

Habitat and Endemic Species

Spanish scale





Analysis of Threats and Enabling Factors for Sustainable Tourism at Pilot Scale

Habitat and Endemic Species Spanish scale



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OVERVIEW

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REVIEW

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Abstract

This report aims to identify the main touristic fluxes and carry capacity of the Spanish coastal zones. It is developed through the review of existing data at national and regional scale. The document is structured as follow:

This report aims to identify the main touristic fluxes and carry capacity of the Spanish coastal zones. It is developed through the review of existing data at national and regional scale. The document is structured as follow:

Section 1: describes the main tourist fluxes in Spain.

Section 2: introduces the concept of carrying capacity of tourism.

Section 3: describes the methodology and characteristics of touristic fluxes and carrying capacity parameters selected in this project.

I. Introduction

Spain is one of the 25 biodiversity hotspots in the world and considered one of the most biodiverse countries in the European Union. Spanish coastal waters possess a high level of biological diversity, with the southern Iberian Peninsula being especially important in terms of biodiversity and endemic species. The country's geographical diversity is extremely varied, consisting of landscapes and ecosystems that include intertidal zones, beaches, cliffs, dune systems, salt marshes, saline steppes, *etc.* Spain also covers four biogeographical regions (Mediterranean, Atlantic, Alpine, Macaronesian) composed of habitats that have favoured the development of a great assortment of vegetation types, to which a variety of fauna communities is associated. The country is also rich in freshwater habitats. Although generally small in size, wetlands are however very important centres of biological diversity. Forests and wooded zones cover 32% of the country's territory.

Spain has the highest number of vascular plants (8,000-9,000 species) among European and Mediterranean countries. Its rate of endemism is between 20-25%. Spain also has the highest incidence of threatened endemic flora. Between 60,000 and 70,000 fauna species are known to exist (approximately 700 are vertebrates, excluding saltwater fish, and the remaining 99% are invertebrates). Regions with the highest endemic rates are mountainous zones, coastal water regions of the Spanish peninsula, and insular areas (especially those of the Canary Islands). Fluvial ichthyofauna has the highest proportion of endemic species. In terms of endangerment, 31% of Spanish vertebrates and around 1,200 vascular species of flora are threatened.

In the last decades, Spanish biodiversity has suffered a significant decrease, with between 40-60% of assessed species included in some threatened categories. However, not all taxonomic groups have the same threat level: for vascular plants, only 15% of the species are endangered; for vertebrates, the figure increases to 31%; continental fish and amphibians have the highest percentage of endangered species (55% and 31% respectively).

Relative to the majority of countries, it is not difficult to locate large and numerous expanses of territory in a natural or semi-natural state in Spain. The better-preserved systems are sclerophyllous scrubs, heath and scrubs, and grasslands, while coastal habitats present the worst state of conservation. In addition, Spain suffers from a high risk of desertification over about one-third of its surface; the state of terrestrial vertebrate conservation has also worsened.

The desired future scenario would consist of a good knowledge base on biodiversity and ecosystem services, a natural network of protected areas connected by ecological corridors where natural processes are fully carried out and where a favorable conservation status exists for natural habitats and species. The projection would also emphasize full integration of biodiversity in sectoral policies and decision-making, recognition of the values of biodiversity and their contribution to human well-being and maintenance of ecosystem resilience for providing essential ecosystem services.

Intense human activity, erosion, introduction of invasive species, extreme natural events, over-exploitation of species of economic interest, desertification, soil degradation, forest fires and climate change are factors contributing to habitat degradation and biodiversity loss. Marine species are especially threatened by the alteration and pollution of certain coastal zones, fishing, chemical pollution, physical alteration and the eutrophication of habitats and intensive urbanization of the coast. The increase in alien flora in many regions of Spain, as well as the emergence of species with invasive behaviors, are affecting areas of high ecological value. The biodiversity of inland water ecosystems is also significantly impacted by invasive alien species; aquaculture and the connections between large artificial basins are important risk factors for the exchange of fauna.

II. Overview of habitat and endemic species in Spain

The European Red List of Species is a review of the conservation status of more than 6,000 species in Europe according to the IUCN Red List Categories and Criteria and the regional Red Listing guidelines (Fig. 1). It identifies species that are threatened with extinction at European level so that appropriate conservation actions can be taken to improve their status. The geographical scope is continent-wide, including European parts of the Russian Federation and Turkey as well as the Macaronesian Islands.

The Caucasus region is not included. To date, European regional assessments have been completed for all mammals, reptiles, amphibians, butterflies, dragonflies, freshwater fish and freshwater molluscs and a selection of saproxylic beetles, terrestrial molluscs, and vascular plants (Table 1). Assessments of pollinators, medicinal plants, birds and marine fish are currently under development. The European Red List is compiled by IUCN Global Species Programme, with funding from the European Commission.

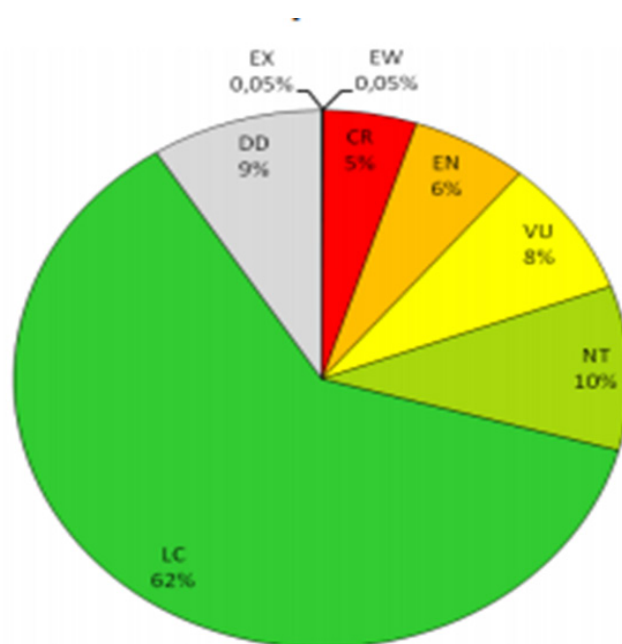


Figure 1. European status of species in Spain(IUCN, 2021)

Spain is host to an estimated 85,000 species of animals and plants. This number represents 54% of the total species described for Europe and could represent more than 5% of the species in the world. According to the table below, approximately 38% of the species assessed by the European Red List of Species are present in Spain (Fig. 2).

For some of the taxonomic groups, the percentages of European species that occur in Spain are particularly high; such as dragonflies, saproxylic beetles and butterflies. Of the 2,233 species assessed that occur in Spain, the groups comprising the highest

number of species are vascular plants, terrestrial molluscs, butterflies and saproxylic beetles. Of the total number of species assessed in the country more than one fifth* are considered threatened and at least 10% are Near Threatened at the European level, one species is Extinct in the Wild and one species is already Extinct.

Many of these species are endemic to Europe and are found nowhere else in the world. Species that are considered threatened at the European level and occur in Spain are found mostly in shrublands, rocky areas, wetlands and forests. These ecosystems require particular attention in order to ensure that the habitats of these sensitive species remain.

Table 1. Number of species assessed within each IUCN Red List category at the European level(IUCN, 2021)

Species group	No. of sp. in Europe	No. of sp. in Spain	% of European sp. occurring in Spain	No. of threatened sp. in Spain (status at European level)		
				CR	EN	VU
Mammals	233	111	48%	4	4	10
Reptiles	140	62	44%	5	7	3
Amphibians	83	29	35%	1	1	3
Freshwater fishes	522	71	14%	5	9	12
Butterflies	435	234	54%	0	4	8
Dragonflies	137	79	58%	0	1	5
Saproxylic beetles**	431	224	52%	0	6	5
Terrestrial molluscs**	1,233	418	34%	22	19	53
Freshwater molluscs	854	166	19%	11	8	23
Vascular plants**	1,826	839	46%	61	76	63
TOTAL	5,894	2,233	38%	109	135	185

**Not comprehensively assessed, selected species only.

This table does not include the Not Applicable (NA) species in Europe (species introduced after AD 1500 or species of marginal occurrence).

The data are based on the results of the European Red List (European region wide assessment).

Habitat loss, fragmentation and degradation are the most significant threats at the European level to species that occur in Spain. For freshwater species, major threats include the over-extraction of water, which in many cases is further exacerbated by increasing droughts due to climate change, pollution and the introduction of alien species (Fig. 3). Other major threats come from farming and ranching as a result of agricultural expansion and intensification, urbanization and tourism.

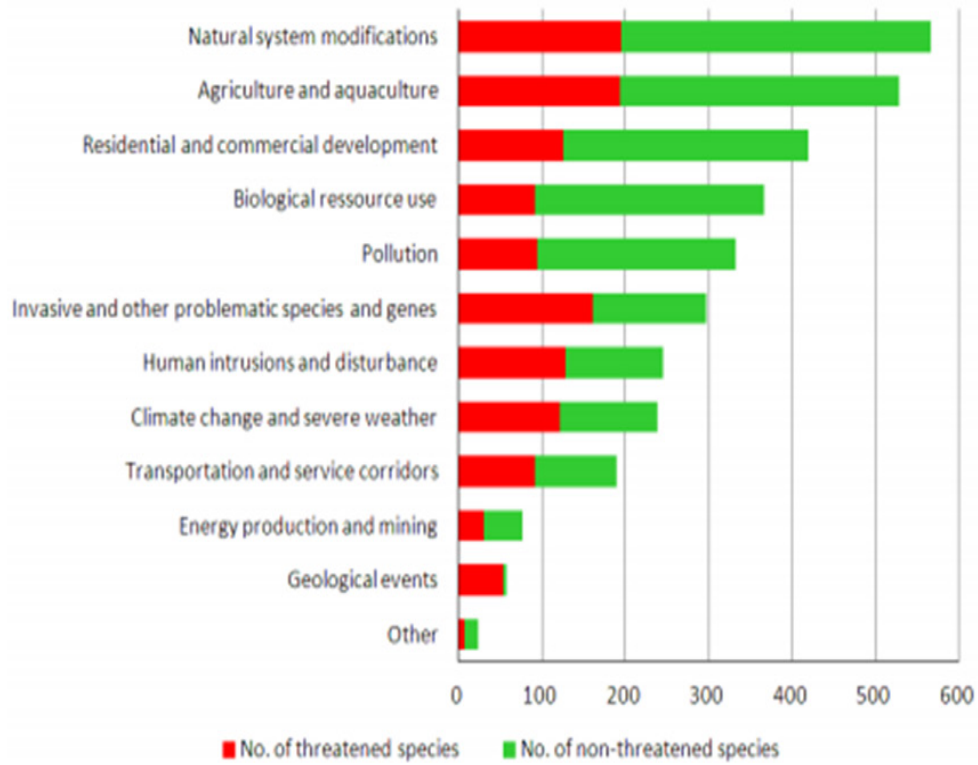


Figure 2. Major threats at the European level to species occurring in Spain (IUCN, 2021)

III. Data collection (projects, networks, initiatives)

In September 2011, the Council of Ministers adopted the Strategic Plan on Natural Heritage and Biodiversity, approved by Royal Decree 1274/2011, which is the national response to the Strategic Plan for Biodiversity 2011-2020, as well as a fundamental element in support of the Law on Natural Heritage and Biodiversity 42/2007 adopted on December 13th, 2007. It includes a number of goals, 39 objectives and 281 actions for the conservation and sustainable use of biodiversity and also considers the targets set out in the EU Biodiversity Strategy for 2020.

Targets relate to improving the knowledge base on biodiversity and ecosystem services; protecting, conserving and restoring Spain's natural capital while reducing the main drivers of loss; fostering the integration of biodiversity into sectoral policies, particularly in regard to agriculture, fisheries, water management, forestry and tourism, and enhancing synergies with climate changes policies; conserving global biodiversity and contributing to poverty alleviation; promoting the participation of the people and the private sector in nature conservation while strengthening awareness and commitments; reinforcing environmental governance for biodiversity conservation; contributing to green growth and mobilizing financial flows from all sources for achieving biodiversity objectives.

The timeframe for implementing the Spanish Strategic Plan is from 2011 to 2017. Trends in protected areas have been positive. Between 2009 and 2012, there was an increase of 3.1% in the surface covered by protected areas. Protected areas in Spain cover 17.3 million hectares and are established under different legal regimes: terrestrial protected areas represent 92.45% of this protected area estate, while marine protected areas represent 7.55% of this total area.

In terms of Natura 2000 designation and management, there are 598 Special Protection Areas and 1,448 Sites of Community Importance, out of which 299 are Special Areas of Conservation, covering 27.2% of the Spanish terrestrial surface (which almost completes the terrestrial Natura 2000 network). A significant number of these Special Areas of Conservation have management plans and/or other measures in place, while management measures are under development for the remaining Natura 2000 sites. Under these circumstances, Spain is the first EU Member State contributing to the European Natura 2000 network.

Regarding marine protected areas, work is ongoing for enhancing and enlarging the Natura 2000 Network at sea. Currently, only 0.5% of Spain's marine area is under legal protection, comprising small and mostly coastal sites. In order to increase the representation of marine ecosystems in the Network, some Special Areas of Conservation (SAC) have been declared in the last years, including 24 SAC in the marine waters surrounding the Canary Islands (2011), 1 SAC in the Strait of Gibraltar (2012) and a SAC/Marine Protected Area in the North Atlantic.

Regarding species conservation, the List of Wild Species under a Special Protection Regime is established through the Law on Natural Heritage and Biodiversity 42/2007 and developed by Royal Decree 139/2011. This list includes species, subspecies and populations that need to be protected or taken into account in a particular way due to scientific, ecological or cultural values, singularity, rarity or threat degree. The inclusion of a species in the list entails specific prohibitions, mainly directed to its capture in the wild, transport and commercialization. The Spanish Catalog of Threatened Species is established from this list (and based on the recommendations emanating from scientific or technical information). The list includes 889 taxa, 120 of which are categorized as vulnerable and 176 as endangered. The State Commission on Natural Heritage and Biodiversity has determined that the Ministry of Agriculture, Food and Environment will serve as the body responsible for including, excluding or changing information on species categorization.

The Autonomous Communities are required to develop recovery plans for endangered species and conservation plans for species categorized as vulnerable. Conservation strategies need to be approved by the General Administration only for threatened species that can be found in more than one Autonomous Community. These strategies establish guidance criteria or guidelines for action plans, specifying minimum content and structure for these documents.

Regarding enhancing the knowledge base on biodiversity, significant efforts have been carried out as a result of the development of the Spanish Inventory on Natural Heritage and Biodiversity, with a view to compiling existing and scattered information on biodiversity and with particular attention placed on harmonizing available data.

In this context, a three-level approach has been implemented:

- Know (from the information components of the inventory);
- Assess via the national indicators system under development;
- Disseminate through national reports.

Spain has devoted notable efforts to combating invasive species, as reflected by the recent adoption of Royal Decree 630/2013 regulating the Spanish Catalog on Invasive Alien Species. The Catalog will include all invasive alien species and subspecies that constitute or could constitute a threat to native species, habitats, ecosystems, agronomy or economic resources associated with the use of natural heritage. Different actions to control invasive species, such as Ruddy Ducks (since 1998), zebra mussels (in the River Ebro since 2001), turtles of Florida (Valencia, Rioja) and Argentinean parrots (Madrid, Catalonia) have been carried out.

Regarding ex situ conservation, the Law on Natural Heritage and Biodiversity 42/2007 establishes that the State Commission on Natural Heritage and Biodiversity will boost the development of breeding or expand programs outside of the natural habitat, especially when these programs have been included in conservation strategies or conservation and recuperation plans.

Work is also being carried out for conservation of genetic biodiversity. The Spanish Strategy for the Conservation and Sustainable Use of Forest Genetic Resources has been adopted, as has legislation for marketing forest biodiversity. For species that are more economically valuable, seed inventories and banks have been developed.

With regard to the pressures of climate change on biodiversity, the project on “Impact Assessment, Vulnerability and Adaptation to Climate Change of Spanish Biodiversity” developed from 2007 to 2011 should be highlighted. This project was designed with a view to assessing the potential effects and vulnerability of Spanish biodiversity to climate change, using spatial modeling techniques applied to the best available information on climate change and objective distribution of species.

Regarding the marine environment, the Law for the Protection of the Marine Environment 41/2010 sets the following national objectives:

- Establishment of 5 marine strategies covering the Spanish marine areas in the three marine subregions (Mediterranean, North Atlantic and Macaronesia).
- Reinforcement of the protection of marine biodiversity through the following actions: development and extension of the Spanish Network of Marine Protected Areas (RAMPE); designation of new marine protected areas, including marine Natura 2000 sites; approval of the Recovery and Conservation Plans for Threatened Marine Species; approval of the National Strategies for the Conservation of Threatened Marine Species; approval of the National Strategies to Fight against the Main Threats to Marine Biodiversity.

Moreover, the Law on the Natural Heritage and Biodiversity 42/2007, under which the Spanish Inventory of Natural Heritage and Biodiversity was created, has also produced the Spanish Inventory of Marine Habitats and Species. Under this, the List of Marine Habitats in Spain that is classified hierarchically was completed and published in March 2013.

Spain is one of the first European countries to have an Integrated Coastal Management Strategy and clear targets for its implementation. The National Strategy for the Restoration of Rivers has also been launched with the objective of making a diagnosis at the national level, and also provides society with the opportunity to actively participate in the management of the environment through a volunteer program.

Additionally, the Spanish Forestry Plan aims to integrate conservation criteria within sectoral policy planning and management, as well as within improvement, protection and restoration practices for forest areas and measures for the conservation and recovery of vulnerable or endangered species of wild fauna and flora.

Regarding the consideration of biodiversity and ecosystem services (including economic values) in private and public activities, the Spanish “Business and Biodiversity” Initiative should be acknowledged. Launched in May 2013 by the Ministry of Agriculture, Food and Environment, through the Biodiversity Foundation, this initiative aims to foster

partnerships between the private and public sectors and determine ways to ensure that economic development is compatible with biodiversity conservation.

Finally, regarding the mobilization of resources from all sources, the creation of conservation banks, through the Law on Environmental Assessment (21/2013), should be highlighted. Conservation banking relates to environmental titles or conservation credits granted by the Ministry of Agriculture, Food and Environment or, in some particular cases, by the Autonomous Communities, representing natural resource values that have been specifically created or enhanced. The holders of the lands affected by the banks should conserve the natural value that has been created or enhanced by using these areas for purposes compatible with these values.

Conservation credits may be compensatory or complementary measures provided in environmental assessment, biodiversity legislation, *etc.*, aimed at balancing the negative effects caused to a natural value by positive effects generated on the same or similar natural value, in the same or different location. Significant progress has been made with regard to furthering legislative and administrative developments in response to the objectives set out by the Law on Natural Heritage and Biodiversity 42/2007. It incorporates new instruments such as the Strategic Plan on Natural Heritage and Biodiversity, which will guide biodiversity priorities, as well as the Spanish Inventory of Natural Heritage and Biodiversity.

The Inventory contains various catalogs that are mandatory for increasing knowledge and understanding of biodiversity in Spain (this includes catalogs on habitats in danger of disappearing, wild species under the special protection regime, invasive alien species, along with inventories of protected natural areas, wetlands, forestry statistics, zoos, game and fish species, and related traditional knowledge).

The development of a national system on indicators, to monitor data contained in the Inventory of Natural Heritage and Biodiversity, has been prioritized in the Strategic Plan on Natural Heritage and Biodiversity 2011-2017. Work in this area is ongoing.

Other legislations include the Environmental Assessment Law 21/2013 which aims to regulate, clarify and harmonize provisions on environmental impact assessments. The Law establishes the basis for environmental assessment of plans, programs and projects which can have significant effects on the environment, assuring a high level of environmental protection for the entire national territory and promoting concepts of sustainable development. It is also important to mention the Law on Environmental Responsibility which seeks to put into action the “Polluter Pays” Principle to address problems associated with environmental damage.

Progress has been made in mainstreaming biodiversity considerations in various productive sectors, such as agriculture, rural development, forestry, fisheries, regional and territorial development, transport, hunting, tourism and energy, climate change and international cooperation. The mainstreaming approach is also promoted in the Strategic Plan on Natural Heritage and Biodiversity, where a number of goals and actions focus on fostering the integration of biodiversity in sectoral policies.

Regarding tourism, under the Strategic Plan on Natural Heritage and Biodiversity, a sectoral plan on natural tourism and biodiversity was developed and has been submitted for adoption. Developed jointly by the Ministry of Agriculture, Food and Environment and the Ministry of Industry, Energy and Tourism, the sectoral plan recognizes the potential provided by tourism activities for socioeconomic development. It aims to make activities compatible with the conservation of natural values through, inter alia, promoting measures to avoid the negative impacts on biodiversity caused by tourism activities while also seeking positive synergies between the tourism sector and biodiversity conservation. A set of measures has been identified for reaching these goals.

Beneficiaries of direct aid within agriculture and certain rural development programs must comply with particular environmental, public health, plant health and animal welfare requirements under the Reform of the Common Agricultural Policy (CAP). The “CAP Health Checks” are coordinated by the Autonomous Communities and the Spanish Agricultural Guarantee Fund (FEGA).

The Law on Natural Heritage and Biodiversity 42/2007 also establishes two cooperation mechanisms. The State Commission on Natural Heritage and Biodiversity (Act 42/2007, Royal Decree 1424/2008) acts as the body responsible for consultation and cooperation with regional authorities on matters related to nature conservation and biodiversity, with a view to more efficient management and fulfillment of the principle of solidarity in decision-making processes.

The following Committees are attached to the State Commission for Natural Heritage and Biodiversity:

- Protected Natural Areas Committee - promotes cooperation between the representative bodies and management of protected natural spaces.
- Wetlands Committee - coordinates activities regarding the conservation of these ecosystems.
- Committee on Flora and Fauna - coordinates all activities in this area and, in particular, those regarding the fulfillment of international agreements and Community rules.
- Spanish Forestry Committee - responsible for the preparation and study of issues specific to Spanish forest policy.
- Committee for the improvement and conservation of forest genetic resources – carries out the necessary coordination for the development, implementation and monitoring of the production and marketing of forest reproductive material.
- Committee to Combat Forest Fires - addresses coordination of rescue media, communication and air operations concerning fire prevention/extinguishing, without prejudice to the powers of the Autonomous Communities and the Cities of Ceuta and Melilla.

The State Council on Natural Heritage and Biodiversity is the public participatory body for nature conservation and biodiversity. Its composition, functions and rules of procedure are regulated by Royal Decree 948/2009 (modified by Royal Decree 649/2011).

Among other functions, the State Council advises on rules and plans related to natural heritage and biodiversity; takes note of the annual reports on the state of Spanish Natural Heritage and Biodiversity; encourages dialogue and collaboration with administrations and institutions and economic and social actors involved in the sustainable use of biodiversity; and advises, as required, on technical and scientific matters in preparation for international meetings on biodiversity conservation.

IV. Mitigating Negative Impacts on Coastal Ecosystems

Negative impacts on land use and occupation were identified, caused by the excessive presence of people, the introduction of invasive species and the artificial filling of beaches. At the end, a set of mitigating measures presented and aiming to ensure that the exploitation of natural resources can be maintained, but in a perspective of preservation and recovery of natural resources and biodiversity:

Land Occupation and Use: This unrestrained growth led to the continuous occupation of the soil with the destruction of the traditional vegetation cover, leaving only a few remnants of that occupation in some isolated areas that are difficult to access, like islands on land confined by the limits of the properties of hotels or condominiums. This occupation and alteration of land use led to a profound change, for example, in the flows of rainwater runoff, and to the exponential increase in the impermeable areas, which had significant and direct negative impacts on the vegetation covering these soils, resulting in soil loss.

Human Presence, Noise and Pollution: The excessive seasonal presence of people on beaches in the region, profoundly impacted the coastal ecosystem, directly interfering with wild species. The cliffs that surround the beach are the refuge of several species of birds, such as seagulls. Adult birds and their young are commonly seen roaming the sand, as they are accustomed to human presence and interaction, approaching to collect food scraps from holiday makers. The interactions between people and animals are so common that many of these seagulls feed mostly on the remains left on the beach and by looting nearby garbage containers. The excessive numbers of people do not only interact with wild animals on the sand, but this also extends to the marine environment. If the use of the water for bathing can be considered a minor impact that can be neglected, the continual circulation of motorboats and jet skis is an impact that has to be considered, since they cause discomfort to the space users. The negative impacts associated with recreational boats include noise, constant agitation of the water, shock to animals and pollution by hydrocarbons, as stated by Whitfield and Becker (2014) and Sim et al.(2015);

This continuous invasion by sea disturbs wildlife by causing unrest in the communities, changing their habits, and, thereby, their normal development. This intensive seasonal occupation occurs after a period where there are no disturbances when the bathing tourist activity practically disappears in the autumn and winter months. However, when resumed with the arrival of spring and summer, it coincides precisely with the reproduction period of a large number of resident species, which use these areas for breeding, and are therefore disturbed.

Introduction of Invasive Species. The origin of these species is closely related to their ornamental function, since almost all of them originated in the gardens, having then spread to the natural environment, where they adapted to the edaphon climatic conditions and were able to start an expansion process, occupying the areas in direct competition with native species.

Artificial beach filling: In the years immediately following the artificial filling of the beaches, there was a period of adaptation of the sediments to the sedimentary dynamics existing in the area. The hydrodynamic calibration of the sediments occurred until an equilibrium was reached, which, although unstable, was maintained.

However, the major negative environmental impact of this artificial beach filling process was the sediment discharge covering an extensive area where many species proliferated. This cover of the seabed by sediments and the subsequent period of adaptation to the new conditions until equilibrium was reached meant that marine life, which had always been abundant until then, practically disappeared and only slowly reappeared after a few years.

After the artificial beach filled, the fish were also slowly returning to the site, as the algae began to recolonize the bottom and the surface of the rocks, making food available for the initial elements of the trophic chains.

V. Selection of parameters in CoEvolve4BG

V.1. The GIS database

Geographic Information System (GIS) is applied to computer systems aimed at managing spatial data that visually allow us to analyze, manage and interpret geographic data. The methodology of this study has consisted of searching and processing shapefile layers, and their subsequent analysis GIS. Shapefile layers have been downloaded from official national statistical platforms (Ministry of Ecological Transition and Demographic Challenge, MITECO, 2021) and from European platforms such as the European Marine Observation and Data Network (EMODnet, 2021).

The Spatial Reference System has the ETRS89 datum with UTM projection in the 30 North zone, with EPSG code: 25830. In addition, they are based on official statistical platforms or rigorous studies, which guarantee the soundness of the information expressed.

The GIS results were expressed by NUTS administrative boundaries from the EU (EUROSTAT <https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-gq-20-092>, 2021). The NUTS classification subdivides the economic territory of the EU Member States into territorial units (regions; Fig. 3). The classification is made up of three hierarchical levels: each Member State and the UK are divided into NUTS 1 regions, which in turn are subdivided into NUTS 2 regions and then further divided into NUTS 3 regions. Each of these regions is allocated a specific code and name. Since several different regions within Europe have the same name, a distinction has been made by adding to each of these the abbreviation for the country concerned.

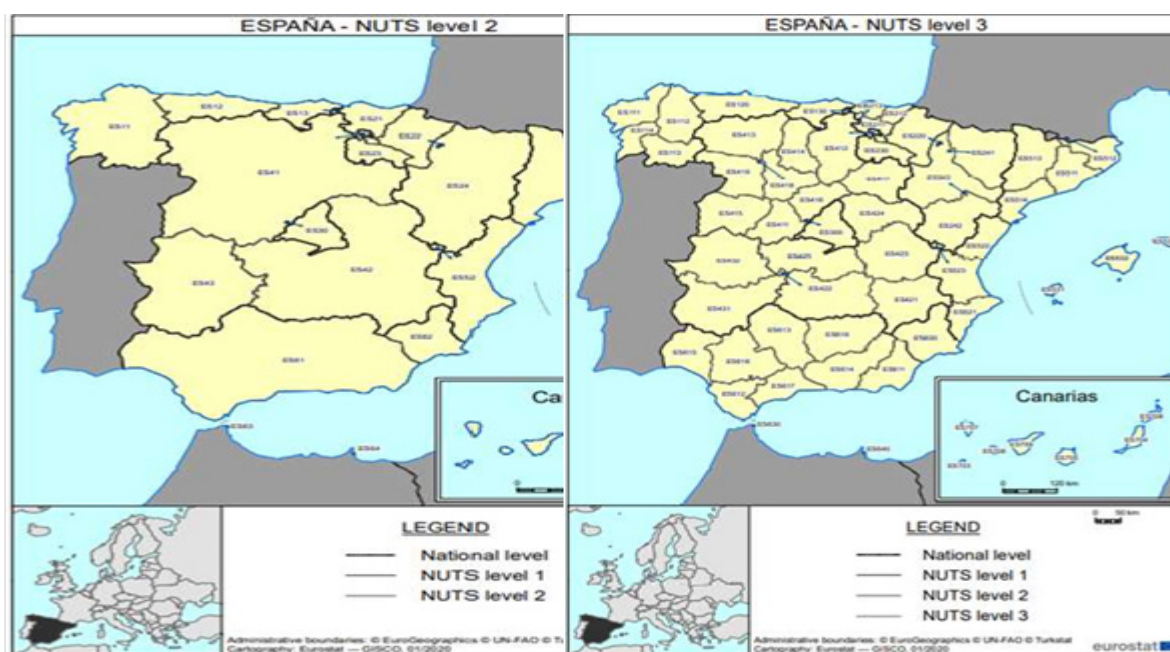


Figure 3. Spain (España): NUTS level 2 and 3(EUROSTAT, 2021)

V.2. Data Records

The developed Spanish Mediterranean coastal database described in this report is available through the figshare repository of results. We have included a csv file with all the information at Nuts 3 level into the repository. The database will be updated and expanded as new and improved data become available. The database presented here has been created using several publicly available datasets, which are thoroughly documented and described in reports or scientific articles. Thus, these datasets have undergone rigorous quality controls and/or validation. In addition, for those parameters where consistent information for the studied area were not available, new datasets were generated.

V.3. Habitat and Endemic Species

A panel of external experts and the working group at the Mediterranean level of the Co-Evolve4BG project has selected the following parameters of Habitat and Endemic Species which will be analyzed at the National and Mediterranean scales (Table 2). In the supplementary material is located the excel table with the values of the parameters selected at the level of Spain.

Table 2. Habitat and endemic species parameters

Parameters	Variable	Description	Source
Number of protected areas	Number	Provide the total number of Protected Areas in the region	Ministry for the Ecological Transition and the Demographic Challenge (MITECO)
Name of protected Area	Name	Provide the name of the Protected Area	Ministry for the Ecological Transition and the Demographic Challenge (MITECO)
Type of protected Area	Possible Value: Ramsar site, biosphere reserves, MCPA, ...	Provide the type of protected area	Ministry for the Ecological Transition and the Demographic Challenge (MITECO)
Localisation	Unit: Degrees Minutes Seconds	Provide the location (Longitude, Latitude) of the Protected Area	Ministry for the Ecological Transition and the Demographic Challenge (MITECO)
Extent of protected area	Unit: ha	Provide the extent of the protected area (ha)	Ministry for the Ecological Transition and the Demographic Challenge (MITECO)
Delimitation of protected Area	Shapefile	Provide a delimitation of the Protected Area	Ministry for the Ecological Transition and the Demographic Challenge (MITECO)
Number of protected area with touristic activity	Number	Indicate the number of Protected Areas which allow tourist activities inside it	Ministry for the Ecological Transition and the Demographic Challenge (MITECO)
Name of dominant Endemic species	Name	Provide us with the name of the dominant Endemic species in the region	International Union For Conservation Of Nature (IUCN)
Total number of Endemic species	Number	Indicate the total number of Endemic species existing in the region	International Union For Conservation Of Nature (IUCN)
Pressure of touristic activities on the Endemic Species	Possible Value: Yes/No	Identify if the Endemic species have an effect on the ecosystem and/or tourism activities in the region	International Union For Conservation Of Nature (IUCN)
Name of dominant Invasive Species	Name	Provide us with the name of the dominant Invasive species in the region	International Union For Conservation Of Nature (IUCN)
Total number of Invasive species	Number	Indicate the total number of Invasive species existing in the region	International Union For Conservation Of Nature (IUCN)
Invasive species impacts	Possible Value: Yes/No	Identify if the invasive species have an effect on the ecosystem and/or tourism activities in the region	International Union For Conservation Of Nature (IUCN)

VI. Conclusions

The main conclusions are:

- Spain is one of the 25 biodiversity hotspots in the world and considered one of the most biodiverse countries in the European Union.
- Habitat loss, fragmentation and degradation are the most significant threats at the European level to species that occur in Spain.
- Natura 2000 designation and management: there are 598 Special Protection Areas and 1,448 Sites of Community Importance, out of which 299 are Special Areas of Conservation, covering 27.2% of the Spanish terrestrial surface.
- The development of a national system on indicators, to monitor data contained in the Inventory of Natural Heritage and Biodiversity, has been prioritized in the Strategic Plan on Natural Heritage and Biodiversity 2011-2017.

VII. References

Bilz M., Kell S.P., Maxted N., Lansdown R.V., 2011. European Red List of Vascular Plants. Publications Office of the European Union, Luxembourg.

Co-Evolve, available at: <https://co-evolve.interreg-med.eu/> [accessed 07/02/2021].

Cox N.A., Temple H.J., 2009. European Red List of Reptiles. Office for Official Publications of the European Communities, Luxembourg.

Cuttelod A., Sheddon M., Neubert E., 2011. European Red List of Non-marine Molluscs. Publications Office of the European Union, Luxembourg.

EMODNET, available at: <https://emodnet.eu/> [accessed 19/04/2021].

EUROSTAT, available at: <https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-gq-20-92> [accessed 19/04/2021].

Freyhof J., Brooks E., 2011. European Red List of Freshwater Fish. Publications Office of the European Union, Luxembourg.

International Union for the Conservation of Nature, 2001. IUCN Species Survival Commission, International Union for Conservation of Nature, & Natural Resources. Species Survival Commission. IUCN Red List categories and criteria. IUCN.

Kalkman V.J., Boudot J.P., Bernard R., Conze K-J., De Knijf G., Dyatlova E., Ferreira S., Jović M., Ott J., Riservato E., Sahlén G., 2010. European Red List of Dragonflies. Office for Official Publications of the European Communities, Luxembourg.

Ministry of the Ecological Transition and Demographic Challenge (MITECO), available at: <https://www.miteco.gob.es/en/> [accessed 19/04/2021].

Nieto A., Alexander K.N.A., 2009. European Red List of Saproxyllic Beetles. Office for Official Publications of the European Communities, Luxembourg.

Temple H.J., Cox N.A., 2009. European Red List of Amphibians. Office for Official Publications of the European Communities, Luxembourg

Temple H.J., Terry A., 2009. The status and distribution of European mammals. Office for Official Publications of the European Communities, Luxembourg.

Van Swaay C., Cuttelod A., Collins S., Maes D., López Munguira M., Šašić M., Settele, J., Verovnik R., Verstrael T., Warren M., Wiemers M., Wynhoff I., 2010. European Red List of Butterflies. Office for Official Publications of the European Communities, Luxembourg.

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