degradation, originating from the local fishing and recreational community: litter from shellfish harvesting, anchors and moorings on the prairies, and aggressive fishing techniques. Through this educational programme, Ocean Alive trains fisherwomen as marine guides, a new profession that values their wisdom and experience.

The municipality of Palmela has implemented the **'Compostagem na Escola'** (Composting at School) project, which aims to raise awareness of the importance of environmental preservation, focusing on recovering organic waste and preserving the soil by using natural fertilisers. The project includes awareness-raising sessions, workshops on building compost bins using recycled materials, and following-up on the composting process. Also on the importance of reducing and recycling waste, there is a series of awareness-raising actions regarding the implementation of the 5 Rs rule (Rethink, Refuse, Reduce, Reuse, and Recycle), emphasising the need to reduce the amount of waste produced, promote its separation for reuse, recycling, and proper processing.

Throughout the territory, in addition to the scheduled activities, whenever requested by schools, **sessions on Environmental Awareness** are provided by municipal technicians.

These sessions aim to contextualise, inform, and/or clarify aspects related to environmental preservation in various areas such as Climate Change, Energy Efficiency, Natural Heritage, Water, Waste, Composting, among others. The ICNF also organises guided tours to various points within the proposed area upon request from schools and other institutions.

The ENA - Agência de Energia da Arrábida (a non-profit association established in 2006, whose area of intervention intersects with the territory proposed for the Biosphere Reserve, encompassing the municipalities of Setúbal, Sesimbra, and Palmela), also carries out activities in the fields of environment and energy, aimed at the sustainable development of the community it serves, acting as a promoter of changes in behaviour and habits in the use of resources and engaging various local stakeholders to foster a truly efficient energy and environmental culture. Within this line of action, it coordinates various programmes related to the management of the territory covered by the application. One of those projects, currently under development, is the '**Por um Turismo Sustentável**' (For Sustainable Tourism) programme, which aims to provide hotel professionals with a set of measures, information, and best practices for more efficient consumption in hotel establishments. The 'Por um Turismo Sustentável' (For Sustainable Tourism) measure is financed by the Plan for the Promotion of Efficiency in Electricity Consumption (PPEC), a programme managed by the Entidade Reguladora dos Serviços Energéticos (ERSE), aimed at promoting measures to improve efficiency in consumption through actions undertaken by eligible promoters, targeting consumers in different market segments - Industry and Agriculture, Commerce and Services, and Residential.

With regard to tourism training, there is an important hotel and tourism school in the Arrábida area, in Setúbal: the Setúbal School of Hospitality and Tourism (managed by Turismo de Portugal).

The Setúbal School of Hospitality and Tourism (part of the national tourism training network) offers courses in initial training and continuous training in the fields of cuisine/pastry, catering and beverages, hotel management, and outdoor tourism, through Dual Certification courses and Technological Specialisation Courses. With a capacity for 300 students, the Setúbal School of Hospitality and Tourism is a highly relevant resource and instrument for training workers and businesses in the tourism sector in the Arrábida region.

Hiking trails are also organised, often in partnership with NGOs such as the SPEA or LPN, to discover the natural areas of the Arrábida Natural Park and the Sado Estuary

Nature Reserve in a participatory way. Keeping environmental preservation as the backdrop, these trails favour learning through direct contact with nature and foster knowledge and appreciation of the local natural heritage.

The '**Hortas Comunitárias**' (Community Vegetable Gardens) project, developed in the municipalities of Setúbal, Sesimbra, and Palmela, has been providing plots of land and offering training, to promote traditional agriculture in organic production mode as a way to ensure environmental sustainability, soil quality, or biodiversity. These vegetable gardens also aim to promote the dissemination of traditional varieties of vegetables and fruits grown in the region and adapted to our climate. There are pedagogical projects developed locally with schools associated with these vegetable gardens.

In the field of energy efficiency, the '**EcoFamílias**' (EcoFamilies) and the '**EcoEmpresas**' (EcoCompanies) projects have been implemented in the Municipality of Palmela, with the aim of informing, raising awareness, and rewarding good environmental practices, contributing to an excellent individual ecological performance and to the sustainable development of the community.

The various museums located in the Arrábida region have educational services covering different themes, namely:

-The **Educational Service of the Municipal Museum of Sesimbra**⁵¹, as a characterising element of a historical and spatial reality, seeks to provide citizens with ways of encountering that same identity, establishing itself as a space for representation and experiential investment, promoting community involvement, and contributing decisively to raising awareness regarding actions inherent to the enhancement of cultural and natural heritage. It promotes activities aimed at the general population, senior citizens, and the school community, including guided tours of the Maritime Museum and a visit to the Fish Market, visits to dinosaur footprint sites, and simulations of 'archaeological excavations' at the Castle of Sesimbra.

-The **Educational Service of the Municipal Museum of Palmela**⁵², located in the Castle of Palmela, organises guided tours, thematic routes, and educational and entertainment activities for various audiences. These activities are related to both tangible heritage and archaeological sites, as well as to the interpretation of the landscape and traditional crafts and local products. They cover areas ranging from the Castle of Palmela and the historic centre to the ridge of the Louro Mountain Range, where archaeological sites such as Alto da Queimada and Castro de Chibanes, as well as a collection of mills, are located.

⁵¹ http://www.cm-sesimbra.pt/spe2019/?page_id=63

⁵² <https://www.cm-palmela.pt/pages/1427>

-The **Educational Service of the Municipal Museums of Setúbal**⁵³ develops a pedagogical programme with interdisciplinary initiatives and projects aimed at gradually raising awareness in society about the knowledge, preservation, and promotion of cultural heritage (both tangible and intangible). Highlighting various thematic visits related to fishing and the canning industry, open to both schools and the general public, there are also activities organised by the Heritage and Archaeology Sector of the Municipality of Setúbal to raise awareness about the archaeological heritage of the municipality and the Arrábida region. These include guided tours of archaeological sites, the 'Arqueologia em Setúbal' (Archaeology in Setúbal) school activity, which aims to explain archaeology as a science and the role of archaeologists, guided tours of fortresses within the proposed area, as well as other archaeological sites and historic buildings, and visits to the historic centre.

-The **Professor Luiz Saldanha Oceanographic Museum**, located in the Fortress of Saint Mary of Arrábida and managed by the ICNF, offers guided tours for school groups and other organised groups, as well as environmental education activities for the general public. The museum showcases the processes of study and management of the Luiz Saldanha Marine Park, aiming to raise awareness among the public to support the role that this protected area plays in the region.

Within the scope of educational projects and in partnership with local associations, activities dedicated to the knowledge of Arrábida are also offered, as exemplified below:

NECA - 2019/2020 school year 'Expedição pela Arrábida' (Expedition through Arrábida) - Field trip through the ecosystems of Arrábida, namely Terras do Risco, Achada, or Pinheirinhos/Azoia, focusing on the geographical context, with an emphasis on karstic environments, and 'Palestras Arrábida por dentro e por fora' (Arrábida Inside and Out Lectures) - a series of lectures aimed at showcasing the natural heritage of the Arrábida mountain range, with special emphasis on topics such as flora, fauna, geology, and speleology. The topics will be developed using the inventory carried out by NECA, showcasing the most important aspects of the region's biodiversity and geodiversity.

ENA - Sustainability Kits - as a pedagogical resource, the Sustainability Kits aim to train students for a new way of exploring the Earth's resources and new ways of acting and interacting with the environment. Aimed at the school population (pre-school to 9th grade), they address various topics related to climate and climate change, energy efficiency, sustainable mobility, consumption, the circular economy, the ocean, and

⁵³ <https://www.mun-setubal.pt/servico-educativo-dos-museus-municipais/>

natural heritage. The contents of the kits are interconnected with the curricula of the various levels of education and have been prepared to be used not only in the classroom, but also outdoors and at home. The physical kits are made available to schools in the municipalities of Palmela, Sesimbra, and Setúbal through the School Libraries Network, and one of the three existing kits is dedicated to the theme 'Arrábida - Mountain and Sea'.

AMRS - An example of how Arrábida can mobilise the educational community at regional level was the Kid's Guernica Project dedicated to Arrábida. Kid's Guernica is an educational project carried out by the AMRS and its associated municipalities since 2005, aiming to spread the values of Freedom, Equality, and Peace. 'Arrábida Biosphere', the theme chosen for the 6th edition of the 'Kid's Guernica' project, is based on the desire to encourage a reflection on the topic of Sustainability and Sustainable Development, considering the importance of recognising a territory. The theme was also intended to promote and reinforce the issues of Peace and Non-Violence through a reflection on our actions towards the environment, raising awareness of behaviours that are essential to guarantee the survival of species on the planet. The participation of schools in this edition was remarkable, with around 4,500 students from the 5th grade to secondary education registering and submitting a total of 895 works.

Lastly, there are plans to set up a centre for the interpretation and dissemination of the natural heritage of Arrábida, in the village of Pedreiras, which is already underway and is expected to be completed in 2024. The project included adapting the old primary school building and the development of contents, pedagogical projects, and interaction with the community. The aim was for the full operation of the facility to include coordination with the nature rangers of the Instituto da Conservação da Natureza e das Florestas, as well as with the associative movement and nature tourism companies present or operating in the territory. In the future, this facility will be even more useful as its ability to interact with local institutions and its promotion to local populations and visitors increase. As part of the project, an initial exhibition was set up to support environmental education activities, already implemented during the 2019/2020 school year, with the support of the Núcleo de Espeleologia Costa Azul (NECA).

16.2.2

WHAT FACILITIES AND FINANCIAL RESOURCES ARE (OR WILL BE) AVAILABLE FOR THESE ACTIVITIES?

The municipalities within the Arrábida Biosphere Reserve have their own budgets that include the management of the proposed region. In addition, ADREPES - Associação para o Desenvolvimento Regional da Península de Setúbal, through the PRODER and PROMAR programmes, has funding lines for projects that promote regional development, which can be applied within the territory. Also, the ENA (Agência de Energia da Arrábida), through its projects, is already providing funding for the described activities, being the driving force behind some of them, such as the educational kits.

Municipal facilities in the municipalities of Setúbal, Sesimbra, and Palmela are used for land management activities, ranging from museums to interpretive centres.

16.3

CONTRIBUTION TO THE WORLD NETWORK OF BIOSPHERE RESERVES

16.3.1

HOW WILL THE PROPOSED BIOSPHERE RESERVE CONTRIBUTE TO THE WORLD NETWORK OF BIOSPHERE RESERVES, ITS REGIONAL AND THEMATIC NETWORKS?

The proposed Biosphere Reserve prioritises local, regional, national, and international cooperation, and therefore aims to be an active partner in relevant thematic networks, such as the National Network of Biosphere Reserves, contributing to strengthen the environmental and cultural diversity aspect of the World Network.

Arrábida aims to distinguish itself through its status and enhanced vision of 'Sustainable Arrábida', serving as a benchmark model for integrated, participatory, and sustainable management of natural resources, with an emphasis on sustainable development. The proposed Reserve is a living, millennia-old laboratory of sustainable development, entirely at the service of its inhabitants. It is capable of becoming a global example and of enriching itself on that scale through experience and integration into a network like the World Network of Biosphere Reserves.

The human occupation of Arrábida, favoured by the region's morphological characteristics and Mediterranean climate, as well as easy access to endogenous natural resources, spans centuries of history, tradition, and culture. This is evident in the customs and expressive traits of a resilient people, as well as in the characteristic duality of the landscapes bordering between mountains and sea, which glorify the scenery of the Arrábida Biosphere Reserve. The proposal for the Arrábida region to become a Biosphere Reserve thus brings together the natural synergy of the three municipalities within its territory: Setúbal, Sesimbra, and Palmela, in their differences and shared aspects, contributing to the natural and cultural richness of the region. The municipality of Sesimbra is predominantly coastal, with fishing and other activities linked to the sea having significant prominence in the area; Palmela is an inland municipality, predominantly rural with strong agricultural activity, while Setúbal, due to its estuarine location, has a significant tradition not only in fishing but also in activities related to the marshland, such as salt extraction and oyster farming. The Arrábida Mountain Range connects these three pillars.

The diversity of ecosystems found in the region and their associated human activities give Arrábida a distinctive characteristic within the framework of the Biosphere Reserves. The scientific relevance of species and habitats encompasses a range of ecosystems, landscapes, and biodiversity that earns this region the classification as an international biodiversity hotspot, making it an important repository of identified and protected values capable of providing valuable contributions to the World Network of Biosphere Reserves. Indeed, it has more than 70 species of flora whose populations in the Arrábida region are considered important for regional and/or national species conservation due to their rarity and/or endemism. In terms of fauna, it also stands out with numerous endemic species of entomofauna, arachnofauna, and gastropods. Additionally, it serves as a habitat for significant populations of cave-dwelling bats and a site for migratory flow (avifauna).

The extended period of continuous occupation, the geographical location, and the unique characteristics of the territory have shaped a historically and culturally rich and remarkable identity at all levels. This identity will be showcased and valued as part of the UNESCO Biosphere Reserve.

The Arrábida Biosphere Reserve is committed to participatory management involving all stakeholders in the region, from citizens to decision-makers. From this perspective of learning and sharing experiences, it is also important to foster collaboration with other Biosphere Reserves for mutual enrichment and networked outcomes.

16.3.2

WHAT ARE THE EXPECTED BENEFITS OF INTERNATIONAL COOPERATION FOR THE BIOSPHERE RESERVE?

The proposed Reserve's international cooperation with other Biosphere Reserves will facilitate the sharing of experiences and promote the exchange of knowledge, consolidating it as a laboratory for experiments in nature conservation, the protection of natural and cultural heritage, as well as economic and social development. Furthermore, it will allow for the dissemination and promotion, within the networks of Biosphere Reserves, of the knowledge and the products and services offered by the Arrábida Biosphere Reserve.

The exchange of knowledge and experiences between the Arrábida Biosphere Reserve and the other reserves in the World Network of Biosphere Reserves will contribute to essential learning, with mutual benefits, in overcoming potential obstacles and improving processes. This will aid in the participatory management aimed at achieving the objectives of the MAB Programme in the Arrábida Biosphere Reserve.

When it comes to managing sustainable human activities, such as tourism, the experience conveyed by other Reserves with similar characteristics is essential. Development in energy issues and global challenges such as climate change and biodiversity loss are also crucial.

The Biosphere Reserve status will serve to project Arrábida at national and international level, enhancing its endogenous resources, biogeodiversity, historical and cultural heritage, traditions, and rurality.

16.4

INTERNAL AND EXTERNAL COMMUNICATION CHANNELS AND MEDIA USED BY THE BIOSPHERE RESERVE

16.4.1

BIOSPHERE RESERVE WEBSITE

The website for the future Arrábida Biosphere Reserve already exists at **arrabida.amrs.pt**. However, in addition to the website, the Action Plan also includes a Communication Plan that will encompass all aspects related to the image, communication methods, and promotion of the future Reserve.

16.4.2

ELECTRONIC NEWSLETTER

Part of the Communication Plan for the Arrábida Biosphere Reserve includes the production of an electronic newsletter that will be regularly sent to the community, aiming to promote communication and strengthen relationships with the population and partner organisations.

16.4.3 SOCIAL NETWORKS

The Arrábida Biosphere Reserve nomination has a social media profile on *Facebook* at www.facebook.com/arrabidabiosfera, which has 1,700 followers. Upon approval, that profile will become that of the Arrábida Biosphere Reserve.

In the Communication Plan to be developed, particular attention will be given to the presence of the Biosphere Reserve on social media and other digital channels, thus ensuring a continuous connection with the local community and broader dissemination of projects and initiatives promoted by the Arrábida Biosphere Reserve. The presence of the BR on social media can serve as a valuable tool for gathering input through surveys that may provide important data for managing the BR and monitoring the Action Plan.

The conservation function of the reserve could benefit greatly from the use of social media, as it allows for the rapid and extensive dissemination of awareness campaigns, particularly reaching younger audiences.

Also when it comes to attracting partners for projects of the Biosphere Reserve or those it intends to support, leveraging social media can be highly beneficial as it allows for targeted engagement with specific audiences in a swift and agile manner.

The Arrábida Biosphere Reserve will also actively participate in the social media of the National Network of Biosphere Reserves, showcasing its activities and highlighting the projects that most contribute to strengthening this network.

17

BIOSPHERE RESERVE GOVERNANCE, MANAGEMENT AND COORDINATION

17.1

MANAGEMENT AND COORDINATION STRUCTURE

The main management and coordination structure of the Reserve will be the Executive Committee, composed of the five promoters of the application - the three municipalities, the Instituto da Conservação da Natureza e Florestas (ICNF), and the Associação de Municípios da Região de Setúbal (AMRS). This committee is the Reserve's decision-making body, with the authority to approve all matters related to the management of the reserve. It is composed of the entities responsible for the territory and the Managing Entity. The collective work experience of the five organisations that make up the Executive Committee and their relationship with the community ensure that significant concerns or needs for the preservation and enhancement of the Reserve are continuously integrated into the Reserve's management efforts. The Executive Committee is also the body responsible for establishing the necessary contacts and connections with partner organisations and coordinating the management of the Reserve with them.

This structure is supported by an **Advisory Committee** and a **Scientific Committee**. The former will be set up as a council in which all the relevant organisations for the management and promotion of the Reserve participate, and the former will consist of a structure for the participation of the regional scientific community, namely higher education institutions, or from other regions, when their contribution is deemed relevant for achieving the objectives of the Reserve.

The Scientific Committee is responsible for advising the Executive Committee and the Technical Committee on technical and scientific matters to support the management of the Biosphere Reserve and enhance the planned activities. To achieve this, it will convene once a year or as necessary. This committee is predominantly composed of universities, regional government bodies, research centres, as well as researchers or agents directly involved in the territory.

The Executive Committee is supported in pursuing its objectives and fulfilling its responsibilities by a Managing Entity - the Associação de Municípios da Região de Setúbal, which oversees the daily management of the Reserve, along with a Technical Committee composed of technicians from the municipalities involved, and a Reserve Coordinator.

The **Managing Entity** will provide the logistic and administrative support necessary for the proper functioning of the Biosphere Reserve, as well as the execution of its Action Plan, through its coordinator who, together with the Technical Committee, will ensure compliance with all management requirements.

The Technical Committee is responsible for assisting the Managing Entity and advising the Executive Committee, undertaking the necessary technical tasks for the implementation of the Action Plan of the Biosphere Reserve. Whenever necessary, the committee will include technicians from other organisations whose contribution to the implementation of the Action Plan proves relevant.

17.1.1

WHAT IS THE LEGAL STATUS OF THE BIOSPHERE RESERVE?

The area of the proposed Biosphere Reserve, which encompasses part of the municipalities of Sesimbra, Setúbal, and Palmela, is integrated into the Natura 2000 Network, a European Union nature conservation policy instrument aimed at protecting and conserving birds, natural habitats, and wild fauna and flora of Europe - the Arrábida/Espichel Special Conservation Area (PTCON 0010), and the Cape Espichel Special Protection Area (PTZPE 0050). With regard to the ZEC, it should be noted that its Management Plan is at the final stage of public discussion and awaits final approval.

At the national level, it should be noted that the territory underlying this application is included in the Arrábida Natural Park (PNA), which encompasses the entire terrestrial area of the Arrábida Mountain Range from the Castle of Palmela to Cape Espichel, and also includes the marine area classified as the Luiz Saldanha Marine Park.

Decree no. 355/71, of 16 August, had already established the Arrábida Mountain Range Reserve. The PNA, with a terrestrial area of 12,328 ha, was created by Decree-Law no. 622/76, of 28 July, which was later extended by two decrees:

- (i) *Regulatory Decree no. 23/98, of 14 October*, which reclassified the PNA by extending its boundaries to include a marine area, thereby completing the nature conservation objectives underlying the NP. The value of the marine fauna and flora along the Arrábida coast was thus encompassed by the Luiz Saldanha Marine Park, with an area of 5,621 ha, 38 km of coastline, a maximum depth of 100 m, and more than 1,400 marine species. It is contiguous to the previously classified terrestrial area. In the Cape Espichel area, protection is aimed at marine cliffs, endemic plant species, bird nesting sites, and the preservation of ichnofossils. And
- (ii) *Regulatory Decree no. 11/2003, of 8 May*, which modifies the boundaries of the PNA defined in the previous decree.

The PNA has a Management Plan in place for both its terrestrial and marine areas

- Arrábida Natural Park Management Plan (POPNA), approved by RCM no. 141/2005, of 23 August, which establishes the systems for protecting natural resources and values, sets their uses, and outlines the management regime.

The area of the Natural Park included in this application was also classified as a Biogenetic Reserve by the Council of Europe in 1979, designated as Arrábida Mountain Range.

17.1.2

WHAT IS THE LEGAL STATUS OF CORE AREA(S) AND BUFFER ZONE(S)?

The zoning defined for the proposed Biosphere Reserve took into account the natural, social, economic, and cultural characteristics of Arrábida, with the main reference being the susceptibility of natural environments, depending on human activities and their implications on the territory. In this context, these boundaries were adjusted to the natural values present in the areas of the Natura 2000 network and the Arrábida Natural Park.

The fact that the proposed Biosphere Reserve corresponds to an extensive area, yet is organised both materially and organically as a unit and has a simple zoning, will contribute to its efficient management with the aim of achieving the conservation, development, and logistic support objectives, while also influencing the entire population within the Reserve and its surroundings. Human activities are regulated and in harmony with the natural and heritage values present, and communication with the population resulting from the constant work of the promoting organisations fosters spaces for convergence, debate, and action that contribute to the consolidation and promotion of the objectives of the Reserve.

The **Core Areas** of the southern slope of Espichel, the woodlands of the central area of the Mountain Range, and the marine region south of Risco are covered by the legal status of the Regulations of the Arrábida Natural Park Management Plan, considered as Total Protection areas. The S. Luís Core Area is covered by the Partial Protection Area I legal status under the same legal framework.

The **Buffer Zones** correspond to Partial Protection Areas I and II and Complementary Protection Areas of the same regulation.

The total area proposed corresponds to 20,152.92 ha (approximately 201.53 km²), of which the Core Areas total 2,688.16 ha (approximately 26.88 km²), accounting for about 13.34% of the total area. These dimensions are sufficient to ensure the long-term preservation of natural values, as they include the most important areas from Arrábida's natural biodiversity perspective.

The Buffer Zone corresponds to around 23.45% of the area of the proposed Biosphere Reserve, totalling 4,725.16 ha (approximately 47.25 km²). The size of this area is designed to protect the Core Area efficiently, while allowing for the development of human activities in the surrounding areas without jeopardising the natural values to be protected.

Most of the proposed Biosphere Reserve (63.21%) is covered by the Transition Area, spanning a total area of 12,739.61 ha (approximately 127.40 km²). This is where most of the productive activities in Arrábida take place, including traditional fishing, boat construction and caulking, cheese production, vineyards and wine production.

17.1.3 WHICH ADMINISTRATIVE AUTHORITIES HAVE COMPETENCE FOR EACH ZONE OF THE BIOSPHERE RESERVE (CORE AREA(S), BUFFER ZONE(S), AND TRANSITION AREA(S))?

The Administrative Authorities for the whole territory covered by the proposed Biosphere Reserve are the **municipalities involved, namely Sesimbra, Setúbal, and Palmela and the Instituto da Conservação da Natureza e Florestas (ICNF)** - common to the Core and Transition Areas and the Buffer Zone.

In exercising their competencies within the Reserve, the City Councils rely on partnerships and synergies in various areas and with various organisations. As stipulated by law, the municipalities also rely on the opinions of other organisations, namely the ICNF - which acts as the National Authority for Nature Conservation and Biodiversity and the National Forestry Authority, the Agência Portuguesa do Ambiente, and the Comissão de Coordenação e Desenvolvimento Regional de Lisboa e Vale do Tejo - CCDR-LVT (Regional Development and Coordination of Lisbon and Tagus Valley).

The proposed Biosphere Reserve, being partially located within the Arrábida Natural Park (PNA), is also under the administration of the Instituto da Conservação da Natureza e Florestas, particularly concerning the protection of local natural, geological, floristic, faunal, and landscape values.

17.1.4

CLARIFY THE RESPECTIVE COMPETENCE OF EACH OF THESE AUTHORITIES

THE ICNF *'is a public institute under a special regime, under the indirect administration of the State, endowed with administrative and financial autonomy and its own assets'*⁵⁴ and *'its mission is to propose and implement integrated policies for land use planning and management, in coordination with public and private entities, in the fields of nature conservation, biodiversity, forests, and the competitiveness of the forestry sector(...)'*⁵⁵. Its competencies are set out in Decree-Law no. 43/2019, of 29 March, revised by Decree-Law no. 46/2021, of 11 June.

For the purposes of this application, it should be noted that the ICNF serves as the national authority for nature conservation and biodiversity, as well as the national forestry authority, and is also responsible for 'supporting the formulation and implementation of the nature conservation and biodiversity policy and the national forestry policy, ensuring the enhancement of natural capital, the conservation and active management of species, natural habitats of wild flora and fauna, geosites, as well as the sustainable management of forestry production, forest and natural spaces, hunting, forestry, beekeeping, and aquaculture resources in inland waters, and other resources and services provided by ecosystems'⁵⁶.

The municipalities of Palmela, Sesimbra, and Setúbal are local authorities defined by the Constitution of the Portuguese Republic as 'territorial legal persons endowed with representative bodies, which aim to pursue the interests of their respective populations'. Their competencies are set out in the Legal Framework for Local Authorities, Law no. 75/2013, of 12 September, and in this context, it is worth highlighting their attributions in domains such as land use planning, environment, heritage, culture, science, education, health, development promotion, rural and urban facilities, among others (Article 23 of Law no. 75/2013, of 12 September).

⁵⁴ Decree-Law no. 43/2019, of 29 March, revised by Decree-Law no. 46/2021, of 11 June, Article 1(1).

⁵⁵ Decree-Law no. 43/2019, of 29 March, revised by Decree-Law no. 46/2021, of 11 June, Article 3.

⁵⁶ Decree-Law no. 43/2019, of 29 March, revised by Decree-Law no. 46/2021, of 11 June, Article 4(b).

17.1.5

INDICATE THE MAIN LAND TENURE (OWNERSHIP) FOR EACH ZONE

The nature of the ownership in the proposed area is, for the most part, private: 98%. There are some areas owned by the State, totalling approximately 321.3 ha (corresponding to 1.59% of the total terrestrial area of the Biosphere Reserve), and the areas of maritime public domain, which are exceptions.

In the terrestrial environment, the public domain is distributed as follows, according to the proposed zoning:

- Core Area: 0.14 ha;
- Buffer Zone: 39.94 ha;
- Transition Area: 281.23 ha.

17.1.6

IS THERE A SINGLE MANAGER/COORDINATOR OF THE BIOSPHERE RESERVE OR ARE THERE SEVERAL PEOPLE IN CHARGE OF MANAGING IT?

The Managing Entity is the Associação de Municípios da Região de Setúbal, which assumes executive functions within the organisational structure of the Biosphere Reserve.

The Managing Entity of the Biosphere Reserve will ensure the logistic and administrative support necessary for the proper functioning of the Biosphere Reserve and, together with the Technical Committee, will ensure compliance with and implementation of the respective action plan, as well as the execution of all decisions of the Reserve's Executive Committee.

17.1.7

ARE THERE CONSULTATIVE ADVISORY OR DECISION-MAKING BODIES FOR EACH ZONE OR FOR THE WHOLE BIOSPHERE RESERVE?

The **Advisory Council** will meet at least twice a year, serving as a broad space for discussion, monitoring, and implementation of the objectives of the Biosphere Reserve. This Council consists of the various organisations active in the area of the Biosphere Reserve, as well as organisations involved in or developing work related to areas of interest for the Reserve's management.

These organisations include representatives of the educational communities of the three municipalities, local, regional and national NGOs primarily focused on nature conservation, representatives from structures connected to health, culture, economic development, and decentralised state bodies with related activities, among many others. (see Chapter 13.3.)

These organisations, given their areas of intervention and the technical and specialised work they do, strengthen the plurality of analysis, participation, and decision-making in the context of the needs set out in the Action Plan. Furthermore, they will also play a key role in sharing and disseminating the results achieved over time.

The Scientific Committee, which is also assigned advisory functions, includes organisations from the regional and national scientific community, and should play a very important role considering the objectives of the Reserve. This Committee will meet at least once a quarter and will be responsible for advising the Executive Committee on technical and scientific matters relevant to Arrábida.

17.1.8

HAS A COORDINATION STRUCTURE BEEN ESTABLISHED SPECIFICALLY FOR THE BIOSPHERE RESERVE?

The General Coordination of the Biosphere Reserve is the responsibility of the Executive Committee, which is composed of representatives from the executive or management bodies of the five organisations promoting this application: the Associação de Municípios da Região de Setúbal - AMRS, the Instituto da Conservação da Natureza e Florestas - ICNF, and the municipalities of Sesimbra, Setúbal, and Palmela.

As mentioned in Chapter 17.1.4, the ICNF is a public institute under the indirect administration of the State, but endowed with administrative and financial autonomy and its own assets. The municipalities of Sesimbra, Setúbal, and Palmela are local authorities, structures within the political organisation of the state⁵⁷, and have political, administrative, and financial autonomy.

The AMRS is an association of municipalities with specific purposes, established in 1983. It is composed of nine municipalities from the Setúbal Peninsula, including the three municipalities that signed the application, as well as municipalities from the Alentejo Coast.

The AMRS is a public law organisation with its own assets and finances, established to pursue the common interests of its member municipalities and to defend collective interests of regional or local nature, such as promoting this application.

The Executive Committee of the future Biosphere Reserve will have the following main functions:

- Approve the rules governing the operation of the Biosphere Reserve;
- Approve the annual and multi-annual Plans and Budgets, as well as the Activity and Accounts Reports;
- Approve the strategic and specific objectives of the Action Plan and regularly monitor their fulfilment;
- Approve revisions to the Action Plan;
- Represent the Biosphere Reserve;
- Ensure the availability of human and financial resources to ensure the necessary structure to achieve the established objectives.

The Executive Committee is assisted by the Advisory Council and the Scientific Committee and delegates the implementation of its decisions to the Managing Entity of the BR.

⁵⁷ Constitution of the Portuguese Republic

17.1.9

HOW IS THE MANAGEMENT/COORDINATION ADAPTED TO THE LOCAL SITUATION?

The Executive Committee, as a management body, actively involves organisations with functions as administrative authorities. These organisations have been working together for decades with the community in the management of this territory, showing deep respect for the local activities that characterise the region, as well as for its vast natural and cultural heritage.

That experience and close relationship with the community enable a continuous consultation process, both through formal and informal means, adapting the measures proposed in each Action Plan to the most relevant concerns or needs for the preservation of Arrábida as a unique ecosystem recognised by all.

17.1.10

IS THERE A PROCEDURE FOR EVALUATING AND MONITORING THE EFFECTIVENESS OF THE MANAGEMENT?

MONITORING

It will be the responsibility of the Executive Committee to ensure that the Action Plan of the Arrábida Biosphere Reserve can be fully implemented. In this way, this Committee will ensure the monitoring of the actions outlined in its action plan, allowing for an assessment of the progress in implementing the planned actions, projects, and initiatives. It will also be responsible for assessing the achievement of the targets set, using evaluation parameters such as gathering evidence and indicators, which will enable the compilation of results and further allow for the evaluation and monitoring of the effectiveness of the Reserve's management.

The Executive Committee will work in coordination with the various promoters involved to prepare semi-annual and annual progress and monitoring reports, which will include predefined evaluation parameters. These progress reports will serve as analytical tools, allowing the Executive Committee to intervene in the revision of the Action Plan when necessary, either in terms of implementing the planned targets or in adapting to new needs and specifications.

The Executive Committee also plans to provide the public with summarised information on the progress of the actions outlined in the Action Plan of the Arrábida Biosphere Reserve, strengthening the relationship with all stakeholders.

At the end of the period of validity, the Executive Committee, in coordination with the promoters of the actions, will prepare the Report on the Implementation of the Action Plan, outlining the specific actions carried out by compiling the overall results achieved during the assessment period as detailed in the previously prepared progress reports.

REVISION

The Action Plan of the Arrábida Biosphere Reserve may be subject to revision if necessary. The revision may occur following a detailed analysis of the progress reports, as well as upon recommendation from the Advisory Council, the Scientific Committee, the involved partners, and/or stakeholders. For revision purposes, potential changes in the socioeconomic context and other external factors that justify it due to their dimension and impact will also be taken into account.

17.2 CONFLICTS WITHIN THE BIOSPHERE RESERVE

17.2.1 DESCRIBE ANY IMPORTANT CONFLICTS REGARDING THE ACCESS OR THE USE OF NATURAL RESOURCES IN THE AREA CONSIDERED

There are no conflicts of any kind at this level. Administrative management in the Core Areas and Buffer Zones is clearly defined in terms of competence under the legislation on classified or protected areas, or through the application of forestry regulations to forest schemes, Sectoral Plans, or constraints imposed by the Municipal Master Plans (PDM) of Setúbal, Sesimbra, and Palmela. Management in the Transition Area is also defined according to these regulatory instruments related to land use planning. It is also important to highlight the fruitful collaboration that has occurred over the years among the organisations that are submitting the Biosphere Reserve application.

17.2.2

IF THERE ARE ANY CONFLICTS IN COMPETENCE AMONG THE DIFFERENT ADMINISTRATIVE AUTHORITIES IN THE MANAGEMENT OF THE BIOSPHERE RESERVE, DESCRIBE THESE

The legal framework of attributions and competencies concerning the administrative authorities involved in the management of the Arrábida Biosphere Reserve, as well as their diverse nature, are designed so as to prevent any possible conflicts of competencies, which are therefore not foreseen.

However, any situations that may arise will be analysed in accordance with the planning and management instruments in force and the applicable legislation, specifically the authorisation and licensing regimes, the environmental impact assessments and incidences and, above all, the management structures created for the management of the Biosphere Reserve.

17.2.3

EXPLAIN THE MEANS USED TO RESOLVE THESE CONFLICTS, AND THEIR EFFECTIVENESS

If a conflict does arise, the Executive Committee will provide the necessary clarifications and mediation.

17.3

REPRESENTATION, PARTICIPATION AND CONSULTATION OF LOCAL COMMUNITIES

17.3.1

AT WHAT STAGES IN THE EXISTENCE OF A BIOSPHERE RESERVE HAVE LOCAL PEOPLE BEEN INVOLVED?

The process of preparing this application began in 2016 with the **Public Presentation of the Application for the Arrábida Biosphere Reserve**, held at the auditorium of the Setúbal School of Hospitality and Tourism.

In addition to presenting the promoting organisations, efforts were made from the outset to involve organisations representing the community in the process that was now underway. Together, we reflected on the objectives of the application and on the community's participation in its construction.

The presentation was attended by local and regional organisations involved in economic, environmental, social, cultural, and academic activities, among others (attendance list attached).

During these eight years (interrupted by the COVID-19 pandemic), dozens of meetings were held, based on a broad platform involving technicians from the promoting organisations in different areas and sectors of work, namely land use planning, environment, culture, tourism, education, and economic development, among others. The platform gathered contributions that were essential for structuring the application.

Based on this information, discussions were held with local organisations that work daily in the Arrábida territory, such as ENA - Agência de Energia da Arrábida, ADREPES - Agência de Desenvolvimento Regional da Península de Setúbal, ARCOLSA, Administração dos Portos de Setúbal e de Sesimbra - APSS, S.A., ERT-LVT - Entidade Regional de Turismo da Região de Lisboa, the Direção Regional de Agricultura e Pescas, among others. These meetings yielded a new and important set of contributions regarding the ongoing work in the territory, as well as insights on the vision and mission of the Arrábida Biosphere Reserve.

From the outset, the work around the application was based on the principle of broad community and stakeholder involvement and participation, fostered by information/dissemination sessions and participatory sessions to gather input and feedback.



To this end, several sessions were held to publicise the application at various events in the region, including the presence of its own space at various editions of the **'Cheese, Bread and Wine Festival'**, organised by ARCOLSA - Associação Regional de Criadores de Ovinos Leiteiros da Serra da Arrábida. This initiative is a privileged showcase of the best the region has to offer: PDO Azeitão Cheese, other sheep cheeses, sheep butter, regional wines, traditional bread, honey, pastries, fruit, and gastronomy.

The application was also present at several editions of **'Quinta na Moagem'**, an initiative organised by the Sesimbra City Council, the Castelo Parish Council, and ARCOLSA.

During these initiatives, it was possible to interact with the local community, raising awareness of the need for everyone to get involved and participate in building the application.

The project was also present at several editions of the **San'tiago Fair**, organised by the Setúbal City Council, and the Harvest Festival, organised by the Palmela City Council. These events are visited by thousands of people every year and are an excellent opportunity for raising awareness and gathering inputs for the application.

We were also present at the 11th and 12th editions of **Observanatura**. This fair, dedicated to nature tourism, is organised by the ICNF together with the Setúbal City Council and TroiaNatura, showcasing the heritage of the Arrábida Natural Park in all its aspects. Here, it was possible to clarify the significance of the Biosphere Reserve to the various tour operators in the Arrábida region and raise awareness of their participation in sectoral workshops.

In addition to these events, we also participated in seminars/conferences, notably, in 2017, in the Conference **'Conversas com a Serra e o Mar' (Conversations with the Mountain and the Sea)** in Pinhal Novo, Palmela, which was attended by Dr. Anabela Trindade, President of the National Committee of the Man & Biosphere Programme, who gave a brief presentation on 'The Arrábida Mountain Range - Biosphere Reserve', providing a closer dissemination of the work developed.

The **6th edition of the Kid's Guernica Project**, in the 2017/2018 school year, focused on the theme 'Arrábida Biosphere'. This educational project, which has stood out and taken root within schools, involved around 4,500 students and 895 works, from the 5th grade to secondary education in the region.

During the project, it was possible to hold an information session about Arrábida, for the teachers involved in this edition of Kid's Guernica, and raise their awareness of the importance of its natural and cultural values. As a result of this process, **895 works were developed by students from the region's schools**, who expressed through painting their **vision** of the Arrábida Biosphere Reserve.

In this 2018 edition, the Portuguese National Commission for UNESCO selected the Kid's Guernica Project as one of the three best national projects for the UNESCO - Japan Prize on Education for Sustainable Development.

In 2018, we participated in the **XXIV Pedagogical Conference on Environmental Education** organised by the ASPEA - Associação Portuguesa de Educação Ambiental, in partnership with the Setúbal City Council and the Instituto das Comunidades Educativas.

The 'Arrábida Biosphere' application was also presented at the Conference '**Oceanos: Sensibilizar para Agir, Proteger para Valorizar**' (**Oceans: Raise Awareness to Act, Protect to Enhance**). The initiative, held in 2018 as part of the World Oceans Day celebrations (in coordination with the Instituto Politécnico de Leiria and the Intersectoral Oceanographic Commission), took place in Peniche. The opening session was attended by the Minister for Foreign Affairs, Augusto Santos Silva, the Secretary of State for Fisheries, José Apolinário, and the President of the National Commission for UNESCO (CNU), Ambassador José Filipe Moraes Cabral.

In 2019, we participated in the Seminar entitled '**Recursos Pedagógicos aplicados à**

Educação para a Sustentabilidade' (Pedagogical Resources Applied to Education for Sustainability), organised by the ENA - Agência de Energia Arrábida. A presentation was given on the 'Application for Arrábida to Become a Biosphere Reserve' and the Arrábida - Mountain and Sea teaching kit was launched. It is important to note that this initiative was directed at teachers from 1st to 9th grade in the municipalities of Palmela, Setúbal, and Sesimbra, providing an excellent opportunity to involve the educational community in the application.

Also in 2019, we participated in the **Seminar 'Arrábida - Biosphere Reserve'**, held as part of the municipal programme **'Setúbal Resiliência +, Os dias da Segurança'** (Setúbal + Resilience, Safety Days), organised jointly by the Setúbal City Council - Municipal Civil Protection Service, and the Setúbal Fire Brigade. Here, participants became acquainted with the objectives of the application and were made aware of the need to participate in its construction.

Also in 2019, we launched the 'Arrábida Biosphere' website, with the aim of publicising Arrábida's application to become a Biosphere Reserve to a wider audience. The website, beyond its informative dimension, has proven to be crucial in raising awareness among communities about the importance of participation and involvement in the process.

We also highlight the **Sectoral Workshop Cycles** with the participation of various organisations with an impact on the local community. These cycles took place between June and October 2019, and later on, between November 2023 and January 2024 in Palmela, Sesimbra, and Setúbal (see Chapter 13.4).

This series of initiatives allowed gathering relevant inputs. Firstly, regarding the vision and objectives of the Arrábida Biosphere Reserve and, secondly, regarding the actions and measures to be included in the Action Plan.

This cycle of workshops, held between June and October 2019, involved around 70 organisations representing the local community (attendance list in Annex III) covering topics such as: Administration and Local Government; Agriculture and Fisheries; Industry; Education, Culture, and Heritage; Tourism, Sport, and Leisure; Environment, Science, and Health.

1st Cycle of Sectoral Workshops

THEME	DATE	VENUE
Administration and Local Government	18 June	Setúbal Livramento Market Auditorium
Agriculture and Fisheries	25 June	Espaço Fortuna Palmela
Extractive Industry	9 July	Sesimbra Business Incubation Support Centre
Education, Culture, and Heritage	8 October	Palmela Municipal Library Auditorium
Tourism, Sport, and Leisure	15 October	Casa da Baía Setúbal
Environment, Science, and Health	22 October	Conde Ferreira Auditorium Sesimbra



1st cycle of sectoral workshops

A second cycle of sectoral workshops, held between November 2023 and January 2024, focused on gathering input for the Action Plan of the Biosphere Reserve. Five sessions were held, attended by 31 organisations (attendance list in Annex III), on the following topics: Territory and Local Government; Economic Activities; Education, Culture, and Heritage; Tourism, Sport, and Leisure; Environment, Science, and Health.

2nd Cycle of Sectoral Workshops

THEME	DATE	VENUE
Territory and Local Government	14 November	Palmela Municipal Library Auditorium
Economic Activities	21 November	Palmela Municipal Library Auditorium
Education, Culture, and Heritage	12 December	Casa da Cultura Setúbal
Tourism, Sport, and Leisure	9 January	Sesimbra Conde Ferreira Auditorium
Environment, Science, and Health	16 January	Casa da Baía Setúbal



2nd Cycle of Sectoral Workshops

17.3.2

DESCRIBE HOW THE LOCAL PEOPLE HAVE BEEN, AND/OR ARE REPRESENTED IN THE PLANNING AND MANAGEMENT OF THE BIOSPHERE RESERVE

The fact that the community is represented on the Advisory Council allows it to take on an active and influential role during the implementation of the actions outlined in the Action Plan and in the management of the Reserve itself. This is particularly important in the development of some of the projects to be implemented, but also in promoting and disseminating the objectives of the Biosphere Reserve. Overall, this participation reinforces the community's identification with the Reserve and the role it plays.

The inclusion in the Reserve's management of representatives from various organisations present in the territory, which interact with the community on a daily basis, as well as others that play an important role in the sustainable development of the region, allows the Reserve's management to take into account and ensure the development policies that are necessary and essential for territorial cohesion.

The application process for Arrábida to become a Biosphere Reserve has relied on the involvement and participation of the local community, a key factor in the construction of the application (see Chapters 13.4 and 17.3.1).

During the consultation process, which involved almost 200 organisations representing the population and various sectors of activity, in the numerous events where the application was present and where it was possible to interact with the community, albeit informally, as well as in the final consultation process, it was possible to receive relevant contributions that influenced the construction of the application. More importantly, they raised awareness and established bridges for future work in the management of the BR and for the implementation of the Action Plan.

It will be the responsibility of the Executive Committee, in coordination with the Scientific Committee and the Advisory Council, to ensure that this participation of society is a constant throughout this process, by taking into account the opinions, concerns, and needs of the local community for the planning, execution, and monitoring of actions and projects, as well as in the evaluation of the results achieved.

The involvement of the population is one of the greatest challenges we face, and therefore, the Action Plan proposes a wide range of actions that allow for a greater and better understanding of the territory and its values by the populations, thus resulting in a more active participation in the life of the BR.

This participation requires an effective management of the Action Plan and an Executive Committee that is always attentive, as the contributions that come in, whether through monitoring or more informal participation, must always be taken into account. This ensures that the population feels heard and involved, thus identifying more with the project and taking ownership of its objectives by participating actively.

17.3.3

DESCRIBE THE SPECIFIC SITUATION OF YOUNG PEOPLE IN THE PROPOSED BIOSPHERE RESERVE

The involvement of young people and the school community in the application process is crucial for the success of the Biosphere Reserve. Throughout this process, the necessary conditions were created to inform the school community about this application through a series of initiatives developed and aimed at schools and young people. One such initiative is the Kid's Guernica Project which, in the 2017/2018 school year, reached 11 municipalities in the Region with the theme 'Arrábida Biosphere', allowing the involvement of thousands of students and teachers who worked on sustainability issues, environmental issues, and became acquainted with the application process and its objectives for the Region.

The Biosphere Reserve serves as a tool for young people, capable of contributing to their comprehensive education as individuals, fostering their appreciation for activities related to the respect and conservation of nature.

The participation of young people and their organisations takes place in the Advisory Council through their associations linked to nature conservation, sports practice, or cultural activities, thus participating not only with their vision but also through practical actions, ensuring the future of the Biosphere Reserve.

17.3.4

WHAT FORM DOES THIS REPRESENTATION TAKE?

The involvement of local communities is one of the most valued aspects of the Biosphere Reserve, as mentioned in the various sections of the application process. Their involvement is primarily reflected in their participation in the various organisations that make up a community. Their involvement spans across various public and private organisations, namely educational institutions, public and private primary and secondary schools, public and private universities and polytechnic institutes, scientific institutions, associations of producers, fishermen, farmers, and hunters, cultural and recreational associations, local private businesses, and also the invaluable contribution of local authorities as representatives of their communities.

Local communities are actively involved in the application, indirectly through representative structures with a seat on the Advisory Council or the Scientific Committee, and directly through the actions outlined in the Action Plan.

17.3.5

ARE THERE PROCEDURES FOR INTEGRATING THE REPRESENTATIVE BODY OF LOCAL COMMUNITIES?

The bodies representing local communities are the Scientific Committee and the Advisory Council, whose members are mandated to represent the organisations they are part of, upon invitation from the Executive Committee or by self-nomination. Individuals of high merit who are not associated with any institution but excel in different sectors of activity relevant to the Biosphere Reserve may also be invited to join these bodies by the Executive Committee.

17.3.6 MECHANISMS FOR CONSULTATION

With regard to the preparation of the application, various consultation methods, both formal and informal, were used to validate the application's assumptions and to ensure that contributions were gathered for its construction (see Chapter 17.3.7)

As outlined in the governance model, the management of the Biosphere Reserve and the implementation of its Action Plan will be continuously monitored by the Advisory and Scientific Councils and, whenever necessary, public consultation processes will be conducted to validate revisions to the objectives of the work.

It is worth noting that permanent monitoring systems will also be implemented, through surveys for each action, not only to assess the outcome of the action, but also to provide data that allow us to evaluate the Reserve implementation process.

17.3.7

WHAT CONSULTATION MECHANISMS HAVE BEEN USED, AND WHO HAS BEEN INVOLVED? [BEING UPDATED]

In preparing the application for Arrábida to become a Biosphere Reserve, with the aim of achieving more effective participation, different approaches were introduced, starting with consultation with stakeholders and the local community (see Chapters 13.4 and 17.3.1).

Dozens of meetings were held between professionals of different fields and partner organisations, as well as 11 Sectoral Workshops to gather input and validate the proposed project (see Chapter 13.4).

The application also includes around a dozen public presentations at trainings sessions, seminars, conferences, and forums, allowing for the dissemination of information regarding the application and encouraging local community participation in its development and in the management of the future Biosphere Reserve (see Chapter 17.3.1).

The path we have travelled enabled a strong contribution from local communities, both in identifying the main values of the Biosphere Reserve and in defining the objectives of the application. But more importantly, it has allowed building bridges and establishing commitments that will be essential in the management of the future Arrábida Biosphere Reserve, as can be seen from the letters of commitment signed in the meantime by the stakeholders (Annex III).

Lastly, there was a period of public consultation between 14 and 29 May 2024, during which the Form and the Action Plan were available on the **arrabida.amrs.pt** website. On 21, 27, and 28 May 2024, in Setúbal, Palmela, and Sesimbra, respectively, there were public sessions to clarify and discuss the application file.

The public consultation involved around a hundred participants and its report is included in Annex III.

17.3.8

DO WOMEN PARTICIPATE IN COMMUNITY ORGANISATIONS AND DECISION-MAKING PROCESSES?

The actions carried out in this process aim to serve as an aggregating example of participatory opportunity, strengthening the exercise of citizenship and reiterating the presence of women in decision-making processes on matters of interest to civil society, which, under the aegis of Article 13 of the Constitution of the Portuguese Republic, enshrines the principle of equality for all citizens.

In addition to the constituent bodies of the Biosphere Reserve relying on the participation of many women who actively engage in the life of local organisations and entities, the Reserve aims to be a plural space for the participation of the local community, where everyone can have their say, but above all as an agent promoting and defending equal rights.

17.4 MANAGEMENT/COOPERATION PLAN AND POLICIES FOR THE BIOSPHERE RESERVE

17.4.1 IS THERE A MANAGEMENT/COOPERATION PLAN/POLICY FOR THE BIOSPHERE RESERVE AS A WHOLE?

The Action Plan of the Arrábida Biosphere Reserve is its operational management instrument, prepared based on a joint and shared reflection on the reality of the Arrábida territory, taking into account contributions from the community in general.

Some of the proposed measures arise in continuity with work that is already underway in the management of the proposed Biosphere Reserve area, whether initiated by the municipalities or in partnership between the municipalities, the ICNF, or other organisations with relevant activity in this territory. The Action Plan also seeks to address some of the main concerns felt in various sectoral areas, with a direct impact on the sustainable development of the Arrábida Region.

The Arrábida Biosphere Reserve will be managed in line with the Action Plan drawn up by the working group specifically for this application, based on indicators of potential and threats to the territory, and also taking into account the contributions from the consultation and discussion sessions referred to in chapters 13.4 and 17.3.1.

The Action Plan, available for consultation in Annex III, covers the entire Biosphere Reserve and is coordinated with the Management Plan of the Arrábida Natural Park, as well as with other applicable legal and planning instruments.

17.4.2

WHICH ACTORS ARE INVOLVED IN PREPARING THE MANAGEMENT/COOPERATION PLAN?

The Action Plan was one of the most extensively discussed elements of the application from the outset, with the aim of both outlining strategic and specific objectives and designing proposed actions. As mentioned in chapters

13.4 and 17.3.1, in addition to the broad platform of professionals from different sectors and institutions who made a significant contribution to its development, the 2nd cycle of sectoral workshops, held between November 2023 and January 2024, focused solely on the Action Plan, with the aim of not only receiving contributions for its construction, but also to establish partnerships for its implementation.

17.4.3

DO LOCAL AUTHORITIES FORMALLY ADOPT THE MANAGEMENT/COOPERATION PLAN?

After the last public consultation period, the Action Plan was approved by the City Councils of Palmela, Sesimbra, and Setúbal, as well as by the AMRS and the ICNF, with the organisations being bound to include their respective actions in their provisional documents (Activity Plan and Budget).

17.4.4

WHAT IS THE DURATION OF THE ACTION PLANE

The Action Plan of the Arrábida Biosphere Reserve has a time horizon of 10 years. The Executive Committee will be responsible for monitoring the implementation of this plan.

The Action Plan of the Arrábida Biosphere Reserve may be subject to revision if necessary. The revision may occur following a detailed analysis of the progress reports, as well as upon recommendation from the Advisory Council, the Scientific Committee, the involved partners, and/or stakeholders. For revision purposes, changes in the socioeconomic context and/or other external factors that justify it, due to their circumstances, it will also be taken into account.

17.4.5

DESCRIBE THE CONTENTS OF THE MANAGEMENT/COOPERATION PLAN

The architecture that structures the Action Plan, available for consultation in Annex III, resulted from an intense and fruitful process of joint construction and responsibility involving all stakeholders. It also relied on a consistent and coherent phased, sequential, and interconnected process of reflection, sharing, collaborative work, and continuous enrichment.

Examples of this are the construction of the SWOT matrix, the drafting of the Strategic Reference Framework, or the alignment with the Sustainable Development Goals, where stakeholders played a central role, both in supporting the construction and in validating and improving the various procedures and conclusions set forth in the Plan. Both the cycles of workshops held in recent months, focusing on the thematic dimensions that structure the Action Plan, and the many bilateral or plenary meetings, were decisive for the results generated and for the quality and ownership of the Plan outlined.

This process of consultation and ongoing collaboration and proximity between the parties allowed for a continuous adaptation and alignment of the Action Plan with the objectives to be pursued, and the responses to be developed in the face of the challenges at hand.

Therefore, the Action Plan took into account the specific concerns and opinions of the stakeholders, but sought to establish, at various moments of consultation and participation, points of unity and common responses that would contribute to ensure that the Action Plan was centred on a recognised and shared strategy for the sustainable development of the Arrábida Biosphere Reserve. This strategy is guided by the reconciliation between the preservation and conservation of natural values and historical-cultural heritage, with all local economic activities, aiming to promote sustainable land management. The enhancement of existing resources is intended to contribute to increase the well-being of the populations.

In this context, the Action Plan represents the culmination of the work carried out on this application, presented in greater detail in the preceding chapters of this form. It is based on broad participation and involvement, with direct contributions from stakeholders who possess extensive knowledge of this territory and its challenges and opportunities. Therefore, the decisions and choices regarding its structure were made in an informed and concerted manner.

The identification of the territory's strengths, weaknesses, threats, and opportunities (SWOT matrix), the framing within the Strategic Reference Framework, or alignment with the Sustainable Development Goals resulted from this process of continuous interaction and coordination among the stakeholders, whether in the context of sectoral workshops or in the various work meetings held among the stakeholders, under the coordination of the AMRS.

The Vision being advocated for this territory was defined based on the construction of this participatory framework, embraced by the stakeholders, and considering a broad understanding of the importance of the values at stake and the motivation and relevance of the classification of the Arrábida Biosphere Reserve. This vision stems primarily from stakeholders' commitment to contribute to achieving an image of a territory of (and with) the future, where socioeconomic realities and dynamics will be sustainable, where ecosystems will be protected and valued, within a context of active involvement and participation of local communities and key territorial and sectoral stakeholders.

Achieving the defined Vision involves fulfilling the Mission, which is translated into achieving the general objectives (see Chapter 13.1) that make up the core functions of Biosphere Reserves (conservation, economic development, and logistic support). In this case as well, stakeholders, as evidenced in various instances of interaction and coordination, have committed themselves to playing an active role in creating conditions to develop a set of actions that contribute to the pursuit of a multidimensional strategy (environmental, cultural, and heritage) that contributes to progress and prosperity, while ensuring the sustainable use and exploitation of resources and the conservation and protection of threatened habitats and species.

Within the framework of Arrábida's specificities and potential, which mark and differentiate it at an international scale, and taking into account the constraints to its development and sustainability, a set of general objectives have been defined.

The operationalisation of these general objectives, perfectly aligned and with a direct contribution to the achievement of the Sustainable Development Goals, involved the creation of strategic objectives and specific objectives, which encompass and coordinate the actions to be implemented.

The Action Plan thus incorporates an assessment of compatibility/coherence with the SWOT analysis, with the general objectives of the Reserve, with the strategy defined in the plans and programmes affecting the Reserve area, with the SDGs, and with the 5 Strategic Areas of the Lima Action Plan.

As mentioned above, the Action Plan is structured around strategic and specific objectives, which will address the main needs and capitalise on the opportunities of this territory, in accordance with the functions defined for Biosphere Reserves:

1. Conservation and enhancement: a unique natural heritage

- A1. Conserving and enhancing biodiversity
- A2. Conserving and enhancing geodiversity

2. Promotion and enjoyment: a territory to be discovered in a sustainable way

- B1. Promoting the territory and creating conditions for sustainable visitation
Strengthening the role of tourism in the local/regional economic base
- B3. Developing traditional activities as assets of the regional economy
- B4. Promoting a sustainable economy and healthy eating

3. Education and knowledge: a reference territory for Sustainable Development

- C1. Promoting a network of partnerships for awareness-raising actions aimed at the community
- C2. Creating a specific scientific programme aimed at generating/enhancing knowledge about the Biosphere Reserve
- C3. Developing and implementing the Science in the Reserve Programme, aimed at the local/regional educational community

4. Climate action: a territory that is proactive and resilient to climate challenges

- D1. Promoting knowledge and supporting the development of innovative approaches to monitoring, mitigation, and adaptation to the effects of climate change
- D2. Disseminating local best practices in Climate Action
- D3. Asserting the Biosphere Reserve as a learning space in responding to climate challenges

5. Participation and identity: a territory of participatory management

- E1. Engaging and actively involving the population, local community, and visitors
- E2. Fully integrating into the National Network and in the thematic and regional networks of Biosphere Reserves

For each specific objective, a set of actions contributing to its achievement is defined, along with those responsible for their implementation and monitoring indicators. It is worth noting that this definition was based on an intense and fruitful process of joint construction and responsibility involving all stakeholders, particularly through sectoral workshops and work meetings organised with key stakeholders, under the coordination.

17.4.6

INDICATE HOW THIS MANAGEMENT/COOPERATION ADDRESSES THE OBJECTIVES OF THE PROPOSED BIOSPHERE RESERVE

The strategic objectives, and consequently the specific objectives and actions outlined in the Action Plan, were based on the general objectives for the Arrábida Biosphere Reserve. The incorporation of the strategic objectives of the MAB Programme 2015-2025 and the objectives of the 2030 Agenda for Sustainable Development into the Action Plan was also ensured.

In this context, each strategic objective contributes to various general objectives of the Reserve, namely:

Strategic Objective A. Conservation and enhancement: a unique natural heritage

- Conserve and enhance the natural values and resources that constitute the biodiversity and geodiversity (terrestrial and marine) in this territory and contribute to its uniqueness and international relevance;
- Reconcile the restoration and enhancement of ecosystems with the development of traditional economic activities (and associated services).
- The pursuit of these general objectives is materialised, within the framework of this strategic objective, in a series of actions focused on the conservation and enhancement of biodiversity and geodiversity.

Strategic Objective B. Promotion and enjoyment: a territory to be discovered in a sustainable way

- Contribute to the development of the local economy by stimulating traditional activities and the quality of regional products, valuing local labour, the tradition-based economy, and the sharing of knowledge and best practices;
- Promote the preservation and enhancement of the natural and cultural heritage, fostering the sustainable development of the Reserve and the sustainable use of natural resources;

The pursuit of these general objectives is materialised, within the framework of this strategic objective, in a series of actions focused on promoting the territory and creating conditions for sustainable visitation, strengthening the role of tourism in the local/regional economy, developing traditional activities as assets of the regional economy, and promoting a sustainable economy and healthy eating.

Strategic Objective C. Education and knowledge: a reference territory for Sustainable Development

- Promote a 'living laboratory' for sustainable development, where innovative solutions can be tested and developed to address the challenges of the green economy, increasing efficiency in the use of natural resources, reducing environmental risks, disorderly human interference in the environment, loss of biodiversity and genetic variability;
- Encourage the production and exchange of knowledge, involving the scientific community and other institutional stakeholders.

The pursuit of these general objectives is materialised, within the framework of this strategic objective, in a series of actions focused on fostering a network of partnerships for developing awareness-raising actions for the community in general, creating a specific scientific programme aimed at generating/deepening knowledge about the Biosphere Reserve, as well as developing and implementing the Science in the Reserve Programme, aimed at the local/regional educational community.

Strategic Objective D. Climate action: a territory that is proactive and resilient to climate challenges

- Promote knowledge and the development of innovative approaches to climate action in a context marked by the effects of climate change and the need to decarbonise the economy;

Strategic Objective E. Participation and identity: a territory of participatory management

- Promote active participation in the management of the territory, integrating the local community in the assumption and pursuit of strategic objectives, and strengthen the identity and sense of belonging to the Reserve;
- Strengthen the protagonism and visibility/recognition of Biosphere Reserves as central and distinctive spaces in terms of promoting sustainability and balancing the need to conserve habitats and species with promoting economic dynamism and enhancing human presence;

- Promote training and awareness-raising among civil society and key territorial and sectoral stakeholders for environmental education and the preservation and enhancement of endogenous resources;
- Encourage the production and exchange of knowledge, involving the scientific community and other institutional stakeholders.
- Contribute to a healthier, fairer, and more prosperous society.

The pursuit of these general objectives is materialised, within the framework of this strategic objective, in a series of actions focused on fostering closer engagement and active involvement of the population, local community, and visitors, as well as achieving full integration into the National Network and the thematic and regional networks of Biosphere Reserves.

The following image illustrates the integrated reading of the aforementioned elements, where the coherence of the objectives is shown by the correspondence (represented by the assignment of different colours) between the strategic objectives of the MAB 2015-2025 Programme with the General and Strategic Objectives of the Arrábida Biosphere Reserve.

17.4.7 IS THE PLAN BINDING? IS IT BASED ON A CONSENSUS?

The Action Plan is the result of the public opinion of the local community, and has been geared towards different areas relevant in the context of the application for Arrábida to become a Biosphere Reserve, namely:

- Administration and Local Government;
- Agriculture and Fisheries;
- Extractive Industry;
- Education, Culture, and Heritage;
- Tourism, Sport, and Leisure;
- Environment, Science, and Health.

The Action Plan includes projects, contributions, and concerns from various local stakeholders and incorporates direct involvement of communities in the consolidation of the Reserve in local daily life.

The Action Plan of the Arrábida Biosphere Reserve, approved by the Palmela, Sesimbra, and Setúbal City Councils, the AMRS, and the local ICNF (Annex III), confirms the alignment between the parties involved in this application process, and was approved by the Board of Directors of the AMRS (Annex III).

Strategic Objectives of the MAB 2015-2025	General Objectives of the Arrábida Biosphere Reserve	Strategic Objectives of the Arrábida Reserve
Conserve biodiversity, restore and enhance ecosystem services, and promote the sustainable use of natural resources.	Conserve and enhance the terrestrial and marine biodiversity and geodiversity of the region.	A. Unique natural heritage.
Contribute to the construction of sustainable, healthy, and equitable societies and economies, and prosperous human settlements in harmony with the biosphere.	Promote the restoration and enhancement of ecosystems, in harmony with economic activities, and their associated services.	B. Promotion and enjoyment: a territory to be discovered in a sustainable way.
Facilitate biodiversity and sustainability science, education for sustainable development (ESD), and capacity building.	Align the preservation and enhancement of the natural and cultural heritage, fostering the sustainable development of the Reserve and the sustainable use of natural resources.	C. Education and knowledge: a reference territory for Sustainable Development.
Support mitigation and adaptation to climate change and other aspects of global environmental change.	Contribute to the development of the local economy by stimulating traditional activities and the quality of regional products, valuing local labour, the tradition-based economy.	D. Climate action: a territory that is proactive and resilient to climate challenges.
	Contribute to a healthier, fairer, and more prosperous society.	E. Participation and identity: a territory of participatory management.
	Encourage the production and exchange of knowledge, involving the scientific community and other institutional stakeholders. Promote training and awareness-raising among the population and civil society as a whole on environmental education.	
	Promote knowledge and approaches to mitigate and adapt to the effects of climate change.	
	Promote information and participation, integrating the community into the strategic objectives and fostering a sense of belonging to the Reserve.	

17.4.8

WHICH AUTHORITIES ARE IN CHARGE OF THE IMPLEMENTATION OF THE PLAN?

Although many of the actions in the Action Plan involve public and private partner organisations, the authorities with the greatest responsibility for managing the Arrábida territory, such as the ICNF and the municipalities of Palmela, Sesimbra, and Setúbal, are part of the Executive Committee of the Biosphere Reserve. Therefore, they will be largely responsible for implementing the Action Plan of the Arrábida Biosphere Reserve.

17.4.9

WHICH FACTORS IMPEDE OR HELP ITS IMPLEMENTATION?

The factors positively contributing to the implementation of the Plan include the involvement of local development stakeholders, established partnerships that have proven to be essential and facilitating for achieving the objectives of the Reserve, as well as all the close collaboration between the organisations involved and the local community.

No foreseeable factors are anticipated that could hinder the implementation of the Action Plan.

17.4.10

IS THE BIOSPHERE RESERVE INTEGRATED IN REGIONAL/NATIONAL STRATEGIES?

The application for Arrábida to become a Biosphere Reserve is part of the strategies for sustainable development and cohesion of the Setúbal Region, in coordination with the National MAB Committee, the National Commission for UNESCO, and the Action Plan for Biosphere Reserves in Portugal 2018-2025.

The Territorial Management Instruments in force, whether at the national, regional, or municipal level, should integrate the Arrábida Biosphere Reserve upon their revision or construction.

17.4.11

INDICATE THE MAIN SOURCE OF THE FUNDING AND THE ESTIMATED YEARLY BUDGET

The Reserve will have its own budget, consisting of income from the sources described below, and will have a set of resources provided by the organisations of the Executive Committee, which we refer to as indirect contributions.

The Biosphere Reserve will be financed through various sources, namely:

- Direct contributions from the partners constituting the Executive Committee;
- National public or private funds, patronage and/or donations;
- European community funds;
- Own revenues from the sale of goods.

The Reserve will have its own budget, consisting of income from the sources described below, and will have a set of resources provided by the organisations of the Executive Committee, which we refer to as indirect contributions.

The Biosphere Reserve will be financed through various sources, namely:

- Direct contributions from the partners constituting the Executive Committee;
- National public or private funds, sponsorship, and/or donations;
- European community funds;
- Own revenues from the sale of goods.

The overall estimate for implementing the actions outlined in the Action Plan is €6,022,000.00 (six million and twenty-two thousand euros). All funding sources described above will contribute to its implementation.

The estimated direct and indirect costs (borne by the applicants or partners) for managing the Biosphere Reserve and implementing its Action Plan will be €200,000.00 (two hundred thousand euros) in 2025, mostly allocated to the Reserve's management; €400,000.00 (four hundred thousand euros) in 2026, of which around 50% is expected to be allocated to management and the remainder to investment; In 2027, €600,000.00 (six hundred thousand euros) of costs are estimated, 30% of which to be allocated to management and the remainder to necessary investment in the Reserve.

17.5 CONCLUSIONS

17.5.1

IN YOUR OPINION, WHAT WILL ENSURE THAT BOTH THE FUNCTIONING OF THE BIOSPHERE RESERVE AND THE STRUCTURES IN PLACE WILL BE SATISFACTORY? EXPLAIN WHY AND HOW, ESPECIALLY REGARDING THE FULFILLMENT OF THE THREE FUNCTIONS OF BIOSPHERE RESERVES (CONSERVATION, DEVELOPMENT, LOGISTIC) AND THE PARTICIPATION OF LOCAL COMMUNITIES

The application for Arrábida to become a Biosphere Reserve arises from the will of the populations, embodied in the actions of the organisations that make up the Executive Committee, having worked long and hard to protect and enhance the natural, cultural, and landscape values present.

Over the past few decades, the organisations that make up the Executive Committee have developed and supported conservation and development projects in the Arrábida territory, either individually or in partnership, albeit in a fragmented manner and falling short of the real needs of the territory.

The Arrábida Biosphere Reserve will provide coherence to existing conservation and development projects and open up opportunities for further development or new projects through funding and a dedicated technical structure.

The effective involvement of the local community, both through participation in the actions promoted by the Reserve and through participation in the advisory bodies, will not only enable the implementation of an ambitious action plan but also the dissemination of a territorial culture where each individual, aware of their role and the values at stake, becomes a guardian of this immense natural and cultural heritage.

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SPECIAL DESIGNATIONS

Name: Arrábida Biosphere Reserve

UNESCO World Heritage Site RAMSAR

Wetland Convention Site

Other international/regional conservation conventions/directives

Natura 2000 Network - ZEC PTCON0010 - Arrábida-Espichel

Natura 2000 Network - ZPE PTZPE050 - Cape Espichel

Biogenetic Reserve of the Council of Europe Arrábida

Mountain Range Long-term monitoring site:

Long Term Ecological Research Site (LTER site)

Other: National Network of Protected Areas and Other Areas Relevant for Fauna Conservation

National Network of Protected Areas

- Arrábida Natural Park
- Professor Luiz Saldanha Marine Park

Other Areas Relevant for Fauna Conservation

- Important Bird and Biodiversity Area (IBA) Cape Espichel (Pt041)

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SUPPORTING DOCUMENTS (TO BE SUBMITTED WITH NOMINATION FORM, ANNEX III)

1. Location and zoning map
2. Land use and occupation map
3. List of legal documents
4. List of land planning, use and management plans
5. List of species
6. List of main bibliographic references
7. Original endorsement letters
8. Further supporting documents

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ADDRESSES

20.1

CONTACT ADDRESS OF THE PROPOSED BIOSPHERE RESERVE

Name: Associação de Municípios da Região de Setúbal

Street or P.O. Box: Avenida Dr. Manuel de Arriaga, nº 6 - 2º esq.

City with postal code: 2900-473 Setúbal

Country: Portugal

Telephone: (+351) 265 53 90 90

Email: amrs@amrs.pt

Website: amrs.pt

20.2

ADMINISTERING ENTITY OF THE CORE AREA(S)

Name: Instituto da Conservação da Natureza e das Florestas, IP (ICNF, IP)

Street or P.O. Box: Avenida Dr. Alfredo Magalhães Ramalho, nº 1

City with postal code: 1495-165 Algés

Country: Portugal

Telephone: (+351) 213 507900

Email: secretariado.cd@icnf.pt

Website: icnf.pt

20.3

ADMINISTERING ENTITY OF THE BUFFER ZONE(S)

Name: Associação de Municípios da Região de Setúbal

Street or P.O. Box: Avenida Dr. Manuel de Arriaga, nº 6 – 2º esq.

City with postal code: 2900-473 Setúbal

Country: Portugal

Telephone: (+351) 265 53 90 90

Email: amrs@amrs.pt

Website: amrs.pt

20.4

ADMINISTERING ENTITY OF THE TRANSITION AREA(S)

Name: Associação de Municípios da Região de Setúbal

Street or P.O. Box: Avenida Dr. Manuel de Arriaga, nº 6 – 2º esq.

City with postal code: 2900-473 Setúbal

Country: Portugal

Telephone: (+351) 265 53 90 90

Email: amrs@amrs.pt

Website: amrs.pt

