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Gap analysis – Assessment of habitat and species conservation status in the Macaronesia

Documentation Review Report

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Introduction

The report of the Intergovernmental Platform for Biodiversity and Ecosystem services (IPBES) published on 2019 alerted about the increasing rate of species extinction and this led the European Union to strengthen their environment policy with the the promotion of the Greend Deal and the EUI Strategy for Biodiversity.

IUCN established in 1964 the Red List of Threatened Especies, which has become over the years the most complete global inventory of animal, plants and fungi species at risk of extinction. The list identifies different level of threats based on a series of scientific criteria and subcriteria. Along with the Red List of Threteaned species, IUCN together with BirdLife Internetional, developed the designation of KEyBiodiversity Areas, to define areas of critical importance for the conservation of species and habitats. Within this framework, in 2021 the Global movement to revert the Red was launched by IUCN and WAZA (World Association of Zoos and Aquariums).

Outermost regions are home to uncommon primary ecosystems with distinctive flora and fauna, ranging from coral reefs to rainforests. These varied regions make up 80% of the biodiversity in Europe.

OR are also some of the Union's most environmentally fragile regions. In fact, because of their tiny size, remote location, and high endemic biodiversity, they are especially vulnerable to dynamics brought on by human activity and climate change, which endanger both the communities who depend on natural ecosystems globally and the ecosystems themselves.

The BEST initiative aims to support the conservation of biodiversity and sustainable use of ecosystem services in ORs and OCTs. In particular, it aims to a) facilitate access to EU funds for actors in the EU ORs and OCTs to unlock initiatives and potential in biodiversity conservation and the sustainable use of ecosystem services b) increase the capacity of ORs and OCTs actors to access and effectively manage EU funds c) increase the visibility of EU ORs and OCTs as key contributors to the achievement of EU and global biodiversity targets and strategies.

The Macaronesian archipelagos, which are home to an extraordinary number of rare species, have experienced significant population and tourism growth, which generates challenges for the conservation of nature and biodiversity. Despite of several conservation and restoration initiatives put in place in the last decade, activities to preserves the ecological stability of these islands needs to be strategically designed and implemented.

In the framework of the BEST initiative, this study has been commissioned to indicate where the conservation needs lie for ORs and to guide in the definition of priorities for strategies or initiatives focusing on biodiversity, ecosystem services and climate change in the Macaronesia.

The study has considered several sources of information – from legislation, research work, conservation and restoration initiatives – and has involved several stakeholders to gather expert opinions on challenges and potential solutions.

Methodology

In order to carry out the study, authors relied on desk review, including several sources of information, and inputs and feedback by stakeholders. The methodology has been conceived in a way to collect the majority of inputs on existing initiatives, challenges and priorities through desk research and to validate/integrate the results of the desk review with the input of stakeholders, either in the form of interviews, focus groups or survey.

Desk review of legislative/regulatory framework

To describe the legislative/regulatory framework concerning biodiversity protection and conservation and protected areas a desk review has been completed. Contributors have explored several web sources at EU, national and regional level to identify any new legislative act introduced following the publication of the ecosystems assessment report of 2016.

The desk review allowed to clearly identify all the legislative acts which affect biodiversity in Macaronesia.

The desk review also concern the list of protected species, habitats and areas in the three regions composing Macaronesia: Azores and Madeira in Portugal and Canary Islands in Spain. Both the IUCN red lists and the catalogue of priority species of the Canary Islands Government have been considered. Likewise, the full list of Natura 2000 areas and of key biodiversity areas have been reported. As reported below, discrepancies have been observed between sources of information.

Literature review of research works

An extensive literature review has been performed to collect all relevant studies concerning biodiversity protection and conservation in Macaronesia. A review with key words (protected areas, protected species, Natura 2000, biodiversity protection, biodiversity conservation, climate change) has been performed in the following repositories:

- Research gate
- ORCID
- Google scholars
- Websites from regional research centers

The desk review has led to the selection of more than 100 studies/papers targeting different issues relevant to this study: existing/new threats for species and habitats, conservation strategies/approaches/actions/challenges, management of protected areas, knowledge improvement/data collection, awareness raising. The literature review has thus allowed to identify:

- Activities filling existing research gaps and/or identifying new research gaps
- Challenges/Threats to biodiversity
- New research/conservation/protection priorities

The full list of articles reviewed is enclosed in Annex I.

Desk review of conservation/protection initiatives

Through web desk review and expert knowledge, new (since 2016) conservation/monitoring/ initiatives have been collected. Within this task an analysis of previous LIFE4BEST project has also been conducted, summarising for each initiatives the most relevant information.

A summary of this activity is presented in the tables 4 and 5 indicating the areas, species and threats addressed, type of activities, conservation outcomes and recommendations where applicable.

Stakeholders engagement

A stakeholder mapping exercise has been completed to identify the most relevant actors to involve in the analysis of existing conservation/protection initiatives, awareness raising activities, existing or expected challenges and current and future conservation priorities.

The following types of stakeholders have been considered:

- National/regional/local policy makers of environment, climate change, spatial planning departments/areas
- Protected areas managers
- Researchers/scientists
- Association/NGOS, civil society organizations
- Beneficiaries of previous LIFE4BEST projects or LIFE projects
- private sector (tourism companies, environment consultants, etc)

The list of stakeholders involved in the assessment performed in 2016 has also been reviewed to assess if the stakeholder involved are still in a position to contribute to the current study. The document “Stakeholder consultation” includes the stakeholder database.

Staekholders have been contacted either by -email or phone and invited to participate in an interview or in focus groups in some cases, depending on the type of stakeholders, such as in the case of researchers from a same department.

Due to the difficulties in recruiting a significant number of stakeholders for interviews, authors decided to design a survey to integrate the findings with inputs from a wider number of stakeholders. Since the survey was launched following a first phase of consultation activities, respondents were asked also to prioritise the main challenges of biodiversity conservation and restoration and the potential solutions identified during the first consultation stage.

Socio-economic context:

According to the eighth report on economic, social, and territorial integration (European Commission, 2022c), all of the outermost regions—aside from Madeira—had lower employment rates than the EU average in 2019—the year before the Covid-19 pandemic broke out in Europe. Similarly, GDP per worker productivity, which is a measure of productivity, was lower in all outermost regions of the EU than it was in Guadeloupe. Low levels of urban wastewater treatment, a high percentage of early dropouts from school or training, and lower levels of digitalization (e.g., in terms of the share of households having internet connection at home) are some of the other issues mentioned in the report.

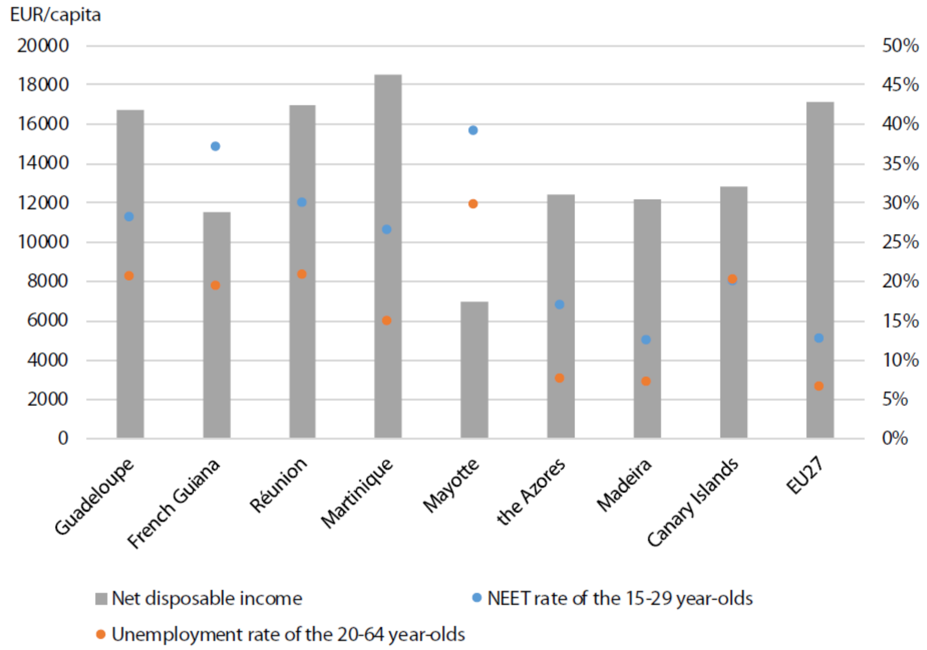

Figure 1 - Income, education and employment indicators in the outermost regions (2019). Source: European Commission

With the exception of Martinique, all of the EU's most remote areas had average net disposable incomes in 2019 that were lower than EUR 17,100 per person. The average net disposable income was a pitiful two-thirds to three-quarters of the EU average in four of the most remote regions: Madeira, Azores, and the Canary Islands. Regarding the unemployment rate, every outermost area had an unemployment rate for individuals between the ages of 20 and 64 that was higher than the 6.6% average for the EU. With an unemployment rate of 7% to 8%, the Portuguese outermost areas were the only two doing quite well in that area. In the Canary Islands, the rate even hovers around 20%.

Demographic trends

Over recent years, the Macaronesian regions have experienced significant demographic changes, with contrasting trends between the Azores, Madeira, and the Canary Islands.

Azores and Madeira:

- Population Decline: Both regions have seen a decline in population. For instance, between 2011 and 2021, the Azores lost around 10,000 residents, which is about 4% of its population and Madeira lost 17,000 (aprox 7%). This decline is more pronounced in smaller islands.
- Youth Exodus: The primary cause of this population decrease is the relatively poor economic performance, which has driven younger people to seek better employment opportunities abroad, particularly in North America and Europe.
- Economic Impact: The outmigration of youth exacerbates economic challenges, resulting in a growing deficit of skills, human capital, and workforce. This limits the regions' capacity to address socio-economic vulnerabilities and hampers economic growth.

Canary Islands:

- Population Increase: In contrast, the Canary Islands have experienced significant population growth. From 2001 to 2023, the population increased by 32%, now representing 4.6% of Spain’s total population.
- Foreign Population Dynamics: This growth is largely due to an influx of foreign residents, driven by improvements in the region's economic situation, particularly the tourism boom at the end of the last century. By 2022, the number of foreign residents had risen to 288,489, with the majority coming from the EU, followed by South America and Africa.
- Economic Attraction: The enhanced economic prospects and high level of external exposure have made the Canary Islands an attractive place to live, contributing significantly to its population growth.

Future Projections:

Eurostat Forecasts: Population projections from Eurostat indicate a continued decline in the Azores and Madeira, while the Canary Islands are expected to see sustained growth until 2050, after which the population levels may return to 2030 numbers.

Socio-Economic Implications:

- Infrastructure and Labour Market Pressure: Fast-paced population growth in the Canary Islands will put additional pressure on existing infrastructure and labour markets, while the declining populations in the Azores and Madeira will struggle with a lack of skills and workforce.
- Tourism Impact: The growing tourism industry in the Canary Islands poses challenges for natural resource use and environmental contamination.
- Aging Population: All regions face the issue of an aging population, with youth outmigration and underlying aging trends contributing to a rising old-age dependency ratio. This creates mounting socio-economic challenges, including increased healthcare costs, which leave less room for transformative and

innovative investments.

Overall, these demographic trends highlight the need for tailored socio-economic strategies to address the unique challenges and opportunities in each region of Macaronesia.

Canary Islands

Most businesses in the Canary Islands are small and medium-sized enterprises (SMEs), with 96% employing fewer than ten people. The scarcity of large companies impacts productivity, employment opportunities, specialization, economies of scale, and internationalization. Over the past 15 years, the active population has grown mainly due to immigration. While the employment rate in 2022 was nearly ten percentage points higher than a decade earlier, unemployment remains above pre-2008 levels.

The economy faces productivity challenges, leading to low wages, limited GDP growth, and restricted dynamism. Competitiveness is another concern, with some sectors needing more support, affecting social cohesion and leading to moderate poverty. Labor market issues include low-skilled workers, long-term unemployment, and high job temporality. The Canary Islands have the second-lowest salaries in Spain, with 30% of jobs being temporary. The underground economy, accounting for 26% of GDP in 2020, complicates the situation further. Consequently, the Canary Islands, along with Andalusia and Extremadura, have the highest poverty risk rates in Spain at 28.4%.

Educational attainment in the Canary Islands is below the national average, with low vocational training completion rates and poor international assessment results, especially in foreign languages. Modernizing career guidance services is crucial. Despite recent improvements, the school dropout rate remains high.

Azores

The economy of the Azores is primarily driven by two main clusters: the agro-industrial cluster and the tourism cluster. Despite some external competitiveness, both sectors face significant external challenges. The agro-industrial cluster, particularly the dairy industry, has historically shown low value-added contributions, primarily due to external ownership of factories and monopolistic conditions on Terceira Island. The tourism sector is heavily influenced by external factors, such as flight liberalization, the COVID-19 crisis, and competition from other destinations. This sector’s sustainability is a concern, as tourism is highly competitive and volatile, requiring continuous specialization and innovation.

Poverty remains a major issue, with the Azores exhibiting high poverty risk indicators and significant participation in national social support programs. Challenges related to low education and training performance, low productivity, and early school dropout rates exacerbate the region’s structural problems.

Additionally, the weak development of the region's base sectors and the high costs of public debt service further fuel socio-economic vulnerabilities.

A significant socio-economic change in the last decade has been the substantial increase in tourism to the Azores, driven by the introduction of low-cost flights. This has led to a dramatic rise in tourist numbers, which has in turn spurred considerable investment in tourism infrastructure, including hotels, restaurants, and recreational facilities. This boom has provided a much-needed boost to the local economy, creating jobs and stimulating related industries.

However, this rapid growth also brings challenges. The influx of tourists has put pressure on local resources and infrastructure, leading to concerns about environmental sustainability. The increased footfall in natural areas threatens the delicate ecosystems of the islands, necessitating careful management and conservation efforts to prevent degradation.

Socially, the tourism boom has had mixed impacts. While it has created employment opportunities and improved incomes for many residents, it has also led to increased living costs and pressures on housing availability, potentially displacing local communities. The focus on tourism can also overshadow other economic activities, making the region more vulnerable to the volatile nature of the tourism industry.

In summary, the Azores' significant increase in tourism due to low-cost flights has had profound socio-economic and environmental impacts. It underscores the importance of sustainable tourism practices and the need for a balanced approach to economic development that safeguards the region’s natural and social fabric.

Madeira

Madeira's economy is primarily based on the service sector, accounting for 85% of the region's GDP. Tourism is the main driver of this sector, contributing to revenue generation and employment.

The region is dominated by small and medium-sized enterprises (SMEs), including artisanal activities and agro-food, beverage, and tobacco industries. The Madeira Free Trade Zone plays a crucial role in diversifying and modernizing the regional economy. The primary sector is agricultural production, but challenges include rugged terrain and limited arable land. The fishing industry holds economic and social importance for coastal communities.

Madeira has made significant investments in improving accessibility, such as road improvements, airport expansion, and international maritime terminals. However, poverty remains a major issue, and the rapid growth in tourism has brought mixed effects, including higher living costs and housing pressures.

The region must focus on sustainable tourism practices, addressing issues in the agro-industrial sector, improving educational outcomes, and reducing poverty for long-term socio-economic stability.

Table 1 – Geographical and economical parameters of Macaronesia regions

Parameter	Azores	Madeira	Canaries	Macaronesia
Country	Portugal	Portugal	Spain	Portugal andSpain
Nº of main islands	9	2	7	18
Land Area (km^2)	2,322	802	7,447	10,571
EEZ (km^2)	926,149	442,316	456,237	1,824,702
Maximum elevation (m)	2,351 (Pico)	1,862 (Madeira)	3,718 (Tenerife)	3,718
Continental isolation (km)	1,369 (São Miguel)	630 (P. Santo)	96 (Fuerteventura)	96
Mean intra-archipelago isolation (km)	220	32	196	-
Age of the oldest emerged island (My)	8 (Sta. Maria)	14 (P. Santo)	21 (Fuerteventura)	27
Last subaerial volcanic eruption	1957 (Faial)	25 Ky BP (Madeira)	2022 (La Palma)	1995
Latitude (°)	37- 39 N	33 N	27 - 29 N	27 - 39 N
Colonization date	1432 AD	1420 AD	ca. 2,500 BP	-
Human population (M)	0.23	0.2 5	2.2	2.6

Legal framework

EU Legislation (green deal, biodiversity strategy, Natura 2000 lists, IUCN)

EU Environmental Action Plan

The 8th Environment Action Programme (EAP) entered into force on 2 May 2022, as the EU's legally agreed common agenda for environment policy until 2030. The action plan restates the European Union's long-term goal of achieving good living conditions within planetary bounds by 2050. It lays forth the key goals for 2030 together with the prerequisites for achieving them. The action program, which builds on the "European Green Deal," intends to expedite the shift to a resource-efficient, climate-neutral economy while acknowledging that ecosystem health is a prerequisite for human well-being.
In order to guarantee that EU environmental and climate regulations are successfully implemented, the 8th EAP urges active participation from all stakeholders at all levels of government.

The Plan sets six main objectives:

- achieving the 2030 greenhouse gas emission reduction target and climate neutrality by 2050
- enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change
- advancing towards a regenerative growth model, decoupling economic growth from resource use and environmental degradation, and accelerating the transition to a circular economy
- pursuing a zero-pollution ambition, including for air, water and soil and protecting the health and well-being of Europeans
- protecting, preserving and restoring biodiversity, and enhancing natural capital
- reducing environmental and climate pressures related to production and consumption (particularly in the areas of energy, industry, buildings and infrastructure, mobility, tourism, international trade and the food system)

Consistent with the European Green Deal's commitment to "do no harm," the Eighth EAP endorses an integrated approach to the formulation and execution of policies.

The Commission approved a set of headline indicators on July 26, 2022, to track

advancement toward the environment and climate goals of the EU as outlined in the 8th EAP. Based on this, a mid-term evaluation of the implementation of the plan was in March 2024. The review emphasized how crucial it is to accomplish environmental and climate change goals in order to reap the benefits for the economy, notably in terms of resilience, health, and material autonomy. The mid-term report also stated that even while a lot of the planned activities, like changing the laws, have been carried out, it is still too early to determine how they would affect the environment because they have not yet been put into practice.
According to the review, the majority of the biodiversity strategy's initiatives, such as reaching a political consensus on the Nature Restoration Law and expanding the number of designated protected land and marine areas, have been accomplished.

European Union Biodiversity Strategy

The biodiversity strategy for 2030 has been approved in 2020 with the goal "to put Europe's biodiversity on the path to recovery by 2030 for the benefit of people, the planet, the climate and our economy. Elaborated during the COVID-19 context, the strategy aims to build Europe's resilience to future threats such as climate change, forest fires, food insecurity and disease outbreaks - including by protecting wildlife and fighting illegal wildlife trade.

The Strategy is organized across four pillars:
- Protect nature by expanding protected areas to 30% of the EU's land and sea and by putting a third of these areas under strict protection
- Restore nature and ensure its sustainable management across all sectors and ecosystems
- Enable transformative change by strengthening the EU biodiversity governance framework, knowledge, research, financing and investments
- Support biodiversity globally by deploying EU external actions to raise the level of ambition for biodiversity worldwide, reducing the impact of trade and supporting biodiversity outside Europe

Under the first pillar, the following commitment and goals are included in the Strategy:
- Legally protect at least 30% of the EU's land area and 30% of its seas.
- Strictly protect at least a third of the EU's protected areas - representing 10% of the EU land and 10% of EU sea, including all remaining primary and old-growth forests as well as other carbon rich ecosystems, such as peatlands, grasslands, wetlands, mangroves and seagrass meadows
- Create and integrate ecological corridors as part of a Trans European Nature Network to prevent genetic isolation, allow for species migration and to maintain and enhance healthy ecosystems

- Effectively manage all protected areas, defining clear conservation objectives and measures, and monitoring them appropriately. In particular the Strategy mention the importance for Member States to promote equal or equivalent rules in EU's Overseas Countries and Territories, which host important host important biodiversity hot spots but are not always governed by EU environmental rules. Within this action the BESTLIFE2030 project, of which IUCN is the coordinator, was awarded. The contribution of the European Maritime Fund for Aquaculture and Fisheries to climate and biodiversity targets will be monitored also for the Outermost Regions under this action.

Pillar 2 lays out a comprehensive plan of actions to restore EU biodiversity, reduce pressures on EU ecosystems, and ensure their sustainable management. The restoration agenda aims to address the main drivers of biodiversity loss and bring back diverse and resilient nature while in turn ensuring the continued provision of the ecosystem services on which our wellbeing and prosperity depend. To do so, Pillar 2 set the following commitments and goals:

- Propose legally binding EU restoration targets by 2021, and restore significant areas of degraded and carbon rich ecosystems by 2030. The target have been included in the proposal for the Nature Restoration Law adopted in June 2022. The Nature Restoration Law requires Member States to develop and adopt national restoration plans The national restoration plans shall cover the period up to 2050, with intermediate deadlines corresponding to the targets and obligations set by the Law. The Plans shall include a dedicated section setting out tailored restoration measures in their outermost regions, when applicable;
- Ensure habitats and species show no deterioration in conservation trends and status; and at least 30% reach favourable conservation status or at least show a positive trend
- Reverse the decline of pollinators
- Reduce the use of chemical pesticides by 50% and reduce the use of more hazardous pesticides by 50%
- Ensure that at least 10% of agricultural area is under high-biodiversity landscape features
- Place at least 25% of agricultural land under organic farming management, and significantly increase the uptake of agro-ecological practices
- Reduce the loss of nutrients from fertilisers by 50%, resulting in the reduction of fertilizer use by at least 20%
- Plant three billion new trees in the EU, in full respect of ecological principles
- Make significant progress in remediating contaminated soil sites
- Restore at least 25,000 km of free-flowing rivers
- Substantially reduce the negative impacts of fisheries and extraction activities on sensitive marine habitats and species, including on the seabed in support of

achieving good environmental status.

- Eliminate or reduce the by-catch of species to a level that allows their recovery and conservation
- Adopt ambitious Urban Greening Plans for cities with at least 20,000 inhabitants
- Minimise or eliminate the use of pesticides in sensitive areas such as urban green areas
- Halve the number of Red List species threatened by invasive alien species.

The Third pillar aims at creating the right implementation conditions for the actions proposed under the Strategy and to integrate the biodiversity strategy into the wider EU policy framework adopting a whole-of-society approach.

The fourth pillar will use the EU external policies, trade arrangements and bilateral programmes to promote biodiversity outside Europe and foster the agreement of a more ambitious global framework for post-2020.

In order to monitor the implementation of the strategy two online tools have been developed which provide up-to-date information on the state of implementation of the strategy's many actions. A targets dashboard shows progress to the quantified biodiversity targets set by the Strategy, at the EU level and in the Member States while the Actions tracker report on the completion of each action by the set deadline.

World Heritage Convention

A new Natural World Heritage Site has been declared in Canary Islands in 2019: Risco Caido and the Sacred Mountains of Gran Canaria Cultural Landscape. Risco Caido is located in a vast mountainous area in the centre of Gran Canaria. Risco Caído comprises cliffs, ravines and volcanic formations in a landscape of rich biodiversity. The landscape includes a large number of troglodyte settlements — habitats, granaries and cisterns — whose age is proof of the presence of a pre-Hispanic culture on the island, which has evolved in isolation, from the arrival of North African Berbers, around the beginning of our era, until the first Spanish settlers in the 15th century.

Strategy for EU's Outermost regions

The Commission also strengthened the biodiversity dimension in the new Strategy for the EU's Outermost regions adopted in May 2022. The European Parliament Resolution on the Outermost regions adopted on 14 September 2021 and the European Committee of the Regions' Opinion adopted in December 2020 had made further calls for EU action to support biodiversity.

Portugal

OSPAR MPA's Portugal announces expanded marine protected area in the Azores archipelago hope spot. (To meet with its commitment to protect 30% of its ocean by 2023) June 27th 2022; It has been stated a specific increase in the protected area (%), no specific number of current total area

Decree-Law No. 92/2019, dated July 10, establishes the **legal framework for the control, detention, introduction into nature, and repopulation of exotic species of flora and fauna in Portugal**. This decree aims to prevent the ecological, economic, and health impacts caused by invasive exotic species by regulating their management and ensuring the protection of native biodiversity.

The decree outlines stringent regulations for the introduction and management of exotic species. It prohibits the release of any exotic species into the wild without prior authorization from the competent authorities. The authorization process includes a comprehensive risk assessment to evaluate the potential impacts on native species, habitats, and ecosystems. This assessment ensures that only species that pose no significant threat are considered for introduction or repopulation.

Additionally, the decree sets forth measures for the control and detention of exotic species. It mandates that any entity or individual responsible for the possession of exotic species must adhere to strict containment and management protocols to prevent their escape or accidental release. Specific guidelines are provided for the transportation, handling, and housing of these species to minimize risks to the environment.

The decree also addresses the management of already established invasive exotic species. It outlines action plans for their control, including methods for their capture, removal, and, where necessary, humane eradication. These action plans are developed in coordination with environmental and conservation organizations to ensure effective and ethical management practices.

Public awareness and education are integral components of the decree. It calls for information campaigns and educational programs to inform the public about the risks associated with invasive exotic species and the importance of compliance with regulatory measures. These initiatives aim to foster community involvement in the prevention and management of exotic species.

Provides a comprehensive legal framework for the control, detention, introduction, and repopulation of exotic species of flora and fauna in Portugal. By implementing strict regulations and promoting public awareness, the decree aims to safeguard native biodiversity and mitigate the adverse impacts of invasive exotic species on the environment, economy, and public health.

Decree-Law No. 92/2019, dated July 10, applies to the entire territory of Portugal, including the Autonomous Regions of the Azores and Madeira. This means that the regulations and measures established for the control, detention, introduction into nature, and repopulation of exotic species of flora and fauna are also applicable in the Azores. The decree aims to ensure a unified approach across all regions of Portugal in managing exotic species to protect native biodiversity and mitigate ecological, economic, and health impacts.

The Resolução do Conselho de Ministros n.º 55/2018, issued by the Presidency of the Council of Ministers, approves the **National Strategy for the Conservation of Nature and Biodiversity 2030**. This strategic framework is designed to safeguard Portugal's natural heritage, ensure the conservation of biodiversity, and promote the sustainable use of natural resources over the coming decade.

The strategy lays out several critical objectives to achieve these goals. Firstly, it emphasizes the protection and enhancement of biodiversity by preserving and restoring natural habitats and ecosystems. This focus aims to halt the loss of biodiversity and ensure the long-term viability of species and habitats. By doing so, it seeks to maintain and improve the ecological health and resilience of natural environments across Portugal.

Secondly, the strategy promotes the sustainable use of natural resources. It advocates for economic activities, such as agriculture, forestry, and fisheries, to be conducted in ways that do not compromise biodiversity. This approach ensures that the exploitation of natural resources contributes positively to conservation efforts and does not lead to environmental degradation.

Another significant component of the strategy is addressing climate change. It includes measures to mitigate the effects of climate change and enhance the resilience of ecosystems. Recognizing the interconnection between climate change and biodiversity, the strategy integrates actions that protect ecosystems from climate-related impacts and bolster their adaptive capacity.

The strategy also calls for the integration of biodiversity considerations into various sectoral policies and plans. This integration ensures that land use planning, tourism, infrastructure development, and other sectors contribute to biodiversity conservation goals. By embedding biodiversity into these areas, the strategy seeks a holistic approach to sustainable development.

Public engagement and education are pivotal elements of the strategy. It highlights the importance of raising awareness and involving citizens in biodiversity conservation. Educational initiatives and communication campaigns aim to foster a culture of respect and care for nature, encouraging active participation in conservation efforts.

Furthermore, the strategy supports scientific research and monitoring to inform conservation actions and policies. It promotes the collection and analysis of data to improve understanding of biodiversity and ecosystem health, enabling evidence-based decision-making.

Lastly, the strategy aligns with global biodiversity conservation efforts and commitments, facilitating international cooperation and collaboration. By engaging in international partnerships, Portugal aims to contribute to and benefit from global initiatives to protect biodiversity.

Through these comprehensive objectives, the National Strategy for the Conservation of Nature and Biodiversity 2030 aims to create a robust framework for preserving Portugal's rich natural heritage. It represents a commitment to ensuring the well-being of ecosystems, supporting sustainable development, and safeguarding the natural environment for current and future generations.

Azores

Marine conservation efforts in the Azores have a rich history, beginning in the 1980s with the establishment of several coastal Marine Protected Areas (MPAs) and an offshore marine reserve. This early phase focused on promoting the sustainable use of marine resources through fishing limitations.

By the late 2000s, the UNESCO recognized parts of the Azores under the Man and Biosphere Program, designating islands such as Corvo, Flores, and Graciosa and their surrounding marine environments as Biosphere Reserves.

Significant strides in marine conservation legislation and initiatives have been made in the Azores since 2014. A cornerstone of these efforts is the **Azores Network of Marine Protected Areas**, established by "Decreto Legislativo Regional nº 15/2007/A" and expanded through subsequent regulations such as "DLR n.º 28/2011/A" and "DLR n.º 13/2016/A". This network includes Island Natural Parks within territorial waters and the Azores Marine Park beyond territorial waters, all coordinated by the Regional Directorate for Maritime Affairs (DRAM).

The 2016 expansion of the network added several new MPAs, including the Meteor Submarine Archipelago and seamounts Condor and Princesa Alice. This brought the total area of the Azores Marine Park to 135,507 km², covering both territorial waters and areas beyond the Portuguese Exclusive Economic Zone (EEZ). A notable addition in 2019 was the Luso hydrothermal vent field, fully protected from fisheries under "Portaria nº 68/2019".

Today, the **Azores Marine Park** comprises a diverse array of protected sites, including five hydrothermal vent fields, six seamounts, and two offshore areas crucial for seabird conservation. These sites fall under various IUCN categories, ranging from nature reserves (IUCN I) to areas for resource management (IUCN VI). This comprehensive network aims to safeguard marine biodiversity, with specific regulations and protections tailored to each site's unique ecological characteristics.

As an EU Member State, the Azores adheres to a wide range of international and national policies governing fisheries, energy, and conservation. The EU Common Fishery Policy plays a central role in managing fishery resources in the region. This policy is implemented through Total Allowable Catches (TACs) for species like blackspot seabream, alfonsinos, and deep-water sharks. Since 2010, a zero TAC for 13 taxa of deep-water sharks has been in place, evolving into a fishing prohibition in 2018. Similarly, the orange roughy (*Hoplostethus atlanticus)* has been a prohibited species since 2017, with all catch required to be discarded under the European Landing Obligation.

The management strategy for *Beryx* species also reflects a nuanced approach. An "80% notice" implemented in 2013 helps manage quotas and mitigate socio-economic impacts by restricting the catch of Beryx splendens once 80% of the mixed quota is reached, while allowing limited landings of Beryx decadactylus.

In addition to fish quotas, the regional government has enacted various technical measures over the years, including minimum landing sizes, mesh sizes, license limitations for specific gears, and area closures. Of particular note is the ban on bottom trawling and deep-sea netting around the Azores since 2005, extended in 2014 to most of the Portuguese extended continental she

The Azores has also implemented several spatial and temporal fishing restrictions. Seasonal closures for blackspot seabream were in effect from 2015 to 2017, while specific spatial restrictions apply to longliners and handliners based on proximity to shore and vessel registration. For instance, longliners are restricted from fishing within 3 nautical miles from shore, with further specific regulations for São Miguel and Terceira islands.

The Azores has demonstrated a strong commitment to marine conservation and sustainable fisheries management through a robust framework of legislation and regulations. These efforts, guided by EU policies and local initiatives, aim to protect marine biodiversity and ensure the sustainable use of marine resources. While challenges remain, the ongoing refinement and expansion of conservation measures promise a positive trajectory for the region's marine environment.

Relevant and very complete work from Blue Azores and Azores University for the update and increase of MPA in the Azores.

Currently, the **Protected Area Network of the Azores** comprises 124 protected areas, distributed across the nine Natural Island Parks, covering 56,066 hectares of terrestrial area, which corresponds to about a quarter of the archipelago's emerged territory.

The foundations of nature conservation and biodiversity in the Autonomous Region of the Azores are outlined in the legal framework for nature and biodiversity conservation, approved by Regional Legislative Decree No. 15/2012/A, dated April 2. This decree aims to safeguard biodiversity by conserving or restoring natural habitats and wild flora and fauna to a favorable conservation status, as well as protecting, managing, and controlling wild species. It also transposes the EU Birds and Habitats Directives into regional law. Resolution No. 135/2018 of the Regional Government Council, dated December 10, approved the landscape quality objectives and guidelines for the management of the Azores landscape, in line with the European Landscape Convention (ELC), approved by Decree No. 4/2005, dated February 14. This promotes the protection, planning, and active, integrated management of the Azores landscape, which adds value to nature conservation within protected areas. Resolution No. 65/2017 of the Regional Government Council, dated June 22, mandated the development of Management Plans for the Natural Island Parks as tools for managing protected areas.

In this context, **Natural Park Management Plans** were developed for all islands, aiming to address the challenges of managing these protected areas. These plans establish regimes for safeguarding natural resources and values across the various categories of protected areas within the Natural Park. They define compatible uses and management regimes for the sustainable use of the territory, in coordination with the territorial management instruments in effect in the intervention area.

The Regional Legislative Decree No. 10/2019/A, dated May 22, establishes the **regime for the protection and classification of volcanic cavities in the Azores**. This decree aims to preserve the geological and speleological heritage of the region, ensuring the protection of volcanic cavities and their scientific, educational, cultural, and tourist value.

The decree classifies volcanic cavities into different categories based on their geological, ecological, historical, and cultural significance. These categories include Natural Monument, Protected Area of Interest for Nature and Landscape Conservation, and Site of Speleological Interest. It defines protection and management measures to ensure the conservation of volcanic cavities, imposing restrictions on access, permitted activities, and interventions within and around these sites. Any activity that could compromise the integrity of the cavities, such as construction, resource extraction, and waste disposal, is prohibited.

Access to volcanic cavities and the conduct of activities within them require prior authorization from the competent authorities. The decree outlines the procedures for obtaining these authorizations, including the need for environmental impact assessments and the implementation of mitigation measures. It also mandates the creation of management plans for each classified cavity, with specific conservation, monitoring, and sustainable use objectives. The decree ensures the involvement of local communities, scientific organizations, and conservation entities in the management of volcanic cavities, and implements a continuous monitoring system to assess the conservation status of the cavities and the effectiveness of protection measures.

Furthermore, the decree promotes public awareness of the importance of volcanic cavities through educational programs, awareness campaigns, and the establishment of interpretation centers. It encourages scientific research and the dissemination of knowledge about volcanic cavities. This represents a significant milestone in the protection of the natural heritage of the Azores. Through the classification, management, and monitoring of volcanic cavities, this decree aims to ensure the preservation of these unique geological formations while promoting their scientific, educational, and tourist value in a sustainable manner.

The Regional Legislative Decree No. 30/2019/A, dated November 28, approves the **Regional Program for Climate Change (PRAC)** in the Azores. This decree aims to establish a comprehensive framework for addressing climate change in the region, outlining strategies and measures to mitigate its impacts and promote adaptation.

The PRAC sets forth a series of objectives focused on reducing greenhouse gas emissions, enhancing energy efficiency, and promoting renewable energy sources. It emphasizes the need for sustainable development practices that align with environmental preservation and the reduction of carbon footprints across various sectors, including transportation, industry, agriculture, and waste management.

A key component of the PRAC is the implementation of adaptation measures to increase the resilience of the Azores to the adverse effects of climate change. This includes actions to protect coastal areas, manage water resources, conserve biodiversity, and safeguard human health. The program advocates for the integration of climate change considerations into regional planning and decision-making processes.

The decree also highlights the importance of public awareness and education on climate change issues. It calls for initiatives to inform and engage the community, fostering a culture of sustainability and environmental responsibility. The program supports scientific research and technological innovation to develop effective solutions for climate change mitigation and adaptation.

To ensure the successful implementation of the PRAC, the decree establishes mechanisms for monitoring and evaluation. These include regular assessments of progress towards the program's goals, the effectiveness of implemented measures, and the updating of strategies as needed based on the latest scientific data and climate projections.

The Regional Legislative Decree No. 6/2016/A, dated March 29, 2016, establishes the **Strategic Plan for the Prevention and Management of Waste** in the Azores, which was later rectified by the Rectification Declaration No. 6/2016, dated April 26. This decree aims to implement a comprehensive framework for effective waste management, focusing on reducing waste generation, promoting recycling, and ensuring the environmentally sound disposal of waste.

The plan sets forth specific goals and actions to minimize waste production at the source and enhance the efficiency of waste collection and treatment systems. It emphasizes the importance of public participation and awareness in waste prevention and management practices. Key measures include the promotion of waste separation and recycling programs, the development of infrastructure for waste treatment, and the implementation of policies to reduce the use of single-use plastics and other non-recyclable materials.

To ensure the successful implementation of the plan, the decree outlines monitoring and evaluation mechanisms to track progress and effectiveness. Regular assessments will be conducted to review the outcomes of the implemented strategies, allowing for adjustments and improvements based on observed results and emerging challenges. This strategic approach aims to foster a sustainable and environmentally responsible waste management system in the Azores.

The Regional Legislative Decree No. 1-A/2017/A, dated February 6, 2017, establishes the Management Plan for the Hydrographic Region of the Azores for the period 2016-2021. This decree aims to provide a comprehensive framework for the sustainable management of water resources across the Azores, ensuring the protection and improvement of water quality in rivers, lakes, coastal waters, and groundwater.

The plan outlines specific objectives and actions to address key challenges such as pollution control, sustainable water use, and ecosystem protection. It emphasizes the importance of integrated water resource management, considering the interconnections between land use, water availability, and environmental health. Measures include the implementation of water quality monitoring programs, the promotion of efficient water use practices, and the rehabilitation of degraded aquatic ecosystems.

To achieve these goals, the decree establishes mechanisms for coordination and collaboration among various stakeholders, including governmental agencies, local communities, and private sector entities. Regular monitoring and evaluation are mandated to assess the effectiveness of the plan's implementation and to adapt strategies based on new data and changing conditions. This approach ensures that the management of the hydrographic region is dynamic and responsive to both current and future water resource challenges in the Azores.

The Regional Legislative Decree No. 38/2008/A, dated August 11, establishes the **Tourism Management Plan** for the Autonomous Region of the Azores. This plan aims to provide a strategic framework for the sustainable development of tourism in the Azores, focusing on enhancing the region's attractiveness while preserving its natural and cultural heritage.

The decree outlines various initiatives to improve infrastructure, promote the Azores as a tourist destination, and ensure the quality of tourist services. It emphasizes the importance of balancing tourism growth with environmental conservation, cultural preservation, and the well-being of local communities. Key measures include the development of sustainable tourism practices, the enhancement of tourism facilities, and the promotion of the Azores' unique natural and cultural assets.

The Tourism Management Plan was partially suspended by Regional Legislative Decree No. 13/2010/A, dated April 7, with the suspension later modified by Regional Legislative Decree No. 17/2019/A, dated July 24. These adjustments were made to respond to evolving circumstances and ensure that the plan remains relevant and effective in promoting sustainable tourism development in the Azores. Regular assessments and updates are integral to maintaining the plan's alignment with the region's long-term tourism and environmental goals.

Madeira

Regional Legislative Decree No. 17/2023/M, dated April 11, establishes a comprehensive framework for the **management and control of exotic species in the Autonomous Region of Madeira**. The decree aims to protect local biodiversity by preventing and mitigating the negative impacts of invasive exotic species on native ecosystems, the economy, and public health.

The primary objective of this decree is to regulate the introduction, control, and eradication of exotic species in Madeira. It sets forth the necessary measures to prevent the introduction of new invasive species and manage those already present, ensuring the preservation of natural habitats and the protection of the region's endemic biodiversity.

The decree prohibits the introduction of exotic species without proper authorization and establishes stringent criteria for risk assessment before granting any permissions. It outlines preventive measures, including the inspection of goods and transport vectors that could carry exotic species. Additionally, it defines action plans for the management and eradication of identified invasive exotic species. These plans include physical, chemical, and biological control methods tailored to each species and affected ecosystem. The decree promotes coordination between governmental entities, non-governmental organizations, and local communities in implementing these control and eradication actions.

A continuous monitoring system is implemented for early detection and rapid response to new invasions of exotic species. This system involves regular surveys and the use of environmental surveillance technologies. The decree mandates periodic reporting on the status of exotic species and the effectiveness of the management measures in place.

The decree also emphasizes the importance of public education and awareness regarding the risks associated with invasive exotic species. It provides for information campaigns and educational programs aimed at increasing community awareness and participation in the prevention and control of these species.

The Resolução n.º 916/2020, issued on November 17, 2020, establishes the **Strategy for the Conservation of the Monk Seal in the Madeira Archipelago** for the period 2020-2032. This resolution is a comprehensive plan aimed at protecting and preserving the monk seal population in the region. The strategy outlines specific measures and actions to ensure the long-term survival and recovery of this endangered species, which is an essential part of Madeira’s natural heritage.

The conservation strategy includes habitat protection, monitoring and research programs, and public awareness campaigns to foster community support for monk seal conservation. It also emphasizes the importance of collaboration between local, national, and international organizations to implement effective conservation practices. The strategy is archived at the Secretariat-General of the Presidency and is available online at the website of the Institute of Forests and Nature Conservation, IP-RAM.

The Despacho n.º 221/2020, issued on June 17, 2020, mandates the development of the **Special Program for the Cetacean Site of Madeira** (PESCM). This program aims to align the management and conservation efforts of the cetacean site with current economic, social, and environmental trends. The initiative recognizes the importance of protecting the diverse marine life within the region, particularly cetaceans, which are significant both ecologically and economically through tourism.

The PESCM is intended to provide a structured framework for the sustainable management of marine resources, ensuring the protection of cetaceans while supporting sustainable economic activities. The program involves updating existing regulations and practices to reflect contemporary challenges and opportunities in marine conservation. It seeks to balance ecological preservation with the needs of the local communities and industries, promoting a harmonious coexistence between human activities and marine biodiversity.

The PGRH-Madeira 2016-2021, or the **Water Management Plan for the Hydrographic Region of the Madeira Archipelago**, is a strategic framework focused on the sustainable management of the region's water resources. The plan's primary objective is to ensure the availability and quality of water for various uses, including domestic, agricultural, industrial, and environmental needs. It emphasizes the protection and improvement of water bodies, aiming to maintain high standards of water quality and ecological health. The plan also addresses the efficient use of water resources, advocating for measures that promote water conservation and the sustainable use of water in all sectors. Additionally, it includes strategies to mitigate the impacts of floods and droughts, enhancing the region's resilience to these events. The PGRH-Madeira aligns with both national and European Union directives on water management, ensuring that the archipelago meets stringent regulatory standards while fostering sustainable development.

The POOC Madeira, or the **Coastal Zone Management Plan of Madeira**, is designed to regulate and manage the use of coastal areas in the archipelago. This plan aims to protect the natural coastal environments while promoting sustainable development and ensuring the safety and well-being of coastal communities. One of its key focuses is the preservation and restoration of natural coastal habitats, which are crucial for biodiversity and the overall health of marine ecosystems. The POOC Madeira also seeks to regulate coastal land use and development, ensuring that any growth in these areas is sustainable and does not compromise the integrity of the environment. It addresses the need for enhanced coastal resilience in the face of climate change and natural disasters, implementing measures to protect communities and infrastructure from these threats. Furthermore, the plan promotes sustainable tourism and recreational activities that are in harmony with the natural coastal environment. Improving coastal infrastructure and ensuring public access to these areas are also vital components of the plan, fostering a balanced approach to coastal management that benefits both people and nature.

The PAESC-RAM, or the **Sustainable Energy and Climate Action Plan for the Autonomous Region of Madeira,** is a comprehensive strategy aimed at addressing climate change and promoting sustainable energy practices throughout the archipelago. This action plan sets ambitious goals for reducing greenhouse gas emissions and enhancing energy efficiency across various sectors, including residential, commercial, and industrial domains. A significant aspect of PAESC-RAM is the promotion of renewable energy sources, encouraging the adoption of technologies such as solar, wind, and hydroelectric power to reduce the region's dependence on fossil fuels. The plan also includes measures to increase the resilience of the region to the impacts of climate change, such as extreme weather events and sea level rise. In addition to technical and infrastructural initiatives, PAESC-RAM emphasizes the importance of public engagement and education, aiming to raise awareness about climate action and the benefits of sustainable energy practices. By fostering sustainable transportation and mobility solutions, the plan seeks to reduce emissions from the transport sector, further contributing to the region's overall sustainability goals.

The Resolução n.º 699/2016, issued on October 17, 2016, approves the inclusion of the **Cetacean Site of Madeira** in the List of Sites of the Autonomous Region of Madeira. This resolution is a significant step in the conservation and management of marine biodiversity in the Madeira archipelago. By including the Cetacean Site in this official list, the resolution recognizes the area's ecological importance and its role in supporting a diverse population of cetaceans, which includes species such as dolphins and whales.

The inclusion in the list ensures that the Cetacean Site receives enhanced legal protection and management attention. It underscores the commitment of the regional government to preserve marine habitats and the species that inhabit them. The site is subject to specific conservation measures aimed at maintaining and improving the natural conditions necessary for the survival and health of cetacean populations.

This designation facilitates the implementation of targeted conservation actions, including monitoring programs, habitat protection, and the regulation of human activities that might impact the marine environment. It also aligns with broader national and international conservation efforts, contributing to the global initiatives for marine biodiversity protection. By formalizing the Cetacean Site's status, the resolution supports the sustainable use of marine resources, balancing ecological preservation with the region's social and economic interests.

Spain

Spain updated in 2022 its Strategic Plan for Biodiversity, approved in 2011 in application of the Law 42/2007. With the **Royal Decree 1057/2022**, the **National Strategic Plan for natural heritage and biodiversity** was set covering the period **until 2030**. The Plan is the tool to promote the conservation, sustainable use and restoration of heritage, terrestrial and marine natural resources, biodiversity and geodiversity. The Plan incorporates the fundamental principles of the United Nations Convention on Biological Diversity and responds to Spain's commitments at the international level and in the European Union, contributing to the achievement of the objectives of the Kunming-Montreal Global Biodiversity Framework adopted at the COP -15 of said Convention, as well as those of the European Union strategy on biodiversity 2030.

The Strategic Plan established two direct support investment packages under the Recovery, Transformation and Resilience Plan, with a first estimated budget for 2025 of 4 million euros.

The plan’s priorities are the **improvement of knowledge about biodiversity for the development of effective conservation strategies and policies and for a greater consideration and integration of those in sectoral policies**.

To this end, among other measures, a **national system for the generation,**

monitoring and governance of knowledge about natural heritage and biodiversity in Spain has been established, allowing for the obtaining of information and continuous evaluation of the state of conservation of biodiversity. and geodiversity, with the goal of zero species or type of habitat of community interest with unknown conservation status for 2030. A national accounting system for natural capital is also planned to make progress in the economic valuation of Spain's ecosystem services.

On the other hand, the Plan promotes the development and implementation of green infrastructure and ecological connectivity and restoration, in line with the different approved Strategies. Overall, by 2030, 15% of degraded ecosystems are expected to be restored.

The Plan also advances in the consideration of the interrelationships between climate change and biodiversity, through mitigation and adaptation policies and nature-based solutions; reinforces the fight against pollution: aquatic and terrestrial, but also light, acoustic and atmospheric.

In nature protection and conservation, the objective is set for at least 30% of the species and habitats that currently do not present a favourable status to reach that status or show a clear positive trend by 2030. It also provides a special attention to the conservation of pollinators and promotes prevention, early warning, control and eradication actions of invasive exotic species.

The Plan also contemplates the integration of geodiversity and geological heritage in sectoral policies regarding the conservation of natural heritage, especially the geological heritage of Spain that is most threatened or at risk of disappearance. To this end, a National Plan for the Conservation of Geological Heritage and Geodiversity will be drawn up and the Spanish Inventory of Places of Geological Interest (IELIG) is expected to be completed.

With regard to protected marine areas, the Plan sat the objective of achieving 30% effective protection and management of both the land surface and marine environment. This was in line, with Declaration of Climate Emergency of the Agreement of the Council of Ministers of January 21, 2020 which sat reaching the 30% of protected marine surface as an objective to protect marine biodiversity. On the other hand, Council Implementation Decision (CID) relating to the approval of the evaluation of the Recovery, Transformation and Resilience of Spain, established the protection of 15% of the marine surface under Spanish jurisdiction before December 31, 2023.

To comply with these different strategic objectives, the Plan set the **designation of 8 new protected marine areas to be declared in Natura 2000 Network**. The designation has been actually completed at the end of 2023 including also two new marine areas in Canary Islands: the seamounts of the southwest and of the northeast of Canary Islands[1]. **Order TED/1416/2023, of December 26, approved the proposal for the inclusion of six protected marine spaces in the list of places of community importance of the Natura 2000 Network and declared two areas of special protection for birds in Spanish marine waters.**

The Natura 2000 marine network under the jurisdiction of the General State Administration covers approximately 8% of the marine surface under Spanish jurisdiction. In the international marine biogeographic seminar held in Malta in 2016, evidence was provided that Spain still had to carry out a process of identification and declaration of marine spaces that allows improving the protection of species of community interest and the coherence and connectivity of the Natura 2000 network. The identification of the areas was made based on a scientific proposal, formulated within the Life Intemares project, which identified 104 areas of high ecological value, of which 71 for its importance for marine species and habitats and 33 for its interest for seabirds. The following spaces have been proposed as Site of Community Importance (SCI) Cañones de Alicante Marine Space, Ibiza Channel, Southwestern Seamounts of the Canary Islands, Seamounts of the Northeast of the Canary Islands and Jaizkibel-Capbretón Marine Space. The expansion of the Special Areas of Conservation with the inclusion of Galician and western Cantabrian coast to constitute a single SPA space, which will be renamed "Western Galician-Cantabrian Migratory Corridor"; as well as the declaration of the Western Strait space as SPA have also been proposed. These areas add up to an additional surface area of more than 9.3 million hectares, and would represent an 8.7% increase in protected marine area.

The Seamounts of the southwest of the Canary Islands are made up of several mountains and underwater banks, of volcanic origin, with two peaks less than 1000 meters deep (Echo, Bimbache). They contain deep communities of cold water reefs, characteristics of the type of habitat of community interest 1170–Reefs, with long-lived species and slow population dynamics that are very sensitive to the impact of anthropogenic activities.

In the seamounts of the northeast of the Canary Islands there are several seamounts, in this case with five peaks above 500 meters deep, with the presence of communities characteristic of habitat 1170. In accordance with the strategy for the conservation of the common turtle (Caretta caretta) and other species of sea turtles in Spain, the area is considered a sensitive area because it is a concentration area in oceanic areas and in the marine corridor.

Spanish marine protected areas are managed under the legal regime, established by Law 41/2010 on the protection of marine environment, that governs the adoption of the necessary measures to achieve or maintain a good environmental state of the marine environment, through its planning. conservation, protection and improvement. The Law created the Network of Marine Protected Areas of Spain. This network (whose acronym

[1] https://www.boe.es/diario_boe/txt.php?id=BOE-A-2023-26741

is **RAMPE**) is made up of **protected spaces located in the Spanish marine environment, representative of the marine natural heritage, regardless of whether their declaration and management are regulated by international, Union and state standards**. Those spaces whose declaration and management are regulated by regional regulations may also be integrated into the network, within the scope of their powers. A unique feature of the RAMPE is its great diversity of types of protected spaces, along with a great diversity of competent administrations thereof.

Royal Decree 1056/2022 approved the Master Plan of the Network of Marine Protected Areas of Spain and the minimum common criteria for coordinated and coherent management of the Network.

The objectives of the RAMPE are established in article 25 of Law 41/2010, of December 29, being: 1) Ensure the conservation and recovery of natural heritage and marine biodiversity; 2) Protect and conserve the areas that best represent the range of distribution of the species, habitat and ecological processes in the seas; 3) Promote the conservation of ecological corridors and the management of those elements that are essential or of primary importance for migration, geographic distribution and genetic exchange between populations of species of marine fauna and flora; and 4) Constitute the contribution of the Spanish State to the European and pan-European networks.

Furthermore, article 28 d) of Law 41/2010, of December 29, establishes that the General Administration of the State, together with the coastal autonomous communities competent in the declaration and management of protected marine spaces, must prepare the proposal of the common minimum criteria for the coordinated and coherent management of the Network of Marine Protected Areas of Spain, which will be approved by the Sectoral Environment Conference, and the RAMPE Master Plan.

Royal Decree 1599/2011, of November 4, establishes the criteria for the integration of protected marine spaces in the Network of Marine Protected Areas of Spain. According to the Directive 2008/56/EC of the European Parliament and of the Council, of June 17, 2008, these programs must include protection measures that contribute to the constitution of coherent and representative networks of marine protected areas that adequately cover the diversity of the ecosystems that comprise them.

On the other hand, Directive 2014/89/EU of the European Parliament and of the Council, of July 23, 2014, which establishes a framework for the planning of maritime space, was transposed into Spanish legislation by Royal Decree 363 /2017, of April 8, on maritime space planning. Article 10, dedicated to the content of maritime space planning plans, establishes that they will determine the spatial and temporal distribution of the corresponding activities and uses, both existing and future. The aforementioned article explains the consideration of protected spaces, as well as places and habitats that deserve special attention, for which adequate coordination must be achieved with the planning and management of RAMPE spaces.

This royal decree approves the first Master Plan, which will have a maximum validity of ten years, including the Common Minimum Criteria for the coordinated and coherent management of the Network (hereinafter, Common Minimum Criteria). The preparation of the Master Plan and the definition of the minimum common criteria has been designed within the framework of the LIFE IP INTEMARES project (LIFE15 IPE ES 012) "Integrated, innovative and participatory management of the Natura 2000 Network in the Spanish marine environment", a through a participatory process in which Public Administrations and other interested agents have participated.

The Plan is organized according to strategic objectives that will allow the network model to be developed and respond to its nature as a basic coordination instrument to achieve the objectives of the RAMPE. The Decree establishes the guidelines for the planning and conservation of the protected marine spaces of the Network, which provide the framework to subsequently establish the Minimum Common Criteria.

The Minimum Common Criteria include guidelines for management at the network level and others for application at the scale of each protected marine space that is voluntarily assigned to the Network. These guidelines have been developed considering the diversity of typologies of protected marine spaces that are part of the Network.

The second final provision of the Decree modified the Royal Decree 139/2011, of February 4, for the development of the List of Wild Species under Special Protection Regime and the Spanish Catalogue of Endangered Species. The provision introduces the establishment of a scientific committee as an advisory body of the General Directorates of Biodiversity, Forests and Desertification and of Sustainable Fisheries and of the autonomous communities

The third final provision modified the Royal Decree 1599/2011, of November 4, which establishes the criteria for the integration of protected marine spaces in the Network of Marine Protected Areas of Spain. A new article 6 is added to Royal Decree 1599/2011 defining the procedures for the incorporation of protected marine spaces to the Network of Marine Protected Areas of Spain. The Articles states that the incorporation of a protected marine space to the RAMPE will be voluntary and submitted by the relevant manging body to the General Directorate of Biodiversity, Forests and Desertification of the Ministry for the Ecological Transition and the Demographic Challenges which will evaluate the request.

Canary Islands

Royal Decree 216/2019, of March 29th, which approves the list of invasive exotic species raising concerns in Canary Islands and which modifies the Royal Decree 630/2013

In compliance with Regulation (EU) No 1143/2014 and Law 42/2007, Spain has adopted this royal decree approving the list of invasive alien species of concern for the Canary Islands, ensuring the application of appropriate measures for species listed therein. **Chapter I** consists of a single article approving the list of invasive alien species of concern for the outermost region of the Canary Islands, listed in the following table.

Plants

Species	Common Name
Austrocylindropuntia cylindrica (Lam.) Backeb.	Cacto cilíndrico
Cereus jamacaru DC.	Reina de noche, Mandacaru
Cinchona pubescens Vahl.	Quinina roja
Cytisus striatus (Hill) Rothm.	Escoba portuguesa, Escoba estriada
Desmanthus virgatus (L.) Willd	Mimosa delgada, Tatán salvaje
Hakea salicifolia (Vent.) B.L. Burtt.	Hakea hoja de sauce
Harrisia martinii (Labour.) Britton	Cactus luz de luna
Imperata cylindrica (L.) Raeusch.	Cisca
Jatropha curcas L.	Jatrofa
Jatropha gossypiifolia L	Tua tua
Ligustrum robustum (Roxb.) Blume.	Ligustre, Aligustre
Melia azedarach L.	Árbol del paraíso, Cinamomo
Miconia calvescens DC	Miconia
Mimosa pigra L	Carpinchera, Mimosa uña de gato
Myoporum laetum G. Forst	Transparente, Brillante.
Pereskia aculeata Mill	Grosella espinosa
Pittosporum tobira (Thunb.) W.T. Aiton	Pitosporo japonés, Azahar chino.
Prosopis juliflora (Sw.) DC.	Mezquite
Ulex minor Roth	Alisaja, Ercajo, Árgoma, Aiaga

Reptiles

Species	Common Name
Iguana iguana (Linnaeus, 1758).	Iguana común
Chamaeleo calyptratus Duméril and Bibron, 1851.	Camaleón de Yemen
Chamaeleo dilepis Leach, 1819.	Camaleón orejero
Rieppeleon brevicaudatus (Matschie, 1892).	Camaleón de cola corta
Cyclura cornuta (Bonnaterre, 1789).	Iguana cornuda.
Anolis spp.	Anolis.
Physignathus cocincinus Cuvier, 1829	Dragón de agua chino
Intellagama lesueurii (Gray, 1831)	Dragón de agua australiano
Salvator rufescens (Günther, 1871).	Lagarto tejú rojo
Chlamydosaurus kingii Gray, 1825	Lagarto de gorguera.
Sceloporus malachiticus Cope, 1864.	Lagarto espinoso esmeralda.
Sceloporus jarrovii Cope in Yarrow, 1875.	Lagarto espinoso de Yarow
Zonosaurus laticaudatus (Grandidier, 1869).	Lagarto listado occidental de Madagascar.
Tiliqua gigas (Schneider, 1801).	Lisa gigante de lengua azul.
Gekko gecko (Linnaeus, 1758).	Perenquén tokay.
Phelsuma madagascariensis (Gray, 1831).	Perenquén diurno de Madagascar.
Coleonyx mitratus (W. Peters, 1863).	Perenquén listado de América central.

Birds

Species	Common Name
Psittacula eupatria (Linnaeus, 1766).	Cotorra alejandrina.
Dendrocygna bicolor (Vieillot, 1816).	Suirirí bicolor
Gracula religiosa Linnaeus, 1758	Miná del Himalaya

Mammals

Species	Common Name
Petaurus breviceps Waterhouse, 1838	Petauro del azúcar
Mephitis mephitis (Schreber, 1776)	Mofeta listada
Suricata suricatta (Schreber, 1776).	Suricato
Vulpes zerda (Zimmermann, 1780).	Feneco.
Cricetomys gambianus Waterhouse, 1840	Rata gigante de Gambia
Acomys cahirinus (É. Geoffroy, 1803).	Ratón espinoso egipcio
Cynictis penicillata (G.[Baron] Cuvier, 1829).	Mangosta de cola amarilla
Echinops telfairi Martin, 1838	Tenrec erizo enano.
Erinaceus europaeus Linnaeus, 1758.	Erizo europeo.

Chapter II regulates preventive measures applicable to the species included in the aforementioned list. It outlines general restrictions to prevent their introduction and spread in the natural environment of the Canary Islands. Additionally, it establishes a system of permits and authorizations for specific purposes such as research, conservation, or health improvement. The Decrees assigned to the State Administration and the Autonomous Community of the Canary Islands, the responsibility to take all necessary measures to prevent the introduction or unintentional spread of invasive exotic species of concern for the Canary Islands, including, if applicable, introduction or spread due to gross negligence.

Chapter III establishes systems for early detection and rapid eradication of invasive alien species that may be introduced in the Canary Islands. It includes provisions for surveillance, official controls, notification mechanisms, and eradication instruments.

Chapter IV regulates management measures for invasive alien species that are already widely spread, aiming to minimize biodiversity and ecosystem service impacts, as well as repair damaged ecosystems; chapter V establishes the sanction regime for violations of this royal decree.

SPANISH NATIONAL LEGISLATION BASIS

- Law 42/2007 of December 13, on Natural Heritage and Biodiversity, establishes the basic legal regime for the conservation, sustainable use, improvement and restoration of natural heritage and biodiversity.
- Royal Decree 139/2011, of February 4th, for the developmneto of the list of Wild Species under Special Protection Regime and in the Spanish Catalogue of Threatened Species
- Royal Decree 630/2013, of August 2nd, which regulates the Spanish Catalogue of invasive exotic species

Law 4/2017 of July 13th of Soil and Natural Protected Areas of Canary Islands, as regional law of development, regulates how these areas are declared and disposes that the declaration of special conservation zones (ZEC) and ZEPAs which constitute Natura 2000 network will be done by Canary Islands Decree.

Likewise, in its article 107.2, it establishes the obligation that, when the spaces of the Natura 2000 Network coincide with the spaces of the Canary Network of Protected Natural Spaces, the plans of must comply with all the conservation and protection obligations referred to the Natura 2000 Network. On the other hand, when the spaces are not included in both Networks, these SPAs will require the approval of a specific protection and management plan.

This law represents a significant legal framework governing land use and conservation in the Canary Islands archipelago. It encompasses regulations related to both urban and rural land, as well as the protection and management of natural areas within the region.

The law is structured to address various aspects related to land use, development, and environmental conservation, reflecting the unique characteristics and needs of the Canary Islands.

Overall, this law represents a comprehensive approach to land management and environmental conservation in the Canary Islands, balancing the needs of development with the preservation of the region's natural heritage. It reflects a commitment to sustainable development principles and aims to protect and enhance the unique natural landscapes and biodiversity of the Canary Islands archipelago.

Decree 184/2022, of September 15, declares the Special Protection Areas for Birds (SPA) in the Autonomous Community of the Canary Islands, and modifies Decree 174/2009, of December 29, by which Special Conservation Zones are declared members of the Natura 2000 Network in the Canary Islands and measures are taken to maintain these natural spaces in a favourable state of conservation, in order to expand the Special Conservation Zone (SAC) of Anaga. This Decree sat:

a) the **new formal declaration of the 43 designated SPAs**. To this end, the **cartographic and geometric adaptation of the limits of the SPA zones has been carried out** to the updated official cartography of the Government of the Canary Islands, and in the case of the SPA zones coinciding with the Protected Natural Spaces, the adaptation of their limits.

b) **the extension of the limits of some of these pre-existing SPAs** by virtue of the new information available in relation to the habitats of bird species included in Annex I of Directive 2009/147/EC (**Lajares, Esquinzo and Costa del Jarubio ; Northern coast of Fuerteventura; Vallebron and Valles de Fimapaire and Fenioy;**

Betancuria), **and the rectification of the area assigned to the Pozo Negro SPA, on the island of Fuerteventura**.

c) the **declaration of 2 new SPAs on the island of Gran Canaria (Summit of Gran Canaria and North of Gran Canaria**). In these SPAs, measures will be established to avoid disturbances and special conservation measures regarding their habitat.

The Decree establishes also the creation of the Natura 2000 Reference Portal of the Autonomous Community of the Canary Islands as a web tool to facilitate inter-administrative cooperation between the island Councils and the Autonomous Community in the exercise of their respective powers, and consequently between the Autonomous Community and the competent Ministry.

The Decree addresses also the special situation regarding the Special Conservation Area of Anaga (ZEC ES7020095 Anaga) also belonging to the Natura 2000 Network, whose problem requires to be corrected immediately. The SEGA programme, a regional programme to monitor the conservation status of threatened species in the Canary Islands, highlighted that the distribution of Monanthes wildpretii, a species included in Annexes II and IV of Directive 92/43/EEC (Habitats Directive), was located 60 m outside the SAC. Based on that the Decree updated the cartographic base, increasing it by 5.7614 ha and therefore occupying 10,340.6077 ha. 10,346.3692 ha.

CANARY ISLANDS NATURE PROTECTION LEGISLATION BASIS

- Law 4/2010, of June 4th, on the Canary Islands Catalogue of Protected Species
- Nature 2000 in Canary Islands . Order ARM/2417/2011 of 30 August which declares Special Areas of Conservation (SACs) for marine Sites of Community Importance (SCIs) in the Macaronesian biogeographical region of the Natura 2000 Network and approves the corresponding conservation measures
- Law 12/1994, of December 19, on Protected Natural Spaces in the Canary Islands. This law provides the legal framework for the establishment, regulation, and protection of protected areas across the Canary Islands.
- Royal Decree 1432/2008, dated August 29, establishes measures for the protection of avifauna against collision and electrocution on high voltage power lines.

Biological importance of Macaronesian region

The Macaronesian region is an extremely important Hotspot of biodiversity and worldwide known for its outstanding endemic biodiversity, the highest of any other insular region within Europe, and comparable in endemism per area to the figures displayed in island show-cases such as Hawaii, Galápagos, New Zealand, New Caledonia or Madagascar (J.M. Fernández-Palacios, 2010)

Research in Macaronesia has led to substantial advances in ecology, evolution and conservation biology. Some of these discoveries indicate that the Macaronesian flora and fauna are composed of rather young lineages, not tertiary relicts, predominantly of European origin. Macaronesia also seems to be an important source region for back-colonisation of continental fringe regions on both sides of the Atlantic. In addition to exceptionally high richness of endemic species, Macaronesia is also home to a growing number of threatened species, along with invasive alien plants and animals. (Florencio 2021).

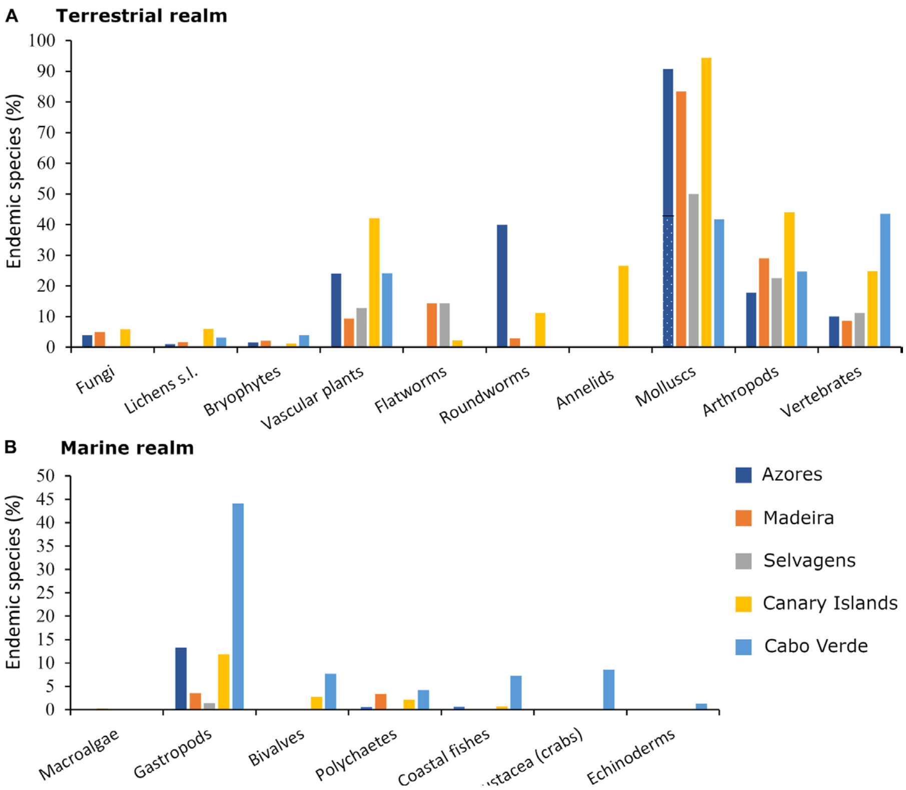

Figure 3 – Distribution of endemic species. Source: Florencio, 2021

Table 2 – Endemic species in Macaronesia (Source: Florencio, 2021)

Terrestrial group Number of natives (non-endemic native plus endemic) species	AZORES	MADEIRA	SELVAGENS	CANARY ISLANDS
Fungi	581	734	3	3943
Lichens s.l. (lichens and lichenicolous fungi)	786	750	25	1164
Bacillariophyta and Amoebozoa (diatoms and amoebae)	539	No data	No data	1

Bryophyta (mosses, liverworts, hornworts)	471	511	9	520
Tracheophyta (Spermatophyta, ferns & fern allies)	270	1337	86	1362
Platyhelminthes (flatworms)	8	7*	7*	45
Nematoda (roundworms)	5	34	No data	81
Annelida	22	36*	36*	49
Mollusca (slugs, snails and bivalves)	54-114	191	2	285
Arthropoda	1323	3062	173	7279
Chordata (vertebrates)	30	35	9	97
Total	4089	6697	350	14826
Terrestrial group Number of endemic species	**AZORES**	**MADEIRA**	**SELVAGENS**	**CANARY ISLANDS**
Fungi	23	36	0	232
Lichens s.l. (lichens and lichenicolous fungi)	8	12	0	69
Bacillariophyta and Amoebozoa (diatoms and amoebae)	7	No data	No data	0
Bryophyta (mosses, liverworts, hornworts)	7	11	0	6
Tracheophyta (Spermatophyta, ferns & fern allies)	65	124	11	573
Platyhelminthes (flatworms)	0	1*	1*	1
Nematoda (roundworms)	2	1	No data	9
Annelida	0	0	0	13
Mollusca (slugs, snails and bivalves)	49	162	1	269
Arthropoda	236	887	39	3202
Chordata (vertebrates)	3	3	1	24
Total	400	1237	53	4398

Marine group - Number of natives (non-endemic native plus endemic) species	**AZORES**	**MADEIRA**	**SELVAGENS**	**CANARY ISLANDS**
Macroalgae (0-50 m)	424	394	294	689
Mollusca: Gastropoda (0-50 m)	280	397	207	811
Mollusca: Bivalvia (0-100 m)	96	110	37	220
Annelida: Polychaeta (0-200	169	300	86	465

m)				
Pisces (coastal) (0-200 m)	165	208	76	299
Crustacea: Brachyura (0- 200 m)	62	75	No data	120
Echinodermata (0-200 m)	64	69	18	85
Total	1260	1553	718	2689
Marine group Number of endemic species	**AZORES**	**MADEIRA**	**SELVAGENS**	**CANARY ISLANDS**
Macroalgae (0-50 m)	0	1	0	1
Mollusca: Gastropoda (0-50 m)	37	14	3	96
Mollusca: Bivalvia (0-100 m)	0	0	0	6
Annelida: Polychaeta (0-200 m)	1	10	0	10
Pisces (coastal) (0-200 m)	1	0	0	2
Crustacea: Brachyura (0- 200 m)	0	0	No data	0
Echinodermata (0-200 m)	0	0	0	0
Total	39	25	3	115

The scientific work carried out over the past 10 years highlights the need to continue and expand efforts in research, monitoring, and conservation of species and habitats, as well as the significance of habitat restoration, some of which are unique in the European context. It is important to mention, for example:

- Endemic Diversity: Macaronesia is a biodiversity hotspot with a large number of endemic species and habitats found nowhere else in the world. This endemism underscores the importance of specific conservation strategies to preserve these unique biodiversity.

- Discovery of New Species: Scientific research in Macaronesia has led to the discovery of several new plant and animal species, highlighting the rich biodiversity of the region. These findings underscore the need for specific conservation measures to protect these newly discovered species.
- Impact of Climate Change: Studies in the region have shown how climate change is affecting local ecosystems, impacting species distribution, habitat composition, and the frequency of extreme weather events which make Macaronesia ecosystem even more fragile.
- Conservation Efforts: Conservation initiatives, such as the creation of marine protected areas and habitat restoration programs, have shown positive results in preserving biodiversity. Expanding these protected areas and improving their

management is essential to ensure the long-term survival of the region's species and ecosystems.

- Ongoing Monitoring and Research: Continuous monitoring and scientific research are crucial to detect changes and emerging threats to ecosystems. Long-term monitoring projects provide valuable data to inform conservation policies and environmental management. Assessing the impact of climate change on species and habitats is of primary importance as well as increase the overall knowledge on marine biodiversity
- Habitat Restoration: The restoration of degraded habitats has been a priority in the region, with projects aimed at recovering native forests, wetlands, and coastal habitats. These efforts not only benefit local biodiversity but also contribute to ecological resilience in the face of climate change.
- Impact of Invasive Species: Studies have documented the negative impact of invasive species on the native ecosystems of Macaronesia. This research has been fundamental in developing management and eradication programs for invasive species, helping to protect native biodiversity.

These following examples illustrate the richness and complexity of Macaronesian biodiversity and highlight the ongoing importance of advancing knowledge on the existing biodiversity of each region.

Azores

- Compared to the last checklist of Azorean arthropods (Borges et al. 2010b), a total of 217 taxa (species and subspecies) were added in the last years. Currently, the total number of terrestrial and freshwater arthropod species and subspecies in the Azores is estimated to be 2420 taxa belonging to 14 classes, 53 orders, 440 families, 1556 genera, 2400 species and 149 individual subspecies. The most diverse orders of Azorean arthropods are: Coleoptera (585 taxa), Diptera (423 taxa), Hemiptera (338 taxa), Hymenoptera (163 taxa), Lepidoptera (159 taxa) and Araneae (133 taxa). A total of 276 endemic taxa are currently known (232 species and 44 subspecies), Based on recent IUCN Red-listing of Azorean arthropods, a large fraction of the endemic taxa is under high threat. (Borges 2022)
-
- -The Azores Archipelago holds the second most important population of Roseate Terns in the North Atlantic. However, the size of the population has been decreasing (lamelas-lopez 2021).
- Common chaffinch was divided into five different species, corresponding to Eurasia (*Fringilla coelebs*), North Africa (*Fringilla spodiogenys/africana*), Azores (*Fringilla moreletti*), Madeira (*Fringilla maderensis*) and the Canary Islands (*Fringilla canariensis*). (Recuerda 2021)

- extinct species – So far, in the Azores five endemic extinct species have been described (three rails, a scops owl and a bullfinch; Rando et al., 2013, 2017; Alcover et al., 2015), in the Canary Islands seven extinct species are known (two shearwaters, a quail, an oystercatcher and three passerines; Alcover & Florit, 1987; McMinn et al., 1990; Walker et al., 1990; Jaume et al., 1993; Rando et al., 1999, 2010; Martín & Lorenzo 2001) and in Madeira three extinct species were reported (two rails and one scops owl; Rando et al., 2012b; Alcover et al., 2015). (Alcover 2017; Rando 2020); also a new extint bullfinch species was discovered in Graciosa island https://phys.org/news/2017-07-bird-humans-drove-extinction-azores.html (rando 2017)
- another recent study added 19 species to the Azorean marine macroalgal flora (15 Rhodophyta, one Chlorophyta and three Ochrophyta), increasing the current total of species recorded in this region to 521 (349 Rhodophyta, 76 Chlorophyta and 96 Ochrophyta), and showing that this isolated island group supports a relatively rich marine macroalgal flora. (Neto 2022).
- Over the last decades, extensive scientific research supported by multiple projects has permitted a better understanding of the ecological importance of deep-sea ecosystems in the Azores and the threats to these ecosystems. New deep-sea species, biotopes and even hydrothermal vent fields have been discovered, affirming the Azores as a hotspot of biodiversity, notably with the highest number of cold-water octocoral species in the North Atlantic. (Blue paper 2020)

Madeira

- From the 60 new records for Desertas sub-archipelago, 30 of them were also new records for Madeira Archipelago. Several specimens could not be assigned to a known species and may be new diatom species not yet described. (Gonçalves 2021)
- 20 species of *Symmocinae*, all belonging in the genus Chersogenes Walsingham, were reported in Canary Islands in 2023 of which 13 are described as new.

Canary Islands

- in 2021 a team of researchers from the University of Oviedo and the Higher Council for Scientific Research (CSIC) has discovered that Chaffinch hides up to five different species located in the Azores, Madeira, Eurasia and North Africa, and also in the Canary Islands (Fringilla canariensis), resulting in the discovery of a new endemic species in the archipelago - chaffinch complex (Fringilla coelebs). The discovery has important implications for the design of specific strategies focused on the management and conservation of finches and for understanding their evolutionary processes.

- A recent study (Escañez et al, 2021) revealed that Canary Islands hold 85 confirmed species of Cephalopods belonging to 31 families, representing ca. 10% of the overall known cephalopod diversity. The cephalopod community was dominated by oceanic cephalopods, followed by shelf-slope and coastal cephalopods species with 65, 11, and 9 species, respectively. 47% of the species showed a wide geographic distribution (33 cosmopolitan and 7 presents in more than one ocean), whereas 19 are only encountered in the Atlantic Ocean and Mediterranean Sea and 26 are exclusively Atlantic. This species richness is comparable to other cephalopod biodiversity hotspots, such as the Indian Ocean Ridge or the Caribbean. The Canarian cephalopod diversity likely to be underestimated, since scarce information exists on species inhabiting the deeper water layers around the Canary Islands.

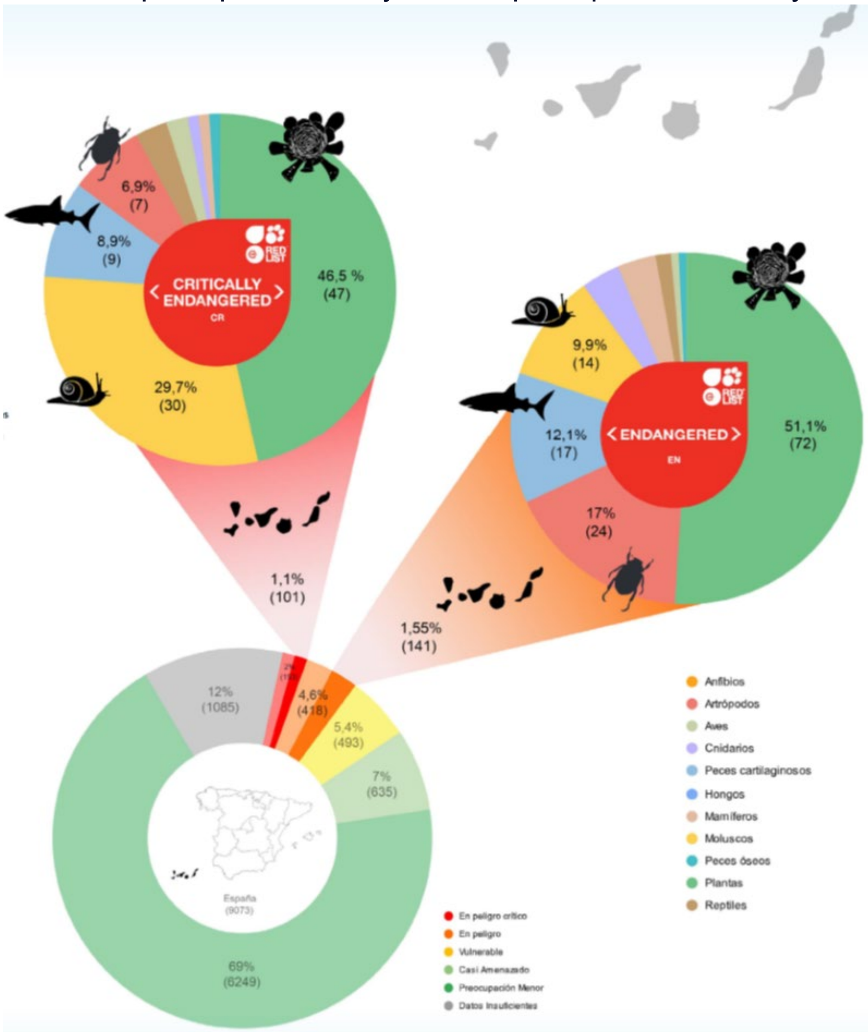

Figure 4 - Canary Islands species. Source: IUCN, 2023

IUCN Red List

According to the distribution of the species evaluated in the IUCN Red List, in the Canary Islands there is a total of 101 Critically Endangered species (1.1% of the total evaluated in Spain) and 141 in Danger (1.5% of the total evaluated in Spain).

In both categories the most abundant group is plants, representing around 50% in both cases.

For the **Critically Endangered** category, the second group with the most threatened species (30) are molluscs (29.7%), with several terrestrial species. In third place there are 9 cartilaginous fish (8.9%), where sharks predominate like the angelshark (Squatina squatina), but also three species of rays like the stingray tiger or bishop fish (Aetomylaeus bovinus).

For the **Endangered** category we find arthropods in second place with 24 species (17%), where insects predominate, such as the Gran Canaria stick cigar (Acrostira tamarani) or different species of the genus Eumerus. The third place is again represented by several species of cartilaginous fish, with the predominance of sharks, as are several species of the genus Centrophorus. Within the same group we find four species of oceanic manta rays of the genus Mobula. Most species are endemic to the islands, so their protection is very important due to the small distribution area they have.

Most than 15% of endemic species are listed an Endangered or Critically Endangered according to IUCN (see table below)

Table 3 - IUCN Red List Database

Status	Azores		Madeira		Canary Islands		Macaronesia	
Extinct	4	0,35%	3	0,21%	1	0,05%	8	0,30%
Critically Endangered	70	6,06%	63	4,31%	**99**	**5,23%**	**215**	**8,05%**
Endangered	77	6,66%	75	5,13%	**113**	**5,97%**	**212**	**7,93%**
Vulnerable	67	5,80%	99	6,78%	**128**	**6,76%**	**201**	**7,52%**
Near Threatened	74	6,40%	63	4,31%	125	6,60%	186	6,96%
Least Concern	745	64,45%	1043	71,39%	1255	66,30%	1561	58,42%
Data Deficient	119	10,29%	115	7,87%	172	9,09%	289	10,82%
	1156		1461					

Source: IUCN database

Differences between IUCN, Natura 2000 and regional and national lists

The Center for the Survival of Species Macaronesia (CSSM), which is part of the Commission for Species Survival of IUCN and is promoted by the Loro Parque Fundación, aims to collaborate in the implementation at the national level of the Conservation Cycle defined by the IUCN: Evaluate, Plan and Act, complemented by Communicate and Establish work networks, in order to drive the movement to Reverse the Red (RtR).

With this objective, CSSM, together with the collaboration of the Spanish Committee of the IUCN (CeUICN), has prepared in 2023 a report on the current state of biodiversity in Spain, based on the classification made by the Red List for the species in Spain. The analysis has been prepared both at a global level and at the autonomous level, and is based on a comparison between the Red List of Species and the species protected by the National Government and the Government of Canary Islands, **obtaining as a result an indication of those taxa and species that require greater attention before its state become irreversible**.

The study includes also a comparison between the Key Biodiversity Areas (KBA) and natural

areas protected at the Spanish level and of each of the autonomous communities with the aim to draw attention to those species that are Critically Endangered and Endangered[2].

According to the distribution of the species evaluated in the IUCN Red List, in the Canary Islands there is a total of 101 Critically Endangered species (1.1% of the total evaluated in Spain) and 141 in Danger (1.5% of the total evaluated in Spain). In both categories the most abundant group is the plants ones, representing around 50% in both cases.

For the Critically Endangered category, the second group with the most threatened species (30) are mollusks (29.7%), where we find several terrestrial species. In third place we find 9 cartilaginous fish (8.9%), where sharks predominate like the angelshark (Squatina squatina), but also we find three species of rays like the stingray tiger or bishop fish (Aetomylaeus bovinus).

For the Endangered category we find arthropods in second place with 24 species (17%), where insects predominate, such as the Gran Canaria stick cigar (Acrostira tamarani) or different species of the genus Eumerus. In third place we again find several species of cartilaginous fish, also predominating in this occasion sharks, as are several species of the genus Centrophorus. Within the same group we find four species of oceanic manta rays of the genus Mobula.

Most species are endemic to the islands, so their protection is very important due to the reduced distribution area that they have.

The study reports a 69% disagreement and 31% concordance between the IUCN Red List categories and the Canarian Catalogue of Protected Species (Law 4/2010, of June 4, of the Catalogue Protected Species Canary). The taxa that present a

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[2] The study does not consider species that are part of the national or regional lists but that are not part of their respective catalogue of protected species. The different subspecies of the same species have nor been considered.

greater discordance (100%) are the cartilaginous fish, the cnidarians and the bony fish. Discordance occurs both in the sense that CE species according to IUCN are under no protection scheme according to Canary Islands law and viceversa, protected species under Canary Islands law not considered as CN by IUCN.

The graph below indicated in red the Critically endangered species that are not any under protection scheme according to Canary Islands law. Within these discordant species, we find some such as the tiger ray (Aetomylaeus bovinus), a species of black coral; Leiopathes glaberrima, Pseudotolithus senegalensis bony fish family of the Sciaenidae, a terrestrial mollusk such as Atlantica gomerensis, the Palo Gomero cigar (Acrostira bellamyi), the curlew (Numenius tenuirostris), crag cabbage (Crambe feuillei), the lisneja (Chalcides simonyi), and the monk seal (Monachus monachus).

Likewise, molluscs are the fourth taxon in percentage terms. which has a greater number of Critically Endangered species according to the IUCN which are not

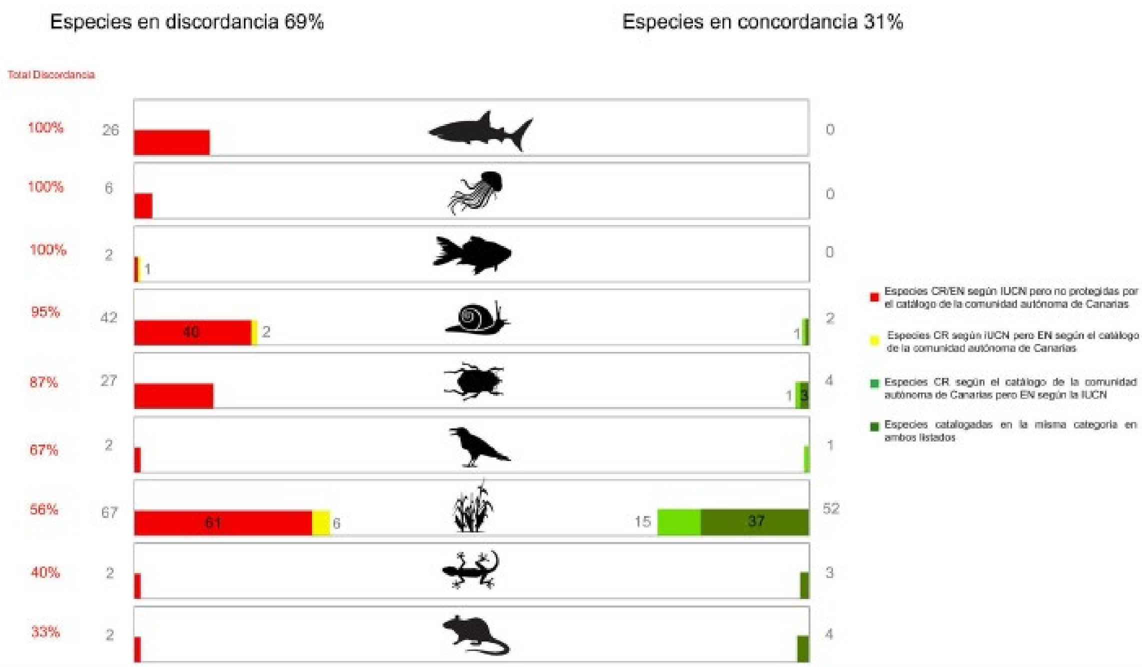

Figure 5 - Non concordance of protected lists

included in the community catalogue of protected species. Within this group, all the species belong to land snails, which have a very small distribution and are therefore highly sensitive to any event negative that affects their habitat. Within this taxon we find several species endemic, such as Xerotricha garachi coensis, a species of land snail from the island from Tenerife who has not been found alive again since its description in 1878 by the naturalist Thomas Wollaston.

This species was distributed in the lower areas of the Garachico coastline when it was found, and it is speculated that it would be associated with the coastal scrub in shady areas (facing north), perhaps associated with springs or water courses. However, in the last 30 years the scrub coastal area has suffered a significant decline due to the increasing urbanization of the area, which suggests that the species may have completely disappeared. The study suggests thus to carry out a systematic search for the species in the optimal habitat areas around Garachico.

When it comes to marine species, none of the canarian endemics species is currently represented in the IUCN Red List and only 47 threatened vertebrate species have been included in the Northeast Atlantic (FAO Zone) (Riera, 2020). This despite of the numerous studies performed during the last decades on Mollusks, Protoctists, Crustaceans and Chordates. In particular marine invertebrates and macroalgae are overlooked (IUCN 2015). Moreover, all species in the Red List are vagrants and occur offshore, being considered as foraging populations in the Canary Islands.

Four taxonomic groups have been extensively studied during the last decades: Mollusks (1170 spp), Protoctists (algae) (1149 spp) and Crustaceans (1096 spp), followed by Chordates (717 spp). An updated check-list is currently being developed and an estimation of over 6000 species is expected (N. Zurita pers. comm.).

The study presents also a density map showcasing points where species are most concentrated on land and which are therefore, the most sensitive areas from the point of view of biodiversity threatened. The study distinguishes mainly 7 areas:

- the center-north area of the Hierro Island,encompassing the areas from Timijiraque, Las Playas and Tibataje. This area hosts several species of plants such as Sonchus gandogeri, Morella rivas-martinezii, Crambe feuillei, Cheirolophus duranii, and Bencomia sphaerocarpa or some reptile, such as the giant lizard of El Hierro (Gallotia simonyi);
- on the island of La Gomera the highest density of species Critically Endangered is concentrated in the Park Garajonay National Park, which is home for example to the Palo Gomero cigar (Acrostira bellamyi), some species of mollusks such as Canariella ronceroi or Hemicycla efferata, and several plant species such as Echium acanthocarpum, Morella rivas-martinezii and Pleiomeris canariensis. In any case the existence of some Critically Endangered species concerns almost the entire island
- on the island of Tenerife the study distinguishes the Punta area of Teno with the presence of the giant lizard of Tenerife (Gallotia intermedia), and some species of plants such as the Fraile's lechuguilla (Hypochaeris oligocephala), the brush (Kunkeliella psilotoclada), the immortelle (Limonium spectabile) and the dolphin (Pleiomeris canariensis). The Anaga Rural Park and the Las Lagunetas area are also mentioned altough with a lower density;
- on the island of Gran Canaria, the study highlights the Isleta Peninsula and Doramas Rural Park with all its surroundings which host species of arthropods

(Evergoderes cabrerai), mollusks (Insulivitrina machadoi), and plants such as Cockscomb (Isoplexis chalcantha) Limonium sventenii, Globularia ascanii, Onopordum carduelium, Tanacetum oshanahanii and Sideritis discolor at the point of greatest density comprising also the Tamadaba Natural Park and the Caldera of Los Marteles. In the south of Gran Canaria a slight increase in density is reported, particularly around Maspalomas, a highly touristic area. This are is home to an arthropod - Dericorys minutus - a plant species; Dracaena tamaranae, and two mollusks with small distribution areas: Arguineguín snub snail (Monilearia arguineguinensis) and Monilearia pulverulenta.

- on the island of Fuerteventura a hot spot is recorded in the South, at the Natural Park of Jandía, with several plant species such as Argyranthemum winteri, Echium handiense, Onopordum walnutsii, Orthotrichum handiense, three species of mollusks - Canariella jandiaensis, Hemicycla paeteliana, Molineara granotriata - and an occasional bird, the slender curlew (Numenius tenuirostris). In the East of the island, Chuchillos de Vigán area exists, with presence of the same bird (Numenius tenuirostris) and two plant species such as conservillamajorera (Salvia herbanica) and Crambe sventenii.

The study analyzed also the concordance between Key Biodiversity Areas and Protected Areas in Canary Islands. According to the analysis KBAs cover 32.1% of the Canary Islands territory while protected spaces cover 51.29%. It must be highlighted that Canary Islands isthe Spanish community with the highest percentage of protected territory.

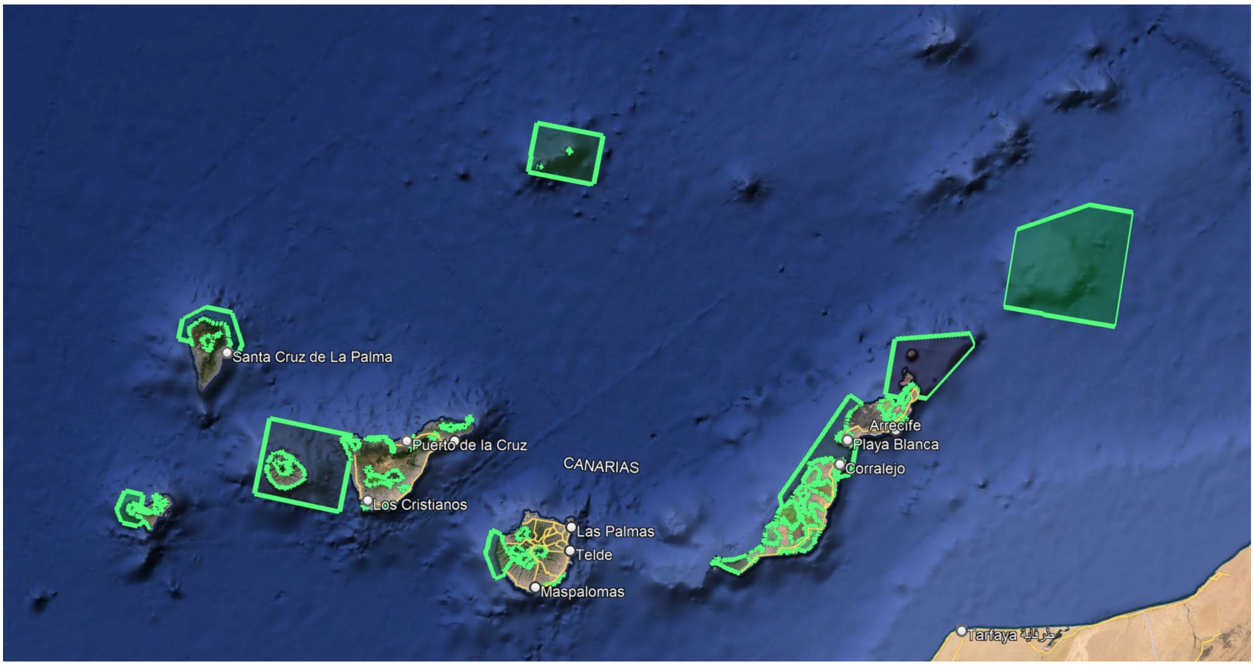

Figure 6 - KBAs of Canary Islands

Regarding the overlap between the designated KBAs in the Canary Islands and protected spaces in the Canary Islands, the latter protect a 75% of the current KBAs. If this suggests that protected areas have been properly designed, on the other side the distribution of some Critically Endangeder species is not yet protected. This is the case, according to the study, of the area surrounding Candelaria city in Tenerife, where an endemic mollusk in critical danger live, the Hemicycla plicaria.

A similar case has been observed for the *Napaeus teobaldoi, an endemis mollusk. Despite of the existence of protected areas within its distribution such* Las Lagunetas, la Corona Forestal, Malpaís de Güimar, Siete Lomas, or Los Rodeos-La Esperanza as KBA, there is still a considerable surface within its potential distribution area which does not enjoy any special designation or protection scheme.

On the other hand, 25% of KBAs are not protected areas according to Canary Islands law. This is the case of:

- los Llanos de Nizdafe in El Hierro island;
- La Montaña Centinela-Llano de la Esquina, El Médano and Los Rodeos-La Esperanza in Tenerife;
- Monteverde de Frontera, Macizo de Tarajalejo, the Mountain El Cardón, Jable de Bigocho, Llano Grande, Malpaís Grande, Malpaís Chico, Barranco de Los Molinos, Llano de La Laguna, Alto de Matías and Barranco de Río Cabras, Reserva de Tesjuate Barranco de Río Cabras, in Fuerteventura;
- Haría -Tabayesco in Lanzarote.

As Riera highlighted threatened marine species are not well-represented in the current net of protected areas, because only populations of turtles (Caretta caretta and Chelonia mydas) and the bottlenose dolphin (Tursiops truncatus) are considered in SACs (Special Areas of Conservation) (http://www.magrama.gob.es/es/ costas/temas/biodiversidad-marina/espacios-marinos-protegidos/). No threatened invertebrates were considered in SACs, and sites with a high proportion of endemisms and presence of regionally-threatened species were overlooked, such as Marina de Arrecife, including Charco de San Ginés, and Jameos del Agua in Lanzarote. Both sites harbor unique ecosystems in the Canary archipelago, muddy intertidal seabeds (Marina de Arrecife) and large volcanic “jameos” (submerged tunnels connected to the sea) (Jameos del Agua) that constitute local biodiversity hotspots with a good representation of limited-ranged invertebrates. There is also at least one regionally catalogued marine seagrass (dwarf eelgrass, Zostera noltei) in the marina de Arrecife, Lanzarote, which was previously included as “Threatened with extinction” in 2010 (Ley 4/2010, de 4 de junio, del Catálogo Canario de Especies Protegidas), but more recently it has been upgraded to “Vulnerable” (Real Decreto 139/2011 de 4 de febrero, para el desarrollo del Listado de Especies Silvestres en Régimen de Protección Especial y del Catálogo Español de Especies Amenazadas).

Knowledge production and knowledge sharing initiatives

The last decade has observed the emergence of several initiatives to produce and collect data and knowledge on biodiversity. These initiatives involve the national and regional authorities, including protected areas management bodies, along with scientists and researchers but also other practitioners. As detailed below, these initiatives have taken different formats, including publications, databases and even mobile applications for the collection of data, following a participatory approach.

The **Complementary Plan for Biodiversity** is a national instrument created by the Ministry of Science, Innovation and Universities in collaboration with the autonomous communities aimed at establishing collaborations in R&D&I actions for biodiviersity protection. This Program, called “Exploration, analysis and foresight of biodiversity: Possible responses to the 2030 strategy for sustainable development in a scenario of global change”, aims to develop solutions that are focused on nature, and that take into account how anthropogenic activities affect it, to stop the Biodiversity crisis while allowing the mitigation and adaptation of natural systems to climate change.

This program has a total investment of 66 million euros. The Ministry of Science, Innovation and Universities contributes with 36 million through the Recovery and Resilience Mechanism and the rest is financed with resources from the participating Autonomous Communities.

The program establishes a collaboration between institutions of the participating CCAA to advance six lines of action:

- Platforms for the observation of biodiversity with aeronautical and aerospace technologies.
- Monitoring and tracking of biodiversity.
- Inventory of ecosystem services.
- Assessment and mitigation of the impact of global change on biodiversity.
- E-Integrated biodiversity observation infrastructure.
- Network of centers for the study and management of biodiversity.

For Canary Islands, the plan will be implemented in Furteventurua in collaboration with the Ministry of Science and Innovation, the Government of the Canary Islands and the Cabildo of Fuerteventura. The Plan will be carried out by the Technological Park of Fuerteventura and consists of a program of innovation, diversification, economic recovery, resilience and observation of the territory, especially in challenges linked to biodiversity, through technologies embedded in high altitude pseudo-satellite platforms (HAPS) and autonomous aerial vehicles (UAVS or drones).

The general objective is to create a pole of innovation and industrial development in the Canary Islands, using new disruptive technologies in the aerospace field, such as satellite platforms, pseudo-satellites (HAPS) and drones (UAVs), for earth observation and intelligent data collection, processing and analysis, in which involves the development of a Data Economy, for the improvement and intelligent management of the services provided by public administrations and, simultaneously, other services provided by private entities.

iNatura was created in 2013 as the Natura 2000 Reference Portal of the Autonomous Community of the Canary Islands as a web support for the information corresponding to the Canary Islands areas included in the Natura 2000 network. The Natura 2000 Reference Portal depends on the competent ministry in matters of the environment. It is a meeting point for information related to the protected spaces belonging to the European ecological network Natura 2000 and whose management is carried out by public administrations of the Autonomous Community of the Canary Islands.

iNatura has been promoted by the Government of the Canary Islands, with co-financing from European FEDER funds within the framework of the FEDER operational program 2014-2020, specifically within the operation called "Creation of technological infrastructures for the detection of the state of conservation of habitats of interest community in the Canary Islands (iNATURA)", with the aim of contributing to the coordinated availability of information on Natura 2000 in the Autonomous Community of the Canary Islands.

The portal does not include the Natura 2000 sites that are located entirely in the marine waters since these are the responsibility of the General Administration of the State.

iNatura makes available to the public the information corresponding to the spaces (their basic characteristics) and their content in bird habitats, species habitats and natural habitats. The information corresponding to the management plans is also made available to the public to contribute to the maintenance or, where appropriate, the reestablishment of the conservation status of these natural habitats and habitats of species or birds. In this sense, all the information corresponding to the objectives and conservation actions included in the approved and current plans for each of the spaces integrated into the Natura 2000 network has been incorporated.

BIOTA is the Biodiversity Data Bank of the Canary Islands and constitutes the official taxonomic record of the biota of the archipelago. It has been created as a public registry of an administrative nature, including the list and known distribution of wild species of plants, fungi, animals and other living organisms that regularly inhabit or reproduce in the Archipelago and its waters. The fundamental pillar of BIOTA is the rigor of the information that is incorporated, based on two aspects: on the one hand, the registered information is supported by documents (published or unpublished) and on the other hand, each data and document is subject to the supervision by specialists. More than a hundred international, national and local experts have participated and collaborated in this scientific validation process.

BIOTA constitutes a dynamic database that tries to update itself continuously. In this way, it aims to reflect the advancement of the state of knowledge, both in terms of the discovery of new species and new distribution data for others, in addition to error correction, refinement of chorological data, updating of biological information, images , etc. BIOTA is based on not only current but also historical information collected since the arrival of the first naturalists to the Canary Islands. The records entered into the Bank are extracted from unpublished publications and reports (doctoral theses, scientific studies, technical files, expert references, etc.) that are generated in all public or private sectors.

BIOTA is freely accessible via the web, both for public administrations and for the general public. It is accessed through the ATLANTIS 4 computer application, which offers available information on wild species in the Canary Islands and their distribution, and allows territorial consultations on different parameters of the distribution of biodiversity in the archipelago. Among other uses, ATLANTIS 4 provides information for the evaluation of the conservation status of threatened species and for the drafting and execution of recovery plans for these species, as well as for the preparation of reports, to guide decision-making regarding management. territorial, facilitate the selection and planning of natural spaces of different nature and the execution of the corresponding planning instruments, etc.

BIOTA is co-financed by the Government of the Canary Islands and the European Union, through the European Regional Development Fund (ERDF) through the FEDER Canary Islands Operational Program 2014-2020, within the Inventory Bank Project Natural from the Canary Islands (BIOCAN). It is developed in the context of Thematic Objective 6 "Protect the environment and promote resource efficiency."

CENTINELA is a free and open access database of protected species in the Canary Islands, launched in 2017 by the Government of the Canary Islands. It is integrated into the Canary Islands Natural Inventory Bank (BIOCAN), a platform that promotes the interoperability of the different databases promoted by the Government of the Canary Islands on biodiversity. CENTINELA aims to disseminate and disseminate among the Administrations, interested social agents and citizens in general, relevant aspects for the conservation of these species, thereby contributing to more effective management and protection of the rich natural heritage of the Canary Islands. CENTINELA provides technical and administrative information on the protected species of the Canary Islands, in accordance with the applicable sectoral regulations. It includes relevant technical information on the taxonomy and systematics of these species, their distribution, population size and evolution, as well as documentation on conservation plans, monitoring programs, studies, technical evaluations of their conservation status, etc.

CENTINELA is developed as a module linked to the Biodiversity Data Bank of the Canary Islands, with specific information for protected species, so that both databases operate in a linked way, sharing information and resources, since the aforementioned Data Bank is constituted as a public administrative registry through Law 4/2010, of the Canary Islands Catalog of Protected Species.

CENTINELA has been also financed within the framework of the operational program of the Canary Islands region for the application of the European Regional Development Fund -PO FEDER Canarias 2014-2020-, a line of action promoted in line with the Biodiversity Strategy for 2020 of the European Union.

EXOS is a free and open access database of invasive exotic species, launched in 2017 by the Government of the Canary Islands. It is also integrated into the Canary Islands Natural Inventory Bank (BIOCAN) with the aim to disseminate among Administrations, interested stakeholders and citizens in general, relevant aspects about these species, thereby contributing to more effective management and protection of the Canary Islands' rich natural heritage. EXOS provides technical and administrative information on invasive exotic species, in accordance with the applicable sector regulations. It includes relevant technical information on the taxonomy and systematics of these species, their distribution, population size and evolution, as well as monitoring programs, studies, technical evaluations of their status, etc. EXOS has also been financed within the framework of the operational program of the Canary Islands region for the application of the European Regional Development Fund -PO FEDER Canarias 2014-2020.

EXOS constituted in 2020 as the Canary Islands Early Warning Network for Invasive Exotic Species (RedEXOS) through Decree 117/2020, of November 19 , and is integrated into the State Alert Network. The network aims to locate, identify, analyze, control or eradicate new outbreaks or populations of invasive alien species (IAS) in the Canary Islands, to prevent their establishment or expansion. It is also responsible for coordinating and compiling information on the appearance of cataloged IAS (Royal Decree 630/2013 and Royal Decree 216/2019) or with invasive potential, as well as on their expansion to new locations.

The Network is composed different administrations involved in the management of invasive exotic species, as well as with institutions in the field of research and nature conservation, external specialists and non-governmental organizations.

Similarly ot EXOS, the Network of **Marine Environment Observers in the Canary Islands (RedPromar)** was created according to Resolution No. 320 of June 22, 2015 of the Vice-Ministry of the Environment of the Government of the Canary Islands, as a tool for the monitoring and surveillance of marine life in the Canary Islands. archipelago. Based on the citizen science approach, REDPROMAR is a system for monitoring and recording information on all marine organisms in the Canary Islands using the concept of “Citizen Science”. Since its inception, it has contributed significantly to the knowledge of some of the ecosystem changes that are currently occurring, such as: the expansion of thermophilous species, the appearance of introduced species, as well as the record of different natural events (algal blooms, mortality and proliferation of organisms, etc.).

Macaronesia: Relevance and Future Directions in Island Biology

Recent research has highlighted numerous political, scientific, and social initiatives aimed at enhancing conservation practices and public awareness in Macaronesia (Florencio, 2021). Over the past decade, significant studies have been published to aid local and regional decision-making, enhancing nature conservation planning and management policies in the region. Conservation and governance policies can be made more cost-effective by implementing island ecosystem-based management, engaging stakeholders, and encouraging public participation (Calado et al., 2016; Gil et al., 2011, 2016a, 2016b). Additionally, funding to support and strengthen ecosystem functions and service delivery has been crucial (Cruz et al., 2011; Fernandes et al., 2015).

Macaronesia has served as a foundation for developing successful methodologies for managing alien species on islands. These include prevention, early detection, eradication, and control of invasive species, along with appropriate legislation. Special focus has been given to the design and effectiveness of "Natural Protected Areas" (Vergílio et al., 2016; Gil et al., 2017). Various indices for selecting priority conservation areas have been developed based on Macaronesian ecosystems (Gaspar et al., 2011; Borges et al., 2012; Cardoso et al., 2013). An innovative, cost-effective, and replicable methodology has also been created for protecting genetic diversity in reserves (Vasconcelos et al., 2012a). Additionally, knowledge gathered in Macaronesia has been used to propose standardized protocols for the conservation assessment of endemic species (Borges et al., 2018).

The proximity of some Macaronesian islands to the mainland provides an ideal setting for island-mainland comparisons to evaluate genetic diversity, gene-flow patterns, and the islands' role in generating mainland diversity. Increasingly available population genetics and genomic datasets allow for testing the genetic imprints of founder events and the impacts of historical geological and climatic events. Multitaxon comparison approaches help understand biotic interchange between islands and the mainland, as well as among archipelagos (Antonelli et al., 2018). While ecological opportunities are considered potential drivers of remarkable radiations in the region, the degree to which isolation affects speciation processes is still not fully understood (Patiño et al., 2017). Combining phylogenetic information and trait data will enhance understanding of niche evolution processes and how ecological attributes, novel habitats, and isolation impact speciation and lineage diversification (Edwards and Donoghue, 2013).

Unique subterranean ecosystems and fossiliferous outcrops in Macaronesia offer insights into past insular biotas, providing opportunities to study diversification and speciation. Island-mainland comparisons can address different ecological questions, such as community assembly and rarity processes (Santos et al., 2011; Borda-de-

Água et al., 2017; Boieiro et al., 2018). Future research could focus on comparing species-abundance distribution patterns and contrasting trait and phylogenetic diversity between islands and the mainland to understand community assembly driving forces.

Research in Macaronesia has been crucial for understanding island mutualistic interactions. Further studies on interaction networks will shed new light on how biotic interactions affect community assembly, immigration, and extinction on islands, and how alien species integrate into and impact these communities. Comparing these patterns with other archipelagos, like the Galápagos, will help determine their generality and influence on colonization/extinction dynamics or speciation rates (Nogales et al., 2016).

Addressing the impact of global change on biodiversity and human well-being is a pressing research agenda. Management strategies to safeguard biodiversity and ecosystem services are critical (Butchart et al., 2010). The relatively well-documented history of human settlement and land-use transformations in Macaronesia aids in assessing the impacts of historical, demographic, and socioeconomic changes on current biodiversity (Nogué et al., 2013, 2017, 2021; Norder et al., 2020). Alien species pose significant threats to island biotas (Russell and Kueffer, 2019). Understanding how newly arrived species establish and affect existing ecosystems is essential for developing effective conservation strategies. However, the precise impacts of novel native-alien interactions on biodiversity and ecosystem functioning are still unclear (Patiño et al., 2017). Long-term ecological data (Van Leeuwen et al., 2005; Nogué et al., 2017) are crucial for understanding the colonization status of insular species and advancing research agendas.

Conservation outcomes of new initiatives

Several initiatives and programmes have led to the successful restoration of different endemic and native species and of habitats.

Research works have highlighted the case of the giant lizard Gallotia simonyi and the Raso lark Alauda razae which are threatened endemic species that have been the target of strong conservation actions, like breeding programmes and reintroductions in small islets and islands of the Canary Islands and Cabo Verde, respectively (Salvador, 2015; Brooke et al., 2020). Other innovative actions have enhanced the reintroductions of the giant lizards, include training procedures where individuals raised in captivity learn to avoid predators (Burunat-Pérez et al., 2018).

As highlighted by most stakeholders consulted the main sources of funding of conservation and restoration initatives are regional or national funds and competitive European funds, such as the LIFE projects.

The table below report most of the EU funded projects and their conservation outcomes. Most of them were funded by the LIFE programme, while some have been funded by the Interreg MAC and Interregl Atlantic programme and in some cases by the Maritime and Fisheries Fund.

Among those the following projects have been highlighted by stakeholder as the most impacting ones.

MARCET project: the project is currently at its second edition and is funded by the INTERREG Mac programme. The aim of the project is to promote the whale watching ecotourism activity as a model of sustainable economic development by the protection and conservation of resident groups of cetaceans in marine protected areas and of special interest for the activity, and its enhancement as natural heritage of the Macaronesia. One of the specific objective of the project is to evaluate possible anthropogenic risk factors that affect the conservation of groups of cetaceans residing in SAC areas of interest for whale watching activity, using the bottlenose dolphin (Tursiops truncatus) and the short-finned pilot whale (Globicephala macrorhynchus) as indicator species. The project has also enhanced the cooperation among researchers and environmentalist of the three Archipielago to agree on methodology to collect and asses data and to jointlyinfrastructures for the health surveillance of cetaceans and other threatened marine species. The project has achieved a considerable deepening of knowledge on the Biology and Ecology of cetaceans in Macaronesia and advancement on monitoring systems (www.marcet-mac.eu)

LIFE LAMPROPELTIS is a best practice under different perspectives. The project objective is the control of the invasive species Lampropeltis getula californiae (California kind snake) in Gran Canaria. The first specimen of the California king snake was captured in 1998 in the northeast of the island of Gran Canaria. In 2007 the species was considered naturalized on the island, with several "main nucleus" and a control campaign was launched by local authorities. At the end of 2011, the LIFE+LAMPROPELTIS Project began, with the main objective of controlling the population in the known nucleus. However, during its execution new nuclei appear including in protected areas such as Montaña de Amago, a Protected Natural Area located in the municipality of Gáldar. The LIFE project ended in 2015 and a set of post-life activities was deployed. Since new nuclear continue to appear in 2019 a Strategic Plan has been developed and control activties continue since then. The project has thus been able not only to sustain their activities across many years but to involve more and more stakeholders and citizens. The project has in fact engaged citizens in the capture of the snake or in alerting of theirs presences through an app. The project addresses also the prevention of the introduction of species and has deployed a wide range of awareness raising and dissemination activities, becoming one of the most known initiatives in Gran Canaria. Since its beginning the project has achieved more than 18.000 captures, of which almost half have been performed by citizens (www.stopculebrareal.com)

18.154	8.534	9.620	1.323
Total catches	Thanks to citizens	Direct captures	Captures 2024

Figure 7 - Outcomes of the LIFE LAMPROPELTIS project

LIFE Egypitian Vulture aimed to improve the conservation of the Egyptian vulture in Italy and in the Canary Islands by implementing not only measures to mitigate the impact of the negative factors affecting the species, but also direct actions to promote its demographic recovery and expansion. The project ended in 2022 and in Canary Islands, was implemented in Fuerteventura and Lanzarote. A strict monitoring of the population is still ongoing, based on the tagging of juveniles at nests, the use of GPS/GSM dataloggers and the monitoring of feeding and roosting sites. During the project 287 juveniles were tagged with metallic and PVC rings and 35 individuals were fitted with GPS dataloggers. Thanks to these efforts, the 90% of the individuals of the Canary Islands population is now marked. The population trend is positive and shows a continuous increase of the number of territories: 67 in 2017, 107 in 2023 (+ 59.7%). Most of them are located in Fuerteventura Island but their number increased also in Lanzarote, from six in 2018 to ten in 2023. The population registered an annual increase of 7,6% in the period 2017-2023: 311 specimens in 2017, 452 in 2023 (+ 45.33%). Nevertheless, the breeding parameters show a strong irregularity and breeding success is quite low, revealing some problems to be monitored further. Mortality rate is low. The ascertained causes of mortality include collision with wind turbines, poisoning and electrocution but this latter cause has been almost completely neutralized thanks to the insulation work carried out over the years (www.lifeegyptianvulture.it)

ATLANTIC WHALE DEAL aims to prevent and limit ship collision with whales in the Atlantic Area. The project is funded by the Interreg Atlantic programme and will last since 2023 until 2026. Partners from different countries are working together to prevent these collisions that can damage biodiversity, trying out new and smart technologies to reduce ship strikes. This involves localization techniques to find whales, making maps to show where there's a risk of collisions, and creating tools to reduce noise in the ocean. The project is innovative in its kind and involve a multidisciplinary team of experts in physics, engineering, biology, statistics, design, and social economics from Canary Islands and Azores but also from France, Portgual and Ireland and count with the participatino of shipping companies.

LIFE IP AZORES NATURA project covers 24 SAC’s, 15 SPA’s and 2 SCI’s of the

Natura 2000 Network in the Azores, seeking to attain a significant contribute for the conservation of species and habitats protected by the Habitats and Bird Directives that underlie their designation. In concrete, by facilitating the implementation of the regional Prioritized Framework Programme for Natura 2000 (PAF 2014-2020), the project seeks that future assessments show a better conservation or a secure status for 100 % habitats and 50 % more species than those described in unfavorable status on the last reporting to the UE (2013), or species and habitats that could not be evaluated by lack of knowledge and reference information. To this effect, the LIFE IP AZORES NATURA directly targets the 4 main areas embraced by the PAF – all which eligible for LIFE-IP funding – and mobilizes complementary funding, with synergic aims, through applications to a variety of other mechanisms (which are granted, in application stage and/or foreseen to be requested within the timeframe of the IP). In order to achieve its targets, LIFE IP AZORES NATURA relies on combined works:

- on-field conservation works identified as needed for improvement of conservation status of 24 species and 13 habitats protected by the HD, including recovery of 6 priority habitats and 3 species, and promotion of the complementary signing/interpretation for awareness raising on the conservation goals;
- habitat improvement works foreseen on the Action Plan for the Azores bullfinch Pyrrhula murina in the European Union to secure its conservation status and promote the complementary signing/interpretation for awareness raising on the conservation goals;
- control/eradication works targeting IAS and monitor their results;
- knowledge production on distribution and/or conservation status/threats for specific species/habitats;
- ex-situ conservation actions, namely through collection and conservation of seeds from 80% of the endemic species of the Azores in the Germoplasm Bank at the Botanical Garden;
- reinforcement of the current capability for N2000 surveillance and management and development of an operational GIS database required for N2000 management
- awareness raising activites of local population and relevant stakeholders for the conservation values of N2000

Azores bullfinch https://cinea.ec.europa.eu/news-events/news/how-life-pulled-one-europes-rarest-birds-back-extinction-2023-11-07_en https://www.audubon.org/news/the-encouraging-comeback-azores-bullfinch

The Azores bullfinch is surely one of Europe's greatest survivors. For nearly 30 years, a total of six LIFE projects dedicated to this remarkable bird have brought it back from the edge of extinction. Once one of the continent's most critically endangered birds, the Azores bullfinch - known to locals as Priolo and to scientists as Pyrrhula murina - can only be found on the island of São Miguel in Portugal. When the first LIFE project began there, the population had shrunk to below 100 breeding pairs. Now there are more than 1,300 individuals. The future of the Azores bullfinch looks brighter than it has for decades, moving from "critically-endangered" on the IUCN red list in 2003 to "vulnerable" in 2016.

Successive LIFE projects have focused on eliminating invasive species and restoring native habitats on which the Azores bullfinch depends for food and shelter. Between 2009 and 2013, for example, the LIFE LAURISSILVA SUSTENTAVEL initiative successful restored 52 hectares of native laurel forest and planted 86,000 new trees.

The following table summarized the most relevant LIFE projects carried out in Macaronesia and their main outcomes.

Table 4 - LIFE projects in Macaronesia

Project/Initiative	**Description**	**Conservation Outcomes**	**Website**
LIFE14 PRE/UK/000002 EuroSAP	Coordinated Efforts for International Species Recovery (2015-2018). Delivered new or revised SAPs for European bird species.	- Reviewed six existing Species Action Plans (SAPs) and EU Management Plans for bearded vulture, cinereous vulture, Dalmatian pelican, European turtle-dove, white-headed duck and velvet scoter; developed two new SAPs for Monteiro's storm-petrel and Yelkouan shearwater; and piloted a Multi-Species Action Plan for European wet-grassland waders.	EuroSAP
Mistic Seas I	Standard indicators and criteria for monitoring Macaronesian marine biodiversity (2015-2016).	- Standardized indicators and criteria developed. - Monitoring protocols created. - Baseline data improved for 3 key taxa: mammals, turtles, and birds. - Enhanced regional cooperation among Mac countries.	Mistic Seas I
LIFE15 IPE/ES/000012 LIFE-IP INTEMARES	Integrated, Innovative and Participatory Management for N2000 network in the Marine Environment (2017-2024).	- 36% of the overall PAF in Spain and 98% of the PAF in the marine Natura 2000 network implemented; 46 management plans for all marine Natura 2000 sites under the Member State's jurisdiction approved; Four national conservation strategies and seven conservation plans for 34 marine species approved;	LIFE-IP INTEMARES

INTERREG LuMinAves (MAC/4.6c/157)	Light pollution reduction in Macaronesian archipelagos (2017-2020).	- Study of seabird populations in nesting colonies, including marking chicks, monitoring reproductive success, demographic parameters, and predator impact; Creation of a seabird database; Improvement of the network for collecting disoriented birds and support infrastructure; Information and outreach campaign; Development of accident and light pollution maps, identifying high-impact points and implementing a strategy to avoid light pollution and favor seabird conservation. Good Lighting Practices Manual, which can serve as a basis for changing public lighting and designing projects with less impact on seabirds, and defined a Macaronesian Strategy to Reduce Light Pollution.	LuMinAves
Mistic Seas II	Subregional coherent and coordinated approach to the monitoring and assessment of marine biodiversity in Macaronesia (2017-2019).	- Establish a common methodology for monitoring marine biodiversity in the Macaronesian sub-region, focusing on marine species populations of cetaceans, turtles, and birds, and also establish a common roadmap for better coordination in the implementation of the Marine Strategy Framework Directive (MSFD) in this sub-region - 15 regional workshops held. - Enhanced cooperation across 3 Macaronesian regions.	Mistic Seas II
LIFE17 IPE/PT/000010 LIFE-IP AZORES NATURA	Active protection and integrated management of Natura 2000 Network in the Azores (2019-2027).	- Improve the conservation status of 24 species and 13 habitat types protected under the Birds Directive and the Habitats Directive; habitat improvements foreseen in the Action Plan for the Azores bullfinch (Pyrrhula murina) to secure its conservation status; reinforce the capability for Natura 2000 surveillance and management; - Creation of 124 ha of ecological corridors to secure conservation status of 9 protected habitats; - Improved habitats over 24 ha for 7 seabird species, and 120 ha for Pyrrhula murina; - Eradication of plant IAS, and reduction or eradication of wild rabbits and rats; - Increase of publicly-owned land within Natura 2000 by 96 ha;	LIFE-IP AZORES NATURA
INTERREG EELabs (MAC2/4.6c/238)	Energy Efficiency Laboratories - Sustainable use of Artificial light (2020-2022).	- Creation of a light pollution laboratory. - Impact assessment on 3 key taxa (seabirds, bats, nocturnal insects). - Several awareness workshops and activities held.	EELabs
LIFE4BEST-ORs (M-86) Seabird Macaronesian Sound	Update information regarding seabird distribution and population size in Madeira and Azores (2020-2022).	- Update the information regarding seabird distribution and population size in Macaronesian islands of Madeira and Azores archipelagos (26 potential colonies and 5 seabird species) through low-cost and standardized passive acoustic methodologies. Madeira (Madeira island) and Azores (Santa Maria, Graciosa, São Jorge, and Flores islands).	Seabird Macaronesian Sound

LIFE20 NAT/PT/001098 LIFE Natura@night	Intervene on public illumination systems to benefit wildlife in Madeira, Azores, and Canary Islands (2021-2024).	- Updated information about abundance and distribution of 10 species of seabirds, 9 bat species, and more than 150 species of nocturnal Lepidoptera in 22 Natura 2000 sites (Madeira, Azores, and the Canary Islands); Maps of light pollution for 22 Natura 2000 sites in Macaronesia; Evaluation of artificial light at night (ALAN) impacts on seabirds, bats and nocturnal insects in Natura 2000 sites, and definition of protocols for effective monitoring; Monitoring impacts of ALAN on seabird fledging and colony attendance for 2 species in Madeira and Azores; Reduction of ALAN in 2 municipalities, decreasing current energy consumption up to 77% (200 000 kWh/year); Removal of 437 luminaires (complete lighting units) from sensitive areas and the implementation of a remote management system to monitor public lighting in Madeira.	LIFE Natura@night
LIFE20 NAT/PT/001277 LIFE Pterodromas4future	Improve and secure the conservation status of Zino's petrel and Desertas petrel in Madeira (2021-2025).	- 2 Pterodroma species targeted. Improved knowledge of breeding for both species, using 20 automatic cameras recording 10 nests; Firebreak built in a 60 ha area around breeding ledges of P. madeira; Ledges with P. madeira nests free of invasive plants; Increase in the number of potential breeding ledges by removal of broom cover; 50 new artificial nests installed for P. deserta and 20 for P. madeira on well-preserved ledges; Bird fatalities caused by cats and rodents down to zero; Creation of a cat early-detection system based on the placement of 6 automatic cameras.	LIFE Pterodromas4future
VECLAM – Mediterranean monk seal conservation status surveillance	Continue the monk seal's conservation work in the Madeira archipelago (ongoing).	- Monitor population status; Recover and care for monk seal habitat; Mitigate threats to monk seals; Engage the Madeiran community in the recovery of the monk seal population; Raise awareness in the community about the importance and necessity of protection measures for the species in the Madeira archipelago.	VECLAM
LIFE13 NAT/ES/000974 LIFE Madeira Monk Seal	Mediterranean monk seal conservation in Madeira and development of a conservation status surveillance system	- Monk Seal Regional Conservation Plan in Madeira; Increased capacity of the Natural Park of Madeira to intervene along the coastline to tackle threats or emergency situations for monk seal individuals; Surveillance systems, indicators and baseline values for monitoring of the monk seal and its habitat; Demonstration of the success and potential transferability of non-invasive monitoring methods for such scattered and low density populations; Improved protection and increased availability of high-quality terrestrial habitats used by monk seals.	https://webgate.ec.europa.eu/life/publicWebsite/project/LIFE13-NAT-ES-000974/mediterranean-monk-seal-conservation-in-madeira-and-development-of-a-conservation-

			status-surveillance-system
UICN - Ações preliminares de conservação da Musschia isambertoi	Conservation of critically endangered plant Musschia isambertoi in Madeira (ongoing).	- 1 critically endangered endemic plant species targeted. - Habitat monitored. - Improve the existing greenhouse in Doca (Deserta Grande) to multiply the species; - Fence an area of 100 m2, also in Doca, to create a field of plants of this species, making it easier to collect seeds for use in population reinforcement of this species; - Fence off access for goats to the natural habitat of the species in Porto das Moças.	https://ifcn.madeira.gov.pt/biodiversidade/projetos/uicn-acoes-preliminares-de-conservacao-da-musschia-isambertoi.html
LIFE12 NAT/PT/000195 LIFE RECOVER NATURA	Recovery of species and habitats of Natura 2000 sites Ponta de São Lourenço and Desertas Islands (2012-2016).	- 2 Natura 2000 sites improved. - 10 species recovered. - 50 ha of habitat restored. - 100 invasive species removed.	LIFE Recover Natura
LIFE11 NAT/PT/000327 LIFE Maciço Montanhoso	Recovery and conservation of species and habitats on the Madeiran Central Massif (2011-2015).	- 3 priority habitats targeted and 13 endemic Madeiran species listed in the Annexes of the Habitats and Bird Directives. -30 000 native plant specimens were produced, with 20 000 planted in target plots. - Removed invasive plants from 7.9 ha of inhospitable and rough terrain, and controlled populations of mice and rabbits.	LIFE Macio Montanhoso
LIFE20 NAT/PT/001377 LIFE SNAILS	Increase habitat quality and quantity for the conservation of endangered snails in the Azores (2022-2027).	- 3 endemic snail species targeted. - Identification of cost-effective and time-effective solutions to increase habitat diversity and quality within at least 27 ha of native habitats.	LIFE SNAILS
LIFE19 CCA/PT/001178 LIFE DUNAS	improve the resilience of Porto Santo Islands dune ecosystems to the impacts of climate change. The project aims to achieve this through ecosystem-based approaches, nature-based solutions and long-term sustainable use of pre-dune areas.		LIFE DUNAS

Among the LIFE4BEST funded project, an analysis of the species targeted and the main outcomes has also been collected and reported in the table below

Project	**Protected species**	**Protected area**	**Conservation measures implemented**	**Recommendations/conclusions**
Puffinus Life4Best Project: The primary goal of the Puffinus Life4Best project was to assess the population status in the valley following the fires, experiment with novel research methods for studying these species, gather additional data for future investigations in the Macaronesia area, and raise awareness among the local community about the plight of this fragile seabird species.	Manx Shearwater Puffinus puffinus	Ecological Park of Funchal, Madeira Island Portugal.	Conservation measures are not clear for this species due to the lack of information for the breeding habitat of the Macaronesia Region, but were installed 2 automated cameras on the active breeding areas and 5 artificial nests for understand better the species.	The project was a success, as it gathered new information and was a pioneer in the region of Macaronesia. We collected approximately 3000 hours of data with the ARU`S, identified 12 new holes, that will be monitored in the future. The investment of the project helped us to increase our action, reinforce our team and continue with the work in the next years.

Seabird Macaronesian Sound (SMS) Seabird Macaronesian Sound project used an autonomous and low-cost methodology through passive and active acoustic monitoring to update seabird population distribution and size in six Azorean islands and Madeira island for four species of Procellariiforms	Four species of Procellariiforms, Band-rumped Storm-petrel Hydrobates castro, Audubon's Shearwater Puffinus lherminieri, Monteiro's Storm-petrel Hydrobates monteiroi and Manx Shearwater Puffinus puffinus	six Azorean islands (Flores, Graciosa, São Jorge, Santa Maria Corvo, Faial islands and Terceira Island were also prospected) and Madeira island	Conservation measures such as Species **Action Plans** and definition of Key Biodiversity Areas.It also a relevant **indicator of marine ecosystems health** and conservation status. Finally, this information will be provided to the authorities in order to report to UE directives such as Birds Directive and Marine Strategy Framework Directive.	To increase future detection, it is extremely important to**; have experienced observers in** all the islands that can correctly identify the species through acoustic traits. To improve seabird estimations, it is also important to **build a new abundance score** according to the experienced observer detection ; to standardize and automated the method active acoustic monitoringcan be combined with passive acoustic monitoring, call rate recording and using autonomous recording units to improve the monitoring program in remote and inaccessible areas.

B-CHARMED (The Black Coral forests as unexplored biodiversity Hotspots in the MAcaronesian Region: ecosysteM functions and sErvices) aimes to tackle several issues related to the conservation of unknown biodiversity values supported by the targeted ecosystems. The project focused its activities in 5 main issues: to fine tune acoustic methods able to map and characterize BCF's, to define a minimal conservation unit based on density and structure of colonies, to demonstrate the high biodiversity value of ecosystems services delivered and to increase public awareness about the importance of BCF's.	Antipathella wollastoni, Antipathes furcata, Stichopathes gracilis	Lanzarote Island (Canary Island, eastern Atlantic Ocean)	The Conservation of biodiversity and ecosysyem services of Black Coral Forests was made by developing mapping tools and acquiring new knowledge regarding habitat-associated biodiversity.	The project has exceeded the expectations because it has been possible to achieve everything planned despite the delays caused by COVID, and the delays have made it easier for the project to reach a wider audience. The results are good, both in scientific point of view and its impact on society, stakeholders and entities related to the management of the marine environment. The outcomes obtained by the project will be used as baseline for future activities, and the desire is to use lessons learned in Lanzarote to apply the same approach not only in other islands of the archipelago, but also to extend it to other Macaronesian region.

Using the endangered Madeira pipistrelle as one of the flagship species to the Conservation of the Natura 2000 SAC Laurissilva da Madeira: The project main goal was to assess the importance of the SAC PTMAD0001 Laurissilva da Madeira forest to the conservation of the endangered Madeira bat Pipistrellus maderensis by assessing the distribution and abundance data while identifying important areas for this species, mainly natural roosts, flight corridors and feeding areas located within the forest.	Madeira bat Pipistrellus maderensis	Madeira	Regarding the conservation of the Madeira pipistrelle, the project has achieved all its goals. Distribution and abundance data was collected in the target habitat of Laurissilva da Madeira SAC. The project team went over its set goals on the monitoring scheme and has contacted observado.org to insert the Madeira Bat monitoring scheme EMMA into their app ObsMap. The team had meetings with observation organization (Observation.org) on the requirements of setting the EMMA transects and points into the App and making available to the entire civil society. This is a significant leap on the conservation of the Madeira Pipistrelle.	With the available resources, the project has achieved a lot in terms of data about the ecological relation of the endangered Madeira bat with the PTMAD0001 Laurissilva da Madeira SAC and the main goals were all achieved with success. Collected data showed us that the Madeira bat is rare and threatened. We also intended this project to have a non-invasive approach to bats and therefore data was completely collected remotely.

Conservation of Madeira's Threatened Endemic Butterflies	Three threatened endemic Madeiran butterflies: the Endangered Madeiran Speckled Wood Pararge xiphia, Madeiran Brimstone Gonepteryx maderensis and the Critically Endangered Madeiran Large White Pieris wollastoni	Madeira	In terms of the conservation of the target butterflies, the project has met all its objectives. Data collection allowed us to fulfil the conservation objectives of gathering baseline data for both the three target species and all the other butterfly species on the island; produce Action Plans for the target species, identify Key Butterfly Areas (KBAs); select 20 transects in KBA MAD1 to monitor endemic butterflies in the future (exceeding the target by 10); establish a maBMS on the island following the European Butterfly Monitoring Scheme (eBMS) protocols for monitoring butterfly population and volunteer/stakeholder staff training for recording butterflies on the transects	The project had to overcome several issues related to the pandemic, weather and also the project schedule. The project was inevitably hampered by COVID restrictions particularly in relation to planned initiatives in schools, but also tourism cluster stakeholders. Some government stakeholders were also involved in other projects which limited their ability to engage with our project whilst undertaking their normal operations. Despite all of the above we believe we planned the project as well as could be reasonably expected and we designed a budget to deliver it effectively. Finally, we believe similar projects could now be implemented in the other Macaronesian archipelagos and action plans could be produced for their threatened endemic butterfly species.

Madeira Maerl Mapping & Conservation	Maërl (rhodolith) beds	Madeira and Porto Santo Islands	A general survey was made to identify the locations where rhodolith beds were present, which was followed by a detailed survey to determine and map the extension of the maërl beds inside each area. With the detailed maps in hand we characterised the biodiversity of the most relevant rhodolith beds	Our assessment is that all aspects of the project implementation and management went very well. In our view, the decisive factors that have contributed to the smooth operation of the project were: an effective and realistic workplan, a motivated and qualified team, an adequate risk assessment plan, the strong engagement with the selected stakeholders, the use of an effective communication tools and a permanently positive and proactive approach.

Macaronesian Rhodoliths: Ecosystem Functions and Services (MAC-RODO) The overarching goal of MAC-RODO project was to increase baseline ecological knowledge on the distribution, biodiversity and ecosystem services of rhodolith (maerl) beds, as well as their vulnerability to anthropogenic stressors, in the Macaronesian region (eastern Atlantic Ocean).	Rhodolith beds distribution	Gando Bay (Gran Canaria, Spain) and Marinho do Cabo Girão natural park (Madeira, Portugal) (	Conservation measures are not clear for this rhodolith due to the lack of information.	The project had a "calling effect" on similar initiatives developed by other national/international research groups (e.g. RHODOCARB Workshop promoted by the European rhodolith specialist), which through this initiative of the LIFE4BEST program has discovered the existence of these ecological important but often overlook marine habitats in the EU outermost regions.The outcomes from MAC-RODO will foster collaboration among scientist, policy makers and the general public to improve the conservation status of this valuable marine habitat in the face of ever increasing human impacts

Current status of conservation community

Governance

Biodiversity conservation in the Macaronesian Autonomous Regions is set both at national and regional level, and is either mainstreamed in the region's environmental legislation, for example in nature protection and water legislations, or specifically addressed through policies and legislation such as the legislation on Protected Areas. In both cases, global and regional agreements have been transposed into several plans, programs and strategies in the regions.

In Canaries, planning and management of protected areas are under the responsibility of island councils, Cabildos, with the exception of those that coincide with national parks, in which case these powers fall to the Government of the Canary Islands through the administrations of the national parks themselves, unless they are delegated to the councils of their territory.

Natura 2000 sites that are located entirely in the marine waters since are under the responsibility of the General Administration of the State.

In the absence of comprehensive locally driven strategies, insufficient attention is being paid to the need for integrating and mainstreaming conservation in development planning, and conservation is approached as a distinct sector. Nature conservation and biodiversity are mostly perceived and approached as limited to protected areas or particular endangered species, and the value of mainstreaming biodiversity into development planning is not yet fully appreciated (Benzaken & Renard, 2011). Nevertheless, as all the archipelagos have a significant percentage of their territories classified as protected areas (40% of the terrestrial surface, on average), nature and biodiversity conservation are in effect being implemented in all main ecosystems.

Article 153 of Organic Law 1/2018, of November 5, reforming the Statute of Autonomy of the Canary Islands, related to the environment, in section 1, establishes that the Autonomous Community of the Canary Islands is responsible for legislative development and of execution of state legislation on the environment, which includes in any case (d): The regulation of natural resources, flora and fauna, biodiversity, the marine and aquatic environment if they do not have purpose is the preservation of maritime fishing resources.

In this sense, the Autonomous Community of the Canary Islands has the authority to declare the Special Protection Areas for Birds in both the terrestrial and maritime spaces surrounding the archipelago, in accordance with the provisions of article 4.3 of the Statute of Autonomy of the Canary Islands.

Likewise, article 154.1 of the Statute of Autonomy of the Canary Islands, referring to Protected Natural Spaces, also attributes to the Autonomous Community of the Canary Islands exclusive competence in matters of protected natural spaces in its spatial scope.

Invasive Alien Species initiatives

In the Canary Islands, the Autonomous Government has assigned to the public company GESPLAN the execution of a pilot experience related to the Detection and Intervention on Invasive Exotic Species in the Canary Islands. The pilot experience resulted in the year in the creation of the EXOS network, a system of information and intervention for the surveillance of invasive exotic species in the Canary Islands.

Gesplan supports also the island authorities in the control of invasive exotic species with the following objectives:

- Control of exotic flora in Protected Natural Spaces, as well as in areas of their influence.
- Planting of native replacement species in areas occupied by flora exotic.
- Control of feral cats in protected natural spaces.
- Control and eradication of feral goats in the Network of Natural Spaces
- Protected
- Action on alerts of outbreaks of exotic flora and fauna species not yet
- established and that require urgent eradication measures.
- Carrying out studies and recommendations documents.

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Annex II – Lists of invasive alien species
Madeira

o

Algas

Anotrichium cf. okamurae Baldock.

Anotrichium furcellatum (J. Agardh) Baldock.

Antithamnion amphigeneum A.J.K.Millar.

Antithamnion densum (Surh) M.A. Howe.

Antithamnion nipponicum Yamada et Inagaki.

Antithamnionella spirographidis (Schiffner) E. M. Wollaston.

Antithamnionella ternifolia (J.D. Hooker & Harvey) Lyle.

Asparagopsis armata Harvey.

Caulerpa taxifolia (M.Vahl) C.Agardh.

Colpomenia peregrina Sauvageau.

Dasya sessilis Yamada.

Gambierdiscus excentricus S.Fraga.

Gracilaria vermiculophylla (Ohmi) Papenfuss.

Grateloupia turuturu Yamada.

Gymnodinium catenatum Graham.

Ostreopsis cf. ovata Fukuyo.

Sargassum muticum (Yendo) Fensholt.

Symphyocladia marchantioides (Harvey) Falkenberg.

Undaria pinnatifida (Harvey) Suringar.

Plantas

Abutilon sonneratianum (Cav.) Sweet.

Abutilon theophrasti Medik.

Acacia spp.

Acanthus mollis L.

Acer negundo L.

Acer pseudoplatanus L.

Adiantum hispidulum Sw.

Adiantum raddianum C. Presl.

Agapanthus praecox Willd. ssp. orientalis (F. M. Leight) F. M. Leight.

Agave americana L. (Spreng.) R.M.King & H.Rob.

Ageratina riparia (Regel) R. M. King & H.Rob.

Ageratina adenophora (Spreng.) R. King & H. Rob.

Albizzia lophanta (Will.) Benth.

Albizzia julibrissin Durazz.

Ailanthus altissima (Miller) Swingle.

Aloe arborescens Mill.

Alternanthera philoxeroides (Mart.) Griseb.

Alternanthera caracasana Kunth.

Alternanthera nodiflora R. Br.

Alternanthera pungens Kunth.

Amaranthus albus L.

Amaranthus blitoides S. Watson.

Amaranthus blitum L. ssp. emarginatus (Moq. ex Uline & Bray) Carretero, Muñoz Garmendia & Pedrol.

Amaranthus caudatus L.

Amaranthus cruentus L.

Amaranthus deflexus L.

Amaranthus hybridus L.

Amaranthus hypochondriacus L.

Amaranthus muricatus (Gillies ex Moq.) Hieron.

Amaranthus paniculatus L.

Amaranthus powellii S. Watson.

Amaranthus retroflexus L.

Amaranthus viridis L.

Amaranthus x ozanonii Thell. ex Priszter.

Amaryllis belladonna L.

Aptenia cordifolia (L. f.) Schwantes.

Araujia sericifera Brot.

Arctotheca calendula (L.) Levyns.

Arundo donax L.

Asclepias curassavica L.

Asclepias syriaca L.

Asparagus asparagoides (L.) Druce.

Aster squamatus (Spreng.) Hieron.

Atriplex rosea L.

Atriplex semibaccata R. Br.

Azolla filiculoides Lam.

Baccharis halimifolia L.

Baccharis spicata (Lam.) Baill.

Bidens aurea (Aiton) Sherff.

Bidens frondosa L.

Bidens pilosa L.

Brachiaria mutica (Forssk.) Stapf.

Cabomba caroliniana Gray.

Cardiospermum grandiflorum Sw.

Carpobrotus acinaciformis (L.) L. Bolus.

Carpobrotus edulis (L.) N.E. Br.

Cenchrus ciliaris L.

Centranthus ruber (L.) DC.

Chasmanthe aethiopica (L.) N.E. Br.

Chrysanthemum coronarium L.

Cirsium vulgare (Savi) Ten.

Commelina diffusa Burm. F.

Conyza bonariensis (L.) Cronq.

Conyza canadensis (L.) Cronq.

Conyza sumatrensis (Retz.) E. Walker.

Coronopus didymus (L.) J.E. Sm.

Cortaderia selloana (Schultes & Schultes fil.) Ascherson & Graebner.

Cotula australis (Sieber ex Spreng.) Hook. fil.

Cotula coronopifolia L.

Crassula ovata (Mill.) Druce.

Crassula multicava Lem.

Crinum bulbispermum (Burm.) Milne-Redh. & Schweick.

Crocosmia x crocosmiiflora (Lemoine) N.E. Br.

Cyperus rotundus L.

Cyrtomium falcatum (L. fil.) C. Presl.

Cytisus scoparius (L.) Link.

Cytisus striatus (Hill) Rothm.

Datura innoxia Mill.

Datura stramonium L.

Delairea odorata Lem. (= Senecio mikanoides Otto ex Walp.).

Doodia caudata (Cav.) R. Br.

Duchesnea indica (Andr.) Focke.

Egeria densa Planch.

Eichhornia crassipes (C.F.P. Mart.) Solms-Laub.

Elodea canadensis Michx.

Elodea nuttallii (Planch.) St. John.

Erigeron karvinskianus DC.

Eryngium pandanifolium Cham. & Schlecht.

Eschscholzia californica Champ.

Fallopia baldschuanica (Regel) J. Holub.

Fallopia japonica (Houtt.) Ronse Decr. (= Reynoutria japonica Houtt.).

Fallopia sachalinensis (Schmidt) Ronse Decr.

Fallopia x bohemica (J. Chrtek & A. Chrtková) J. P. Bailei.

Fuschia arborescens Sins.

Fuschia magellanica Lam.

Galinsoga parviflora Cav.

Galinsoga quadriradiata Ruiz et Pav.

Gleditsia triacanthos L.

Gomphocarpus fruticosus (L.) Aiton fil.

Gunnera tinctoria (Molina) Mirbel.

Hakea salicifolia (Vent.) B.L. Burtt.

Hakea sericea Schrad.

Hedychium gardnerianum Ker - Gawl.

Helichrysum foetidum (L.) Cass.

Heracleum mantegazzianum Sommier & Levier.

Heracleum persicum Fischer.

Heracleum sosnowskyi Mandenova.

Holcus lanatus L.

Hydrangea macrophylla (Thunb.) Ser.

Hydrilla verticillata (L. f.) Royle.

Hydrocotyle ranunculoides L. f.

Impatiens glandulifera Royle.

Ipomoea acuminata (Vahl) Roemer & Schult.

Ipomoea indica (Burm.) Merr.

Ipomea purpurea (L.) Roth.

Isatis tinctoria L.

Kalanchoe daigremontiana Raym. -Hamet & H. Perrier.

Kalanchoe delagonensis Eckl. et Zeyh.

Kalanchoe fedtschenkoi Raym. - Hamet et Perrier.

Kalanchoe pinnata (Lam.) Pers. N.

Lagarosiphon major (Ridley) Moss.

Lantana camara L.

Lepidium didymum L.

Leptospermum scoparium J. R. Forst. & G. Forst.

Leucaena leucocephala (Lam.) De Wit.

Leycesteria formosa Wall.

Lonicera japonica Thunb.

Ludwigia grandiflora (Michx.) Greuter & Burdet.

Ludwigia peploides (Kunth) Raven.

Ludwigia uruguayensis (Cam-bess.) H.Hara.

Lysichiton americanus Hultén & St. John.

Malephora crocea (Jacq.) Schwantes.

Melinis minutiflora P. Beauv.

Melinis repens (Willd.) Zizka.

Malvastrum coromandelianum (L.) Garcke.

Microstegium vimineum (Trin.) A. Camus.

Myriophyllum aquaticum (Vel-loso) Verdc.

Myriophyllum brasiliensis Camb.

Myriophyllum heterophyllum Michaux.

Nicotiana glauca R.C. Graham.

Nymphaea mexicana Zucc.

Opuntia elata Salm -Dyck.

Opuntia ficus-indica (L.) Miller.

Opuntia maxima Miller.

Opuntia subulata (Muehlenpf.) Engelm (= Austrocylindropuntia subulata).

Opuntia tuna (L.) Mill.

Oxalis corniculata L.

Oxalis pes-caprae L.

Oxalis purpurea L.

Paraserianthes lophantha (Willd.) I.C. Nielsen [=Albizia distachya (Vent) J.F. Macbr.].

Parthenium hysterophorus L.

Paspalum paspalodes (Michx) Scribner.

Paspalum vaginatum Swartz.

Passiflora tripartita (Juss.) Poir. var. mollissima (Kunth) Holm - Niels. & P. Jørg.

Paulownia tomentosa (Thun-berg) Steudel.

Pelargonium inquinans (L.) L'Hér. ex Ait.

Pennisetum purpureum Schum.

Pennisetum setaceum (Forssk.) Chiov.

Pennisetum villosum R. Br. ex Fresen.

Persicaria perfoliata (L.) H. Gross (= Polygonum perfoliatum L.).

Phytolacca americana L.

Pistia stratiotes L.

Pittosporum undulatum Vent.

Podranea ricasoliana (Tanfani) Sprague.

Polygonum capitatum Buch.-Ham.ex D.Don.

Pueraria lobata (Willdenow) Ohwi (= P. montana var lobata).

Rhus coriaria L.

Ricinus communis L.

Robinia pseudoacacia L.

Sagittaria latifolia Willd.

Salpichroa origanifolia (Lam.) Thell.

Salvinia molesta D.S. Mitchell.

Senecio bicolor (Willd.) Tod. ssp. cinerea (DC.) Chater.

Senecio inaequidens DC.

Senecio mikanioides Otto ex Walp.

Senecio petasites (Sims) DC.

Setaria verticillata (L.) P. Beauv.

Solanum mauritianum Scop.

Soleirolia soleirolii (Req.) Dandy.

Sorghum halepense (L.) Pers.

Spartina densiflora Brongn.

Symphyotrichum subulatum (Michx.) G. L. Nesom var. squamatum (Spreng.) S. D. Sundb.

Tamarix gallica L.

Tetragonia tetragonioides (Pall.) Kuntze.

Tradescantia fluminensis Velloso.

Tradescantia zebrina Hort. ex Bosse Vollst.

Tropaeolum majus L.

Ulex europaeus L.

Ulex minor Roth.

Verbena bonariensis L.

Verbena rigida Spreng.

Vinca major L.

Zantedeschia aethiopica (L.) Spreng.

Moluscos

Achatina (= Lissachatina) fulica.

Anodonta woodiana.

Arion distinctus.

Arion hortensis.

Corbicula fluminea.

Cornu aspersum.

Crassostrea gigas.

Deroceras invadens.

Deroceras reticulatum.

Dreissena bugensis.

Dreissena polymorpha.

Euglandina rósea.

Limnoperna fortunei.

Limax maximus.

Mya arenaria.

Mytilus galloprovincialis.

Pomacea canaliculata.

Pomacea insularum.

Annex III – List of threatened species of Macaronesia

Group	scientificName	redlistCategory	redlistCriteria	Azores	Canaries	Madeira	endemic
Arthropoda	*Acorigone zebraneus*	Critically Endangered	B1ab(i,ii,iii,v)	x			end
Arthropoda	*Acrostira bellamyi*	Critically Endangered	B1ab(iii,iv,v)		x		end
Arthropoda	*Acrostira euphorbiae*	Critically Endangered	B1ab(i,ii,iii,iv,v); C2a(ii)		x		end
Arthropoda	*Agyneta depigmentata*	Critically Endangered	B1ab(i,ii,iii,v)	x			end
Arthropoda	*Aleochara freyi*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Atheta caprariensis*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Atheta floresensis*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Athous pomboi*	Critically Endangered	B1ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Bembidion derelictum*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Calacalles azoricus*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Calathus carvalhoi*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Calathus lundbladi*	Critically Endangered	B1ab(i,ii,iii,v)	x			end
Arthropoda	*Canariphantes junipericola*	Critically Endangered	B1ab(i,ii,iii,v)	x			end
Arthropoda	*Canariphantes relictus*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Catops velhocabrali*	Critically Endangered	B1ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Caulotrupis parvus*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Centromerus anoculus*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)			x	
Arthropoda	*Centromerus sexoculatus*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)			x	
Arthropoda	*Cheiracanthium floresense*	Critically Endangered	B1ab(i,ii,iii,v)	x			end
Arthropoda	*Chirothrips azoricus*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Cixius cavazoricus*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Cryptolestes azoricus*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Dericorys minutus*	Critically Endangered	B1ab(iii,v)+2ab(iii,v)		x		
Arthropoda	*Donus multifidus*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Dysdera portisancti*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)			x	end
Arthropoda	*Eumerus nivariae*	Critically Endangered	B2ab(iii)		x		end
Arthropoda	*Eupithecia ogilviata*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Evergoderes cabrerai*	Critically Endangered	B1ab(v)+2ab(v)		x		
Arthropoda	*Geostiba melanocephala*	Critically Endangered	B1ab(i,ii,iii,iv)+2ab(i,ii,iii,iv)	x			end

Arthropoda	*Gietella faialensis*	Critically Endangered	B1ab(i,ii,iii)+2ab(i,ii,iii)	x			end
Arthropoda	*Hadena azorica*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Hogna ingens*	Critically Endangered	B1ab(ii,iii,v)+2ab(ii,iii,v)			x	
Arthropoda	*Homoeosoma miguelensis*	Critically Endangered	B1ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Homoeosoma picoensis*	Critically Endangered	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)	x			end
Arthropoda	*Macarorchestia martini*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			
Arthropoda	*Medon varamontis*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Megaselia miguelensis*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Meta barreti*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)			x	end
Arthropoda	*Mniophilosoma obscurum*	Critically Endangered	B1ab(ii,iii,v)+2ab(ii,iii,v)	x			end
Arthropoda	*Neomariania incertella*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Nesotes azoricus*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Oecobius selvagensis*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)		x	x	
Arthropoda	*Olisthopus inclavatus*	Critically Endangered	B1ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Phlogophora kruegeri*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Phytosus schatzmayri*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Pieris wollastoni*	Critically Endangered	B1ab(v)			x	
Arthropoda	*Polydesmus ribeiraensis*	Critically Endangered	B1ab(i,ii,iii,v)	x			end
Arthropoda	*Pseudanchomenus aptinoides*	Critically Endangered	B1ab(i,ii,iii,iv)	x			end
Arthropoda	*Pseudoblothrus oromii*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			
Arthropoda	*Savigniorrhipis topographicus*	Critically Endangered	B1ab(i,ii,iii,v)	x			end
Arthropoda	*Sphaericus velhocabrali*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Stenoptilia meyeri*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Tarphius acuminatus*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Tarphius depressus*	Critically Endangered	B1ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Tarphius floresensis*	Critically Endangered	B1ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Tarphius gabrielae*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Tarphius pomboi*	Critically Endangered	B1ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Tarphius relictus*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Tarphius rufonodulosus*	Critically Endangered	B1ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Tarphius serranoi*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end

Arthropoda	*Tarphius wollastoni*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Thalassophilus azoricus*	Critically Endangered	B1ab(iii,iv,v)+2ab(iii,iv,v)	x			end
Arthropoda	*Tinea poecilella*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Trechus jorgensis*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			end
Arthropoda	*Trechus montanheirorum*	Critically Endangered	B1ab(i,ii,iii,iv)	x			end
Arthropoda	*Trechus oromii*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Trechus pereirai*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Trechus torretassoi*	Critically Endangered	B1ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Typhochrestus acoreensis*	Critically Endangered	B1ab(i,ii,iii,v)	x			end
Arthropoda	*Xysticus grohi*	Critically Endangered	B1ab(iii,v)			x	
Arthropoda	*Acrostira tamarani*	Endangered	B1ab(iii,iv,v)+2ab(iii,iv,v)		x		end
Arthropoda	*Acrostira tenerifae*	Endangered	D		x		
Arthropoda	*Agabus godmanni*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Agyneta rugosa*	Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			
Arthropoda	*Apamea ramonae*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Apamea sphagnicola*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Aphrodes hamiltoni*	Endangered	B2ab(ii,iii,iv)	x			end
Arthropoda	*Argyresthia minusculella*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Athous azoricus*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Atlantocis gillerforsi*	Endangered	B2ab(ii,iii,iv,v)	x			end
Arthropoda	*Brachmia infuscatella*	Endangered	B2ab(ii,iii,iv,v)	x			end
Arthropoda	*Calacalles droueti*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Calliphona alluaudi*	Endangered	B1ab(i,ii,iii,iv,v)		x		end
Arthropoda	*Calliphona gomerensis*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)		x		end
Arthropoda	*Calliphona palmensis*	Endangered	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)		x		
Arthropoda	*Cheiracanthium jorgeense*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Cixius azofloresi*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Cixius azomariae*	Endangered	B1ab(iii,iv)+2ab(iii,iv)	x			end
Arthropoda	*Cixius azopicavus*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Conocephalus chavesi*	Endangered	B2ab(ii,iii,iv,v)	x			end
Arthropoda	*Crotchiella brachyptera*	Endangered	B1ab(iii)+2ab(iii)	x			

Arthropoda	*Drouetius azoricus*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Drouetius borgesi*	Endangered	B2ab(i,ii,iii,iv)	x			end
Arthropoda	*Drouetius oceanicus*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Drusia tenerifensis*	Endangered	B2ab(iii,v)		x		
Arthropoda	*Encarsia estrellae*	Endangered	B1ab(iii)+2ab(iii)	x			end
Arthropoda	*Euconnus azoricus*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Eudarcia atlantica*	Endangered	B2ab(i,ii,iv)	x			end
Arthropoda	*Eumerus canariensis*	Endangered	B1ab(iii)+2ab(iii)		x		end
Arthropoda	*Eumerus dubius*	Endangered	B1ab(iii)+2ab(iii)		x		end
Arthropoda	*Eumerus purpurariae*	Endangered	B1ab(iii)+2ab(iii)		x		end
Arthropoda	*Eumerus santosabreui*	Endangered	B2ab(iii)		x		end
Arthropoda	*Gonepteryx maderensis*	Endangered	B1ab(i,iii)			x	
Arthropoda	*Graphania granti*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Heringia adpropinquans*	Endangered	B1ab(iii)+2ab(iii)		x		
Arthropoda	*Heteroderes azoricus*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Hydroporus guernei*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Leipaspis pinicola*	Endangered	B2ab(iii)		x		
Arthropoda	*Megaselia leptofemur*	Endangered	B2ab(i,ii,iii)	x			end
Arthropoda	*Melanostoma incompletum*	Endangered	B2ab(iii)		x		
Arthropoda	*Melanostoma wollastoni*	Endangered	B1ab(iii)+2ab(iii)			x	end
Arthropoda	*Mesiotelus maderianus*	Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)			x	
Arthropoda	*Metophthalmus occidentalis*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Micrurapteryx bistrigella*	Endangered	B2ab(ii,iii,iv)	x			end
Arthropoda	*Myathropa usta*	Endangered	B1ab(iii)+2ab(iii)			x	end
Arthropoda	*Neomariania scriptella*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Pararge xiphia*	Endangered	B1ab(iii,v)			x	
Arthropoda	*Pelecocera nigricornis*	Endangered	B2ab(i,ii,iii,iv)		x		end
Arthropoda	*Phloeosinus gillerforsi*	Endangered	B2ab(ii,iv)	x			end
Arthropoda	*Phloeostiba azorica*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Pieris cheiranthi*	Endangered	B1ab(iii,v)+2ab(iii,v)		x	x	

Arthropoda	*Pseudechinosoma nodosum*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Pseudoblothrus vulcanus*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Pseudoyersinia canariensis*	Endangered	B1ab(iii,iv,v)+2ab(iii,iv,v)		x		end
Arthropoda	*Purpuraria erna*	Endangered	B1ab(iii,v)+2ab(iii,v)		x		end
Arthropoda	*Purpuraria magna*	Endangered	B1ab(iii,v)+2ab(iii,v)		x		
Arthropoda	*Serratorotula juliformis*	Endangered	B1ab(ii,iii)+2ab(ii,iii)			x	
Arthropoda	*Sphingonotus picteti*	Endangered	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)		x		
Arthropoda	*Sphingonotus rugosus*	Endangered	B1ab(ii,iv,v)+2ab(ii,iv,v)		x		end
Arthropoda	*Syrphoctonus morio*	Endangered	B1ab(iii)+2ab(iii)	x			end
Arthropoda	*Tarphius azoricus*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Tarphius furtadoi*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Tarphius tornvalli*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Trechus picoensis*	Endangered	B1ab(i,ii,iii,iv)+2ab(i,ii,iii,iv)	x			end
Arthropoda	*Trechus terrabravensis*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Trigoniophthalmus borgesi*	Endangered	B2ab(ii,iii,iv)	x			end
Arthropoda	*Turinyphia cavernicola*	Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Xanthandrus babyssa*	Endangered	B1ab(iii)+2ab(iii)			x	end
Arthropoda	*Ameles gracilis*	Vulnerable	B2ab(iii,iv,v)		x		end
Arthropoda	*Canariphantes acoreensis*	Vulnerable	B2ab(i,ii,iii,iv,v)	x			
Arthropoda	*Chrysotoxum triarcuatum*	Vulnerable	B1ab(iii)+2ab(iii)		x		
Arthropoda	*Cixius azopifajo*	Vulnerable	B1ab(iii,iv)+2ab(iii,iv)	x			end
Arthropoda	*Cixius azoterceirae*	Vulnerable	B1ab(iii,iv)+2ab(iii,iv)	x			end
Arthropoda	*Colletes dimidiatus*	Vulnerable	B1ab(ii,iii)+2ab(ii,iii)		x		
Arthropoda	*Colletes moricei*	Vulnerable	B1ab(ii,iii)+2ab(ii,iii)		x		
Arthropoda	*Cryptorchestia chevreuxi*	Vulnerable	B2ab(iii,iv,v)	x			end
Arthropoda	*Dysdera aneris*	Vulnerable	D2		x	x	end
Arthropoda	*Eudonia melanographa*	Vulnerable	B2ab(iii,iv)	x			end
Arthropoda	*Eumerus hispidus*	Vulnerable	B1ab(iii)+2ab(iii)			x	end
Arthropoda	*Eumerus latitarsis*	Vulnerable	B1ab(ii,iii)+2ab(ii,iii)		x		end
Arthropoda	*Eumerus purpureus*	Vulnerable	B1ab(iii)+2ab(iii)		x		end
Arthropoda	*Gonepteryx cleobule*	Vulnerable	B1ab(iii,v)		x		end
Arthropoda	*Hipparchia bacchus*	Vulnerable	D2		x		

Arthropoda	*Hipparchia tilosi*	Vulnerable	D2		x		
Arthropoda	*Leipaspis lauricola*	Vulnerable	D2		x		
Arthropoda	*Leucognatha acoreensis*	Vulnerable	B2ab(ii,iii,iv,v)	x			end
Arthropoda	*Minicia floresensis*	Vulnerable	B2ab(i,ii,iii,v)	x			end
Arthropoda	*Neomariania oecophorella*	Vulnerable	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)	x			end
Arthropoda	*Neon acoreensis*	Vulnerable	B2ab(ii,iii,iv,v)	x			
Arthropoda	*Parapetrobius azoricus*	Vulnerable	D2	x			end
Arthropoda	*Phlogophora furnasi*	Vulnerable	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)	x			end
Arthropoda	*Plebecula giramica*	Vulnerable	D2			x	
Arthropoda	*Porrhomma borgesi*	Vulnerable	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Psalmatophanes barretoi*	Vulnerable	B1ab(ii,iii,iv,v)			x	
Arthropoda	*Pseudoyersinia subaptera*	Vulnerable	B1ab(iii,iv,v)+2ab(iii,iv,v)		x		end
Arthropoda	*Rugathodes pico*	Vulnerable	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	x			end
Arthropoda	*Savigniorrhipis acoreensis*	Vulnerable	B2ab(ii,iii,iv,v)	x			end
Arthropoda	*Scoparia carvalhoi*	Vulnerable	B1ab(iii,iv)+2ab(iii,iv)	x			end
Arthropoda	*Trechus isabelae*	Vulnerable	D2	x			end
Arthropoda	*Trechus terceiranus*	Vulnerable	B1ab(iii)+2ab(iii)	x			end
Arthropoda	*Walckenaeria grandis*	Vulnerable	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)	x			end
Aves	*Numenius tenuirostris*	Critically Endangered	C2a(i,ii);D		x		
Aves	*Fringilla polatzeki*	Endangered	D		x		
Aves	*Neophron percnopterus*	Endangered	A2abcde+3bcde+4abcde		x		
Aves	*Pterodroma cahow*	Endangered	D	x			
Aves	*Pterodroma madeira*	Endangered	D	x	x	x	
Aves	*Pterocles orientalis*	Endangered	A2bcde+4bc		x		
Aves	*Fratercula arctica*	Endangered	A2abcde+4abcde	x	x	x	
Aves	*Chlamydotis undulata*	Vulnerable	A2cd+3cd+4cd		x		
Aves	*Hydrobates leucorhous*	Vulnerable	A2bce+3bce+4bce	x	x	x	
Aves	*Hydrobates monteiroi*	Vulnerable	D1+2	x			
Aves	*Larus audouinii*	Vulnerable	A4b		x		
Aves	*Pterodroma deserta*	Vulnerable	D1+2	x	x	x	
Aves	*Pyrrhula murina*	Vulnerable	D1+2	x			
Aves	*Rissa tridactyla*	Vulnerable	A2abd+3bd+4abd	x	x	x	

Aves	*Streptopelia turtur*	Vulnerable	A2bcd+3bcd+4bcd		x		
Fish	*Aetomylaeus bovinus*	Critically Endangered	A2d		x	x	
Fish	*Anguilla anguilla*	Critically Endangered	A2bd+4bd	x	x		
Fish	*Carcharhinus longimanus*	Critically Endangered	A2bd	x	x	x	
Fish	*Carcharias taurus*	Critically Endangered	A2bd		x	x	
Fish	*Galeorhinus galeus*	Critically Endangered	A2bd		x	x	
Fish	*Glaucostegus cemiculus*	Critically Endangered	A2d				
Fish	*Myliobatis aquila*	Critically Endangered	A2bd		x	x	
Fish	*Rhinobatos rhinobatos*	Critically Endangered	A2bd		x		
Fish	*Rhinoptera marginata*	Critically Endangered	A2d				
Fish	*Sphyrna lewini*	Critically Endangered	A2bd	x	x	x	
Fish	*Sphyrna mokarran*	Critically Endangered	A2bd		x	x	
Fish	*Squatina squatina*	Critically Endangered	A2bcd		x	x	
Fish	*Carcharhinus obscurus*	Endangered	A2bd		x		
Fish	*Carcharhinus plumbeus*	Endangered	A2bd		x		
Fish	*Centrophorus granulosus*	Endangered	A2bd	x	x	x	
Fish	*Centrophorus squamosus*	Endangered	A2bd	x		x	
Fish	*Centrophorus uyato*	Endangered	A2bd		x		
Fish	*Cetorhinus maximus*	Endangered	A2bd	x	x	x	
Fish	*Echinorhinus brucus*	Endangered	A2bd		x		
Fish	*Gymnura altavela*	Endangered	A2d	x	x	x	
Fish	*Isurus oxyrinchus*	Endangered	A2bd	x	x	x	
Fish	*Isurus paucus*	Endangered	A2d	x	x	x	
Fish	*Leucoraja circularis*	Endangered	A2bcd		x	x	
Fish	*Merluccius senegalensis*	Endangered	A2bd		x		end
Fish	*Mobula birostris*	Endangered	A2bcd+3d	x	x	x	
Fish	*Mobula mobular*	Endangered	A2bd+3d	x	x	x	
Fish	*Mobula tarapacana*	Endangered	A2bd+3d	x	x	x	
Fish	*Mobula thurstoni*	Endangered	A2bd+3d		x	x	
Fish	*Mustelus mustelus*	Endangered	A2bd		x	x	
Fish	*Oxynotus centrina*	Endangered	A2d		x	x	
Fish	*Pseudotolithus*	Endangered	A2bd		x		

	senegalensis						
Fish	*Raja undulata*	Endangered	A2bd+3d+4bd		x	x	
Fish	*Rhincodon typus*	Endangered	A2bd+4bd	x	x		
Fish	*Rostroraja alba*	Endangered	A2cd+4cd		x	x	
Fish	*Alopias superciliosus*	Vulnerable	A2bd	x	x	x	
Fish	*Alopias vulpinus*	Vulnerable	A2bd	x	x	x	
Fish	*Balistes capriscus*	Vulnerable	A2bd	x	x	x	
Fish	*Balistes punctatus*	Vulnerable	A2bd		x	x	
Fish	*Bathytoshia lata*	Vulnerable	A2d		x	x	
Fish	*Bodianus scrofa*	Vulnerable	B2ab(iv,v)	x	x	x	
Fish	*Carcharhinus brevipinna*	Vulnerable	A2bd		x		
Fish	*Carcharhinus falciformis*	Vulnerable	A2bd	x	x	x	
Fish	*Carcharhinus leucas*	Vulnerable	A2bcd	x	x		
Fish	*Carcharhinus limbatus*	Vulnerable	A2bd		x		
Fish	*Carcharodon carcharias*	Vulnerable	A2bd	x	x	x	
Fish	*Centroscymnus owstonii*	Vulnerable	A2d	x	x	x	
Fish	*Chimaera monstrosa*	Vulnerable	A2bd	x	x	x	
Fish	*Dalatias licha*	Vulnerable	A2bd+3d		x	x	
Fish	*Dasyatis pastinaca*	Vulnerable	A2bd	x	x	x	
Fish	*Dentex dentex*	Vulnerable	A2bd		x	x	
Fish	*Etmopterus spinax*	Vulnerable	A2bd	x	x	x	
Fish	*Galeus polli*	Vulnerable	A2d		x		end
Fish	*Ginglymostoma cirratum*	Vulnerable	A2bcd				
Fish	*Hippocampus erectus*	Vulnerable	A2cd	x			
Fish	*Istiophorus platypterus*	Vulnerable	A2bd	x	x	x	
Fish	*Lamna nasus*	Vulnerable	A2bd	x	x	x	
Fish	*Leucoraja fullonica*	Vulnerable	A2bd	x		x	
Fish	*Makaira nigricans*	Vulnerable	A2bd	x	x	x	
Fish	*Mola mola*	Vulnerable	A4bd	x	x	x	
Fish	*Mustelus punctulatus*	Vulnerable	A2d		x	x	
Fish	*Mycteroperca fusca*	Vulnerable	B2ab(v)	x	x	x	
Fish	*Mycteroperca marginatus*	Vulnerable	A2bd+4bd	x	x	x	

Fish	*Odontaspis ferox*	Vulnerable	A2bd	x	x	x	
Fish	*Oxynotus paradoxus*	Vulnerable	A2d		x	x	end
Fish	*Pomatomus saltatrix*	Vulnerable	A2bd	x	x	x	
Fish	*Raja maderensis*	Vulnerable	D2			x	end
Fish	*Rhizoprionodon acutus*	Vulnerable	A2bd			x	
Fish	*Sardinella maderensis*	Vulnerable	A2d		x	x	
Fish	*Scymnodon ringens*	Vulnerable	A2bd		x	x	
Fish	*Sphyrna zygaena*	Vulnerable	A2bd		x	x	
Fish	*Squalus acanthias*	Vulnerable	A2bd		x		
Fish	*Thunnus obesus*	Vulnerable	A2bd	x	x	x	
Fish	*Torpedo marmorata*	Vulnerable	A2bd		x	x	
Fish	*Torpedo torpedo*	Vulnerable	A2bd		x	x	
Fish	*Trachurus trachurus*	Vulnerable	A2bd		x	x	
Fish	*Zanobatus schoenleinii*	Vulnerable	A2bd				
Mammalia	*Eubalaena glacialis*	Critically Endangered	C2a(ii)	x	x	x	
Mammalia	*Plecotus teneriffae*	Critically Endangered	B2ab(ii,iii,v)		x		end
Mammalia	*Balaenoptera borealis*	Endangered	A1abd	x	x	x	
Mammalia	*Balaenoptera musculus*	Endangered	A1abd	x	x	x	
Mammalia	*Crocidura canariensis*	Endangered	B1ab(i,iii)		x		
Mammalia	*Pipistrellus maderensis*	Endangered	B2ab(iii)	x	x	x	end
Mammalia	*Balaenoptera physalus*	Vulnerable	A1d	x	x	x	
Mammalia	*Monachus monachus*	Vulnerable	D1			x	
Mammalia	*Nyctalus azoreum*	Vulnerable	B2ab(iii)	x			
Mammalia	*Physeter macrocephalus*	Vulnerable	A1d	x	x	x	
Mollusca	*Actinella arridens*	Critically Endangered	B1ab(iii)			x	
Mollusca	*Actinella obserata*	Critically Endangered	B2ab(iii)			x	
Mollusca	*Atlantica engonata*	Critically Endangered	D		x		end
Mollusca	*Atlantica gomerensis*	Critically Endangered	D		x		end
Mollusca	*Atlantica guerinianus*	Critically Endangered	B1ab(iii,v)			x	end
Mollusca	*Atlantica putrescens*	Critically Endangered	D		x		end
Mollusca	*Azorivitrina angulosa*	Critically Endangered	B1ab(iii,iv)+2ab(iii,iv)	x			
Mollusca	*Boettgeria obesiuscula*	Critically Endangered	B1ab(ii,iii)+2ab(ii,iii)			x	

Mollusca	*Canariella jandiaensis*	Critically Endangered	B2ab(iii)	x		
Mollusca	*Canariella ronceroi*	Critically Endangered	B1ab(iii)+2ab(iii)	x		
Mollusca	*Canarivitrina falcifera*	Critically Endangered	B2ab(iii)	x		end
Mollusca	*Caseolus galeatus*	Critically Endangered	B2ab(iii)		x	
Mollusca	*Caseolus subcalliferus*	Critically Endangered	B2ab(iii)		x	
Mollusca	*Craspedaria delphinuloides*	Critically Endangered	D		x	
Mollusca	*Cryptella alegranzae*	Critically Endangered	B2ab(iii,v); C2a(ii)	x		end
Mollusca	*Cryptella tamaranensis*	Critically Endangered	D	x		end
Mollusca	*Discula lyelliana*	Critically Endangered	B1ab(iii)		x	
Mollusca	*Discula tabellata*	Critically Endangered	B1ab(iii)		x	
Mollusca	*Discula tetrica*	Critically Endangered	B1ab(iii)		x	
Mollusca	*Geomitra coronula*	Critically Endangered	B1ab(iii,v)+2ab(iii,v); D		x	end
Mollusca	*Hemicycla efferata*	Critically Endangered	B1ab(iii)+2ab(iii)	x		end
Mollusca	*Hemicycla modesta*	Critically Endangered	B1ab(iii,v)+2ab(iii,v)	x		
Mollusca	*Hemicycla paeteliana*	Critically Endangered	B2ab(iii)	x		
Mollusca	*Hemicycla plicaria*	Critically Endangered	B2ab(iii)	x		
Mollusca	*Hemicycla saulcyi*	Critically Endangered	B2ab(iii)	x		
Mollusca	*Idiomela subplicata*	Critically Endangered	B1ab(iii)+2ab(iii)		x	
Mollusca	*Insulivitrina machadoi*	Critically Endangered	B2ab(iii)	x		
Mollusca	*Insulivitrina reticulata*	Critically Endangered	B2ab(iii)	x		end
Mollusca	*Janulus pompylius*	Critically Endangered	D	x		end
Mollusca	*Leiostyla abbreviata*	Critically Endangered	B2ab(iii)		x	end
Mollusca	*Leiostyla cassida*	Critically Endangered	B2ab(iii)		x	end
Mollusca	*Leiostyla cassidula*	Critically Endangered	B2ab(iii)		x	
Mollusca	*Leiostyla gibba*	Critically Endangered	B1ab(iii)		x	
Mollusca	*Leiostyla simulator*	Critically Endangered	D		x	
Mollusca	*Monilearia arguineguinensis*	Critically Endangered	B2ab(ii,iii)	x		end
Mollusca	*Monilearia granostriata*	Critically Endangered	B1ab(iii)+2ab(iii)	x		
Mollusca	*Monilearia pulverulenta*	Critically Endangered	B1ab(iii)+2ab(iii)	x		
Mollusca	*Monilearia tumulorum*	Critically Endangered	B1ab(iii)+2ab(iii)	x		
Mollusca	*Napaeus arinagaensis*	Critically Endangered	B2ab(iii)	x		end
Mollusca	*Napaeus doloresae*	Critically Endangered	D	x		end

Mollusca	*Napaeus exilis*	Critically Endangered	B2ab(iii)		x		end
Mollusca	*Napaeus isletae*	Critically Endangered	B2ab(iii)		x		
Mollusca	*Napaeus osoriensis*	Critically Endangered	B2ab(iii)		x		end
Mollusca	*Napaeus teobaldoi*	Critically Endangered	B1ab(iii)+2ab(iii)		x		end
Mollusca	*Oxychilus agostinhoi*	Critically Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	x			
Mollusca	*Testudodiscula testudinalis*	Critically Endangered	B1ab(iii)+2ab(iii)			x	
Mollusca	*Theba arinagae*	Critically Endangered	B2ab(iii)		x		
Mollusca	*Vermetum festinans*	Critically Endangered	B1ab(iii,iv,v)		x		end
Mollusca	*Wollastonaria jessicae*	Critically Endangered	B1ab(iii,v)+2ab(iii,v)			x	
Mollusca	*Wollastonaria klausgrohi*	Critically Endangered	B1ab(iii,v)+2ab(iii,v)			x	
Mollusca	*Wollastonaria vermetiformis*	Critically Endangered	D			x	end
Mollusca	*Xerotricha garachicoensis*	Critically Endangered	B1ab(iii)+2ab(iii)		x		
Mollusca	*Actinella carinofausta*	Endangered	B2ab(iii)			x	
Mollusca	*Amphorella tuberculata*	Endangered	B1ab(iv,v)+2ab(iv,v)			x	end
Mollusca	*Boettgeria crispa*	Endangered	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)			x	end
Mollusca	*Canariella eutropis*	Endangered	B1ab(iii)+2ab(iii)		x		
Mollusca	*Canariella huttereri*	Endangered	B1ab(iii)+2ab(iii)		x		end
Mollusca	*Caseolus calvus*	Endangered	B1ab(iii)+2ab(iii)			x	
Mollusca	*Discula pulvinata*	Endangered	B2ab(iii)			x	
Mollusca	*Discula tectiformis*	Endangered	B1ab(iii)			x	
Mollusca	*Geomitra moniziana*	Endangered	B1ab(iii)+2ab(iii)			x	
Mollusca	*Geomitra tiarella*	Endangered	B1ab(iii)+2ab(iii)			x	
Mollusca	*Hemicycla fuenterroquensis*	Endangered	B1ab(iii)+2ab(iii)		x		end
Mollusca	*Hemicycla pouchadan*	Endangered	B2ab(iii)		x		
Mollusca	*Hystricella echinulata*	Endangered	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)			x	
Mollusca	*Lampadia webbiana*	Endangered	B1ab(ii,iii)+2ab(ii,iii)			x	
Mollusca	*Leiostyla concinna*	Endangered	B1ab(iii)+2ab(iii)			x	
Mollusca	*Leiostyla falknerorum*	Endangered	B2ab(iii)			x	
Mollusca	*Leptaxis caldeirarum*	Endangered	B1ab(iii)+2ab(iii)	x			
Mollusca	*Leptaxis minor*	Endangered	B1ab(iii)	x			
Mollusca	*Leptaxis wollastoni*	Endangered	B1ab(iii,v)+2ab(iii,v)			x	
Mollusca	*Malacolimax wiktori*	Endangered	B2ab(iii,v)		x		

Mollusca	*Napaeus doliolum*	Endangered	B2ab(iii)		x		end
Mollusca	*Napaeus myosotis*	Endangered	B1ab(iii)+2ab(iii)		x		end
Mollusca	*Napaeus nanodes*	Endangered	B2ab(iii)		x		end
Mollusca	*Obelus discogranulatus*	Endangered	B2ab(iii)		x		end
Mollusca	*Retinella osoriensis*	Endangered	B1ab(iii)+2ab(iii)		x		end
Mollusca	*Theba grasseti*	Endangered	B1ab(ii,iii)+2ab(ii,iii)		x		
Mollusca	*Vermetum tamadabaensis*	Endangered	B2ab(iii)		x		end
Mollusca	*Xerotricha pavida*	Endangered	B1ab(iii)+2ab(iii)		x		end
Mollusca	*Haliotis tuberculata*	Vulnerable	A2de	x	x	x	
Mollusca	*Leiostyla arborea*	Vulnerable	D2			x	
Mollusca	*Leiostyla colvillei*	Vulnerable	D2			x	end
Mollusca	*Leiostyla corneocostata*	Vulnerable	D2			x	
Mollusca	*Leiostyla ferraria*	Vulnerable	D2			x	end
Mollusca	*Leiostyla filicum*	Vulnerable	D2			x	
Mollusca	*Leiostyla heterodon*	Vulnerable	D2			x	
Mollusca	*Leiostyla laurinea*	Vulnerable	B1ab(iii)			x	
Mollusca	*Leiostyla macilenta*	Vulnerable	B2ab(iii)			x	
Mollusca	*Leptaxis furva*	Vulnerable	B2ab(iii)			x	
Mollusca	*Madeirovitrina albopalliata*	Vulnerable	B1ab(iii)+2ab(iii)			x	
Mollusca	*Millepora alcicornis*	Vulnerable	A3c		x	x	
Mollusca	*Moreletina obruta*	Vulnerable	D2	x			
Mollusca	*Napaeus boucheti*	Vulnerable	D2		x		end
Mollusca	*Napaeus elegans*	Vulnerable	B2ab(iii)		x		
Mollusca	*Napaeus esbeltus*	Vulnerable	B2ab(iii)		x		end
Mollusca	*Napaeus lichenicola*	Vulnerable	D2		x		
Mollusca	*Napaeus minimus*	Vulnerable	D2		x		end
Mollusca	*Napaeus ornamentatus*	Vulnerable	B1ab(iii)+2ab(iii)		x		
Mollusca	*Napaeus roccellicola*	Vulnerable	B1ab(iii)+2ab(iii)		x		end
Mollusca	*Napaeus rupicola*	Vulnerable	B1ab(iii)+2ab(iii)		x		end
Mollusca	*Napaeus tagamichensis*	Vulnerable	D2		x		end
Mollusca	*Napaeus taguluchensis*	Vulnerable	D2		x		end
Mollusca	*Obelus despreauxii*	Vulnerable	D2		x		

Mollusca	*Obelus moratus*	Vulnerable	D2		x		
Mollusca	*Spirorbula squalida*	Vulnerable	D2			x	
Mollusca	*Theba impugnata*	Vulnerable	B1ab(iii)		x		
Mollusca	*Wollastonaria leacockiana*	Vulnerable	D2			x	
Mollusca	*Wollastonaria turricula*	Vulnerable	D2			x	
Plantae	*Aichryson dumosum*	Critically Endangered	B2ab(iii)			x	end
Plantae	*Andryala crithmifolia*	Critically Endangered	B2ac(iv)			x	
Plantae	*Argyranthemum winteri*	Critically Endangered	B2ab(iii,v)		x		
Plantae	*Bencomia brachystachya*	Critically Endangered	B2ab(iii,iv,v)		x		
Plantae	*Bencomia sphaerocarpa*	Critically Endangered	D		x		
Plantae	*Berberis maderensis*	Critically Endangered	B1ab(ii,iii)+2ab(ii,iii)			x	end
Plantae	*Beta patula*	Critically Endangered	B1ab(iii,iv)+2ab(iii,iv)			x	
Plantae	*Callina bulverii*	Critically Endangered	B2ab(iii,v)			x	
Plantae	*Cheirolophus duranii*	Critically Endangered	B2ab(iii,v)		x		
Plantae	*Cheirolophus metlesicsii*	Critically Endangered	B2ab(iii,v)		x		
Plantae	*Crambe feuillei*	Critically Endangered	B1ab(iii,v)+2ab(iii,v)		x		
Plantae	*Crambe sventenii*	Critically Endangered	B2ab(iii,v)		x		
Plantae	*Crambe tamadabensis*	Critically Endangered	B1ab(iii)+2ab(iii)		x		
Plantae	*Crambe wildpretii*	Critically Endangered	C2a(i)		x		
Plantae	*Dracaena tamaranae*	Critically Endangered	C2a(i)		x		
Plantae	*Echium acanthocarpum*	Critically Endangered	B1b(iii)c(iv)		x		end
Plantae	*Echium handiense*	Critically Endangered	B2ab(iii,v); C2a(ii)		x		
Plantae	*Echium portosanctense*	Critically Endangered	B1ab(v)+2ab(v)			x	end
Plantae	*Erica maderensis*	Critically Endangered	B1ab(iii)			x	
Plantae	*Euphorbia anachoreta*	Critically Endangered	D		x	x	end
Plantae	*Fissidens azoricus*	Critically Endangered	B1ab(iii)+2ab(iii)	x			
Plantae	*Geranium maderense*	Critically Endangered	D			x	end
Plantae	*Globularia ascanii*	Critically Endangered	B1ab(iii)+2ab(iii)		x		
Plantae	*Goodyera macrophylla*	Critically Endangered	D			x	end
Plantae	*Grammitis azorica*	Critically Endangered	B2ab(iii,v); C2a(i)	x			
Plantae	*Helianthemum bystropogophyllum*	Critically Endangered	B2ab(iii)c(iv)		x		

Plantae	*Helianthemum teneriffae*	Critically Endangered	B2ab(iii,v)c(iv); C2a(ii)b		x		
Plantae	*Hymenophyllum maderense*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v) ; C2a(i,ii); D			x	end
Plantae	*Hypochaeris oligocephala*	Critically Endangered	B2ab(iii)c(iv)		x		
Plantae	*Isoplexis chalcantha*	Critically Endangered	B1ab(i,ii,iii,iv)+2ab(i,ii,iii,iv)		x		
Plantae	*Isothecium montanum*	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v) ; C2a(i); D			x	end
Plantae	*Jasminum azoricum*	Critically Endangered	D			x	end
Plantae	*Limonium dendroides*	Critically Endangered	B2ab(iii,iv,v); C2a(i); D		x		
Plantae	*Limonium spectabile*	Critically Endangered	B2ab(ii,iii,v)		x		
Plantae	*Limonium sventenii*	Critically Endangered	B2ab(ii,iii,iv)		x		
Plantae	*Lotus eremiticus*	Critically Endangered	B2ab(iii,v)c(iv); C2a(i)b; D		x		
Plantae	*Lotus kunkelii*	Critically Endangered	B2ab(iii)		x		
Plantae	*Lotus maculatus*	Critically Endangered	B2ab(iii,v); C2a(i); D		x		
Plantae	*Lotus pyranthus*	Critically Endangered	B2ab(ii,iii,v); C2a(i)		x		
Plantae	*Micromeria glomerata*	Critically Endangered	B2ab(iii,iv)		x		
Plantae	*Monizia edulis*	Critically Endangered	D			x	end
Plantae	*Morella rivas-martinezii*	Critically Endangered	B2ab(iii,v)		x		
Plantae	*Onopordum carduelium*	Critically Endangered	B2ab(iii,iv)		x		
Plantae	*Onopordum nogalesii*	Critically Endangered	B2ac(iv)		x		
Plantae	*Orthotrichum handiense*	Critically Endangered	B1ab(iii,v)+2ab(iii,v); C2a(i,ii); D		x		end
Plantae	*Patellifolia webbiana*	Critically Endangered	B1ab(iii)+2ab(iii)		x		
Plantae	*Pericallis hadrosoma*	Critically Endangered	B2ab(iii)		x		
Plantae	*Pericallis malvifolia*	Critically Endangered	B1ab(iii)	x			end
Plantae	*Pittosporum coriaceum*	Critically Endangered	D			x	end
Plantae	*Plantago famarae*	Critically Endangered	B2ab(v)		x		
Plantae	*Pleiomeris canariensis*	Critically Endangered	C2a(i)		x		end
Plantae	*Polystichum drepanum*	Critically Endangered	D			x	
Plantae	*Ramalina portosantana*	Critically Endangered	B1ab(iii)+2ab(iii)			x	
Plantae	*Riccia atlantica*	Critically Endangered	C2a(i)		x	x	end
Plantae	*Salvia herbanica*	Critically Endangered	B2ab(iii,v); C2a(i)		x		
Plantae	*Sideritis cystosiphon*	Critically Endangered	B2ab(iii,iv)		x		

Plantae	*Sideritis discolor*	Critically Endangered	B1ab(iii)c(iv)+2ab(iii)c(iv)		x		
Plantae	*Sideritis marmorea*	Critically Endangered	B2ab(iii,iv)		x		
Plantae	*Silene nocteolens*	Critically Endangered	B2ab(iii)		x		
Plantae	*Sinapidendron angustifolium*	Critically Endangered	B1ab(iii)+2ab(iii)			x	
Plantae	*Sinapidendron rupestre*	Critically Endangered	D			x	end
Plantae	*Solanum lidii*	Critically Endangered	B2ab(ii,iii); C2a(i)		x		
Plantae	*Sonchus gandogeri*	Critically Endangered	B2ab(iii)		x		
Plantae	*Sphagnum nitidulum*	Critically Endangered	B1ab(iii)	x			end
Plantae	*Tanacetum oshanahanii*	Critically Endangered	B2ab(iii,v); C2a(i); D		x		
Plantae	*Teline nervosa*	Critically Endangered	B2ab(iii,v)		x		
Plantae	*Teline salsoloides*	Critically Endangered	B2ab(iii,v); C2a(ii)		x		
Plantae	*Teucrium abutiloides*	Critically Endangered	B1ab(iii)			x	
Plantae	*Thesium psilotocladum*	Critically Endangered	D		x		
Plantae	*Thesium subsucculentum*	Critically Endangered	B2ab(ii,iii,v)		x		
Plantae	*Trematodon perssoniorum*	Critically Endangered	B1ab(iii)	x			end
Plantae	*Vicia costae*	Critically Endangered	B1ab(iii)+2ab(iii)			x	
Plantae	*Vicia ferreirensis*	Critically Endangered	B1ab(iii)+2ab(iii)			x	
Plantae	*Acrobolbus azoricus*	Endangered	B2ab(iii,iv,v)	x			end
Plantae	*Acrobolbus madeirensis*	Endangered	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v); C2a(i)			x	end
Plantae	*Adenocarpus ombriosus*	Endangered	B2ab(iii,v)		x		
Plantae	*Aeonium gomerense*	Endangered	B1ab(iii,v)+2ab(iii,v)		x		
Plantae	*Anagyris latifolia*	Endangered	B2ab(iii,iv,v); C2a(i)		x		
Plantae	*Anzia centrifuga*	Endangered	D			x	end
Plantae	*Argyranthemum lidii*	Endangered	B2ab(iii)c(iv)		x		
Plantae	*Argyranthemum thalassophilum*	Endangered	D		x	x	end
Plantae	*Asparagus fallax*	Endangered	B2ab(iii,v)		x		
Plantae	*Asparagus nesiotes*	Endangered	B2ab(ii,v)		x	x	
Plantae	*Asplenium anceps*	Endangered	B2ab(iii,v)	x	x	x	
Plantae	*Asplenium terorense*	Endangered	B2ab(iii)		x		
Plantae	*Atractylis arbuscula*	Endangered	B2ab(ii,iii)		x		
Plantae	*Atractylis preauxiana*	Endangered	B2ab(iii,iv,v)		x		

Plantae	*Bazzania azorica*	Endangered	A3c; B2ab(ii,iii,iv,v)	x			end
Plantae	*Breutelia azorica*	Endangered	A3c; B2ab(iii,v)	x			end
Plantae	*Bryoxiphium madeirense*	Endangered	A3c			x	end
Plantae	*Bupleurum handiense*	Endangered	B1ab(i,ii,iv,v)+2ab(i,ii,iv,v)		x		
Plantae	*Bystropogon maderensis*	Endangered	D			x	end
Plantae	*Calypogeia azorica*	Endangered	B2ab(ii,iii)	x		x	end
Plantae	*Campanula vidalii*	Endangered	B2ab(iii,v)	x			end
Plantae	*Cedrorum azoricus*	Endangered	B2ab(i,ii,iii,iv,v)	x			end
Plantae	*Chamaemeles coriacea*	Endangered	B1ab(iii)+2ab(iii)			x	
Plantae	*Cheilolejeunea cedercreutzii*	Endangered	B2ab(ii,iii); C2a(i)	x		x	end
Plantae	*Cheirolophus falcisectus*	Endangered	B2b(iii)c(iv)		x		
Plantae	*Cheirolophus ghomerythus*	Endangered	B1ab(iii,iv,v)+2b(iii,iv,v)		x		
Plantae	*Cheirolophus junonianus*	Endangered	B1ab(iii)+2ab(iii)		x		
Plantae	*Cheirolophus massonianus*	Endangered	D			x	end
Plantae	*Cicer canariense*	Endangered	B2ac(iv)		x		
Plantae	*Cistus chinamadensis*	Endangered	B2ab(ii,iii)		x		end
Plantae	*Cololejeunea madeirensis*	Endangered	B2ab(iii,v); C2a(i)	x		x	end
Plantae	*Convolvulus lopezsocasii*	Endangered	B2ab(v)		x		
Plantae	*Crambe laevigata*	Endangered	B1ab(iii,v)+2ab(iii,v)		x		
Plantae	*Crambe microcarpa*	Endangered	B1ab(iii,v)+2ab(iii,v)		x		
Plantae	*Crambe pritzelii*	Endangered	B1ab(iii,v)+2ab(iii,v)		x		
Plantae	*Crambe scoparia*	Endangered	B2ab(ii,iii)		x		
Plantae	*Dendriopoterium menendezii*	Endangered	B1ab(iii)+2ab(iii)		x		end
Plantae	*Dorycnium spectabile*	Endangered	B2ab(iii,v); C2a(i)		x		
Plantae	*Dracaena draco*	Endangered	B2ab(ii,iii,iv,v)		x	x	
Plantae	*Echinodium renauldii*	Endangered	A3c	x			
Plantae	*Echinodium setigerum*	Endangered	A3c			x	
Plantae	*Echinodium spinosum*	Endangered	A3c		x	x	
Plantae	*Echium pininana*	Endangered	B2ac(iv)		x		
Plantae	*Elaphoglossum semicylindricum*	Endangered	B2ab(iii,iv,v)	x		x	
Plantae	*Fissidens nobreganus*	Endangered	C2a(i)			x	end

Plantae	*Gesnouinia arborea*	Endangered	B2ab(iii)		x		
Plantae	*Hedenasiastrum percurrens*	Endangered	A3c			x	end
Plantae	*Helichrysum monogynum*	Endangered	B2ab(iii)		x		
Plantae	*Herbertus azoricus*	Endangered	B2ab(iii)	x			
Plantae	*Himantoglossum metlesicsianum*	Endangered	B1ab(iii,v)+2ab(iii,v)		x		end
Plantae	*Homalia webbiana*	Endangered	B2ab(iii,v)	x	x	x	
Plantae	*Isoplexis isabelliana*	Endangered	B2ab(iii)		x		
Plantae	*Isoplexis sceptrum*	Endangered	B1ab(iii)+2ab(iii)			x	
Plantae	*Juniperus cedrus*	Endangered	B2ab(ii,iii,v); C2a(i)		x	x	
Plantae	*Lactuca watsoniana*	Endangered	B2ab(i,ii,iii); C2a(i)	x			
Plantae	*Leptogium hibernicum*	Endangered	A3ce+4ace			x	
Plantae	*Limonium fruticans*	Endangered	B2ab(iii)		x		
Plantae	*Limonium preauxii*	Endangered	B2ab(iii)c(iv)		x		
Plantae	*Lotus callis-viridis*	Endangered	B2ac(ii,iv)		x		
Plantae	*Marcetella maderensis*	Endangered	D			x	end
Plantae	*Marcetella moquiniana*	Endangered	B2ab(iii)		x		
Plantae	*Micromeria leucantha*	Endangered	B2ab(iii)		x		
Plantae	*Musschia wollastonii*	Endangered	D			x	end
Plantae	*Pelekium atlanticum*	Endangered	C2a(i)		x	x	end
Plantae	*Plagiochila maderensis*	Endangered	A3c		x	x	end
Plantae	*Platanthera micrantha*	Endangered	B1ab(i,iii,v)	x			
Plantae	*Porella inaequalis*	Endangered	C2a(i)			x	end
Plantae	*Radula jonesii*	Endangered	C2a(i)		x	x	end
Plantae	*Ramalina confertula*	Endangered	D			x	
Plantae	*Ramalina erosa*	Endangered	D			x	end
Plantae	*Rhynchostegiella bourgaeana*	Endangered	A3c	x	x		
Plantae	*Ruta microcarpa*	Endangered	B2ab(ii,iii)		x		
Plantae	*Sideroxylon canariense*	Endangered	D		x		end
Plantae	*Sideroxylon mirmulans*	Endangered	B1ab(iii)+2ab(iii)			x	end
Plantae	*Sinapidendron frutescens*	Endangered	B1ab(iii,v)c(iii)+2ab(iii,v)c(iii)			x	
Plantae	*Sinapidendron*	Endangered	D			x	end

	sempervivifolium						
Plantae	*Stemmacantha cynaroides*	Endangered	B2ab(v)		x		
Plantae	*Sventenia bupleuroides*	Endangered	B2ab(iii)		x		
Plantae	*Tanacetum ptarmiciflorum*	Endangered	B2ab(ii,iii,iv,v)		x		
Plantae	*Telaranea azorica*	Endangered	B2ab(iii)	x	x		end
Plantae	*Teline rosmarinifolia*	Endangered	B2ab(iii,v)		x		
Plantae	*Thamnobryum rudolphianum*	Endangered	B2ab(iii)	x			end
Plantae	*Tolpis glabrescens*	Endangered	B2ab(iii)		x		
Plantae	*Vicia capreolata*	Endangered	A2e			x	
Plantae	*Acorigone acoreensis*	Vulnerable	B2ab(ii,iii,iv,v)	x			
Plantae	*Acrobolbus wilsonii*	Vulnerable	D1	x		x	end
Plantae	*Actinella actinophora*	Vulnerable	B1ab(iii)+2ab(iii)			x	
Plantae	*Actinella armitageana*	Vulnerable	D2			x	
Plantae	*Actinella laciniosa*	Vulnerable	D2			x	
Plantae	*Aeonium balsamiferum*	Vulnerable	D2		x		
Plantae	*Aeonium saundersii*	Vulnerable	D2		x		end
Plantae	*Andoa berthelotiana*	Vulnerable	A3c	x	x	x	end
Plantae	*Androcymbium psammophilum*	Vulnerable	B2ac(iv)		x		
Plantae	*Arachniodes webbiana*	Vulnerable	D1			x	end
Plantae	*Artemisia argentea*	Vulnerable	C2a(i)			x	end
Plantae	*Asparagus arborescens*	Vulnerable	B2ab(ii,iii,iv)		x		
Plantae	*Asparagus plocamoides*	Vulnerable	B1ab(iii,v)+2ab(iii,v)		x		
Plantae	*Asplenium lolegnamense*	Vulnerable	B2ab(iii,v); D1		x	x	
Plantae	*Atlantica anagaensis*	Vulnerable	D2		x		end
Plantae	*Atlantica laurisilvae*	Vulnerable	D2		x		end
Plantae	*Atlantica rupivaga*	Vulnerable	D2		x		
Plantae	*Bencomia exstipulata*	Vulnerable	D2		x		
Plantae	*Canariella bimbachensis*	Vulnerable	D2		x		
Plantae	*Canariella fortunata*	Vulnerable	B1ab(ii,iii)+2ab(ii,iii)		x		end
Plantae	*Canariella hispidula*	Vulnerable	B1ab(i,ii,iii)+2ab(i,ii,iii)		x		end
Plantae	*Canariella leprosa*	Vulnerable	B1ab(iii)		x		

Plantae	*Canariella pontelirae*	Vulnerable	D2		x		
Plantae	*Canariella pthonera*	Vulnerable	B1ab(iii)		x		
Plantae	*Canarivitrina dianae*	Vulnerable	D2		x		
Plantae	*Caseolus baixoensis*	Vulnerable	D2			x	
Plantae	*Caseolus calculus*	Vulnerable	D2			x	
Plantae	*Caseolus leptostictus*	Vulnerable	B2ab(iii)			x	
Plantae	*Cheirolophus tagananensis*	Vulnerable	D2		x		
Plantae	*Cololejeunea schaeferi*	Vulnerable	A3c	x	x	x	end
Plantae	*Convolvulus massonii*	Vulnerable	D1			x	end
Plantae	*Crambe arborea*	Vulnerable	D2		x		
Plantae	*Crambe gomerae*	Vulnerable	D2		x		
Plantae	*Crambe scaberrima*	Vulnerable	B1ab(iii)+2ab(iii)		x		
Plantae	*Craspedopoma lyonnetianum*	Vulnerable	D2			x	
Plantae	*Cryptella auriculata*	Vulnerable	B2ab(iv,v)		x		end
Plantae	*Cryptella famarae*	Vulnerable	B1ab(iv,v)+2ab(iv,v); D2		x		end
Plantae	*Cryptella susannae*	Vulnerable	D2		x		end
Plantae	*Cylichnidia ovuliformis*	Vulnerable	D2			x	end
Plantae	*Delagrangeus schurmanni*	Vulnerable	D2		x		end
Plantae	*Dendriopoterium pulidoi*	Vulnerable	D2		x		
Plantae	*Disculella spirulina*	Vulnerable	D2			x	
Plantae	*Domunculifex littorinella*	Vulnerable	D2			x	
Plantae	*Echium callithyrsum*	Vulnerable	B1ab(iii)+2ab(iii)		x		
Plantae	*Echium gentianoides*	Vulnerable	D2		x		
Plantae	*Euphorbia bourgeana*	Vulnerable	D2		x		
Plantae	*Euphorbia handiensis*	Vulnerable	D2		x		
Plantae	*Exsertotheca intermedia*	Vulnerable	A3c	x	x	x	end
Plantae	*Ferula latipinna*	Vulnerable	D2		x		
Plantae	*Frullania polysticta*	Vulnerable	A3c		x	x	end
Plantae	*Genista benehoavensis*	Vulnerable	B2ab(iii)		x		
Plantae	*Globularia sarcophylla*	Vulnerable	D1		x		
Plantae	*Grimmia curviseta*	Vulnerable	D2		x		end

Plantae	*Heberdenia excelsa*	Vulnerable	C1		x	x	
Plantae	*Helichrysum gossypinum*	Vulnerable	D2		x		
Plantae	*Hemicycla inutilis*	Vulnerable	B2ab(iii)		x		end
Plantae	*Hemicycla pouchet*	Vulnerable	B2ab(ii)		x		end
Plantae	*Isoetes azorica*	Vulnerable	A4ce + C2a(i)	x			endemica
Plantae	*Isothecium prolixum*	Vulnerable	A3c	x		x	
Plantae	*Janulus stephanophorus*	Vulnerable	B2ab(iii)			x	end
Plantae	*Juniperus brevifolia*	Vulnerable	B2ab(ii,iii,v)	x			
Plantae	*Lejeunea canariensis*	Vulnerable	B2ab(iii)		x	x	end
Plantae	*Lejeunea mandonii*	Vulnerable	B2ab(iii,v)		x	x	end
Plantae	*Leptodon longisetus*	Vulnerable	A3c		x	x	end
Plantae	*Leucodon treleasei*	Vulnerable	C2a(i)	x	x	x	end
Plantae	*Limonium perezii*	Vulnerable	D1+2		x		
Plantae	*Lycopodium madeirense*	Vulnerable	C2a(i)	x		x	
Plantae	*Marsupella profunda*	Vulnerable	D1	x	x	x	end
Plantae	*Myosotis azorica*	Vulnerable	D1	x			end
Plantae	*Parolinia schizogynoides*	Vulnerable	D1+2		x		
Plantae	*Phalaris maderensis*	Vulnerable	D1			x	end
Plantae	*Rhynchostegiella trichophylla*	Vulnerable	A3c		x	x	end
Plantae	*Sambucus lanceolata*	Vulnerable	D1			x	end
Plantae	*Sarcodon joeides*	Vulnerable	A2c+3c+4c		x		
Plantae	*Saxifraga portosanctana*	Vulnerable	D2			x	end
Plantae	*Schizymenium pontevedrense*	Vulnerable	C2a(i)			x	
Plantae	*Sedum brissemoretii*	Vulnerable	D1+2			x	end
Plantae	*Sideritis infernalis*	Vulnerable	D2		x		
Plantae	*Tetrastichium fontanum*	Vulnerable	B2ab(iii,v); C2a(i); D1	x	x	x	end
Plantae	*Thamnobryum fernandesii*	Vulnerable	B1ab(iii)+2ab(iii)			x	end
Plantae	*Tortella limbata*	Vulnerable	B2ab(iii)		x	x	end
Reptilia	*Eretmochelys imbricata*	Critically Endangered	A2bd	x	x	x	
Reptilia	*Gallotia bravoana*	Critically Endangered	D		x		

Reptilia	*Gallotia intermedia*	Critically Endangered	B1ab(v)+2ab(v)		x		
Reptilia	*Gallotia simonyi*	Critically Endangered	B1ab(v)+2ab(v)		x		
Reptilia	*Lepidochelys kempii*	Critically Endangered	A2bd	x		x	
Reptilia	*Chalcides simonyi*	Endangered	B1ab(iii)		x		
Reptilia	*Chelonia mydas*	Endangered	A2bd	x	x	x	
Reptilia	*Caretta caretta*	Vulnerable	A2b	x	x	x	
Reptilia	*Dermochelys coriacea*	Vulnerable	A2bd	x	x	x	
Reptilia	*Triturus carnifex*	Vulnerable	A3ce	x			end

Annex IV – Full list of KBAs of Macaronesia

Country	NatName	intname	KbaStatus	IbaStatus
Portugal	Corvo e Flores	Corvo e Flores	confirmed	confirmed
Portugal	Faial	Faial	confirmed	confirmed
Portugal	Ilhas Desertas	Ilhas Desertas	confirmed	confirmed
Portugal	Ponta do Pargo	Ponta do Pargo	confirmed	confirmed
Portugal	Pico da Vara	Pico da Vara	confirmed	confirmed
Portugal	Costa das Flores	Costa das Flores	confirmed	confirmed
Portugal	Capelinhos	Capelinhos	confirmed	confirmed
Portugal	Cabeço do Fogo	Cabeço do Fogo	confirmed	confirmed
Portugal	Ilhéu da Praia	Ilhéu da Praia	confirmed	confirmed
Portugal	Ilhéu da Baleia e Ponta da Barca	Ilhéu da Baleia e Ponta da Barca	confirmed	confirmed
Portugal	Raminho – Pesqueiro Velho	Raminho – Pesqueiro Velho	confirmed	confirmed
Portugal	Ilhéu das Lagoínhas e Costa Adjacente	Ilhéu das Lagoínhas e Costa Adjacente	confirmed	confirmed
Portugal	Costa Sudeste do Pico	Costa Sudeste do Pico	confirmed	confirmed
Portugal	Zona Central do Pico	Zona Central do Pico	confirmed	confirmed
Portugal	Feteiras	Feteiras	confirmed	confirmed
Portugal	Ponta do Cintrão	Ponta do Cintrão	confirmed	confirmed
Portugal	Graciosa	Graciosa	confirmed	confirmed
Portugal	Terceira	Terceira	confirmed	confirmed

Portugal	Contendas	Contendas	confirmed	confirmed
Portugal	Ilhéus do Porto Santo	Ilhéus do Porto Santo	confirmed	confirmed
Portugal	São Jorge - Oeste	São Jorge - Oeste	confirmed	confirmed
Portugal	Laurissilva	Laurissilva	confirmed	confirmed
Portugal	Lomba Grande	Lomba Grande	confirmed	confirmed
Portugal	Ilhéu da Vila	Ilhéu da Vila	confirmed	confirmed
Portugal	Fajã das Almas	Fajã das Almas	confirmed	confirmed
Portugal	Ilhéu das Cabras	Ilhéu das Cabras	confirmed	confirmed
Portugal	Norte do Corvo - Oceânica	Norte do Corvo - Oceânica	confirmed	confirmed
Portugal	Maciço Montanhoso Oriental	Maciço Montanhoso Oriental	confirmed	confirmed
Portugal	Ponta de São Lourenço	Ponta de São Lourenço	confirmed	confirmed
Portugal	Desertas	Desertas	confirmed	confirmed
Portugal	Selvagens - Oceânica	Selvagens - Oceânica	confirmed	confirmed
Portugal	Norte do Corvo e Faial - Oceânica	Norte do Corvo e Faial - Oceânica	confirmed	confirmed
Portugal	Selvagens	Selvagens	confirmed	confirmed
Portugal	Costa do Corvo	Costa do Corvo	confirmed	confirmed
Portugal	Baía do Varadouro	Baía do Varadouro	confirmed	confirmed
Portugal	Ribeirinha	Ribeirinha	confirmed	confirmed
Portugal	Ilhéu de Baixo e Costa Adjacente	Ilhéu de Baixo e Costa Adjacente	confirmed	confirmed
Portugal	Serra Branca	Serra Branca	confirmed	confirmed

Portu-gal	Ponta dos Rosais - Urzelina	Ponta dos Rosais - Urzelina	confirmed	con-firmed
Portu-gal	Ilhéu do Topo e Costa Adjacente	Ilhéu do Topo e Costa Adjacente	confirmed	con-firmed
Portu-gal	Ponta da Malbusca e Ponta do Castelete	Ponta da Malbusca e Ponta do Castelete	confirmed	con-firmed
Portu-gal	Ponta da Ilha e Terra Alta	Ponta da Ilha e Terra Alta	confirmed	con-firmed
Portu-gal	Mistério da Prainha	Mistério da Prainha	confirmed	con-firmed
Portu-gal	Mosteiros – Bretanha	Mosteiros – Bretanha	confirmed	con-firmed
Portu-gal	Faial da Terra e Ponta do Arnel	Faial da Terra e Ponta do Arnel	confirmed	con-firmed
Portu-gal	Lajes do Pico	Lajes do Pico	confirmed	de-liste
Portu-gal	Furnas - Santo António	Furnas - Santo António	confirmed	con-firmed
Portu-gal	Pico - Norte	Pico - Norte	confirmed	con-firmed
Portu-gal	São Jorge - Nordeste	São Jorge - Nordeste	confirmed	con-firmed
Portu-gal	São Miguel - Sul	São Miguel - Sul	confirmed	con-firmed
Portu-gal	Santa Maria	Santa Maria	confirmed	con-firmed
Portu-gal	Porto Santo Oeste	Porto Santo Oeste	confirmed	con-firmed
Spain	Pinares de Pajonales, Ojeda, Inagua, La Data y la Cumbre	Pajonales, Ojeda, Inagua and La Data pine woodlands	confirmed	con-firmed
Spain	Archipiélago Chinijo (Islotes al Norte de Lanzarote)	Lanzarote islets	confirmed	con-firmed
Spain	Llanos de La Corona - La Hondura - Tegala Grande	Plains of La Corona-Las Honduras	confirmed	con-firmed
Spain	Jable de Famara	Famara sandy plain	confirmed	con-firmed
Spain	Vallebrón - Montaña Escanfraga - Llanos de Guisguey - Laderas del Time	Morro Tabaiba-Morro de los Rincones-Vallebrón mountains	confirmed	con-firmed
Spain	Jable de Corralejo	Sandy plain of Corralejo	confirmed	con-firmed

Spain	Macizo de Pozo Negro - Vigán	Pozo Negro mountain-Vigán	confirmed	con-firmed
Spain	Macizo de Tarajalejo	Tarajalejo mountain range	confirmed	con-firmed
Spain	Jable del Istmo de Jandía	Isthmus of Jandía sandy plain	confirmed	con-firmed
Spain	Barranco de Ajuí - Betancuria	Gully of Ajuí-Betancuria	confirmed	con-firmed
Spain	Monteverde de Anaga	San Andrés, Pijaral and Anaga mountains	confirmed	con-firmed
Spain	Reserva de Lajares - Cotillo - Ezquinzo	Lajares sandy plain-Cotillo-Ezquinzo	confirmed	con-firmed
Spain	Costa de Arinaga - Castillo del Romeral	Coast between Arinaga and Castillo del Romeral	confirmed	con-firmed
Spain	Pinar de Tirajana	Tirajana pine woodland	confirmed	con-firmed
Spain	Monteverde de Santa Úrsula y La Victoria	Santa Trsula and La Victoria laurel forest	confirmed	con-firmed
Spain	Pinar de Tamadaba	Tamadaba pine woodland	confirmed	con-firmed
Spain	Acantilados de Santo Domingo y Roque de Garachico	Acantilados de Santo Domingo y Roque de Garachico	confirmed	con-firmed
Spain	Estrecho de la Bocaina	Estrecho de la Bocaina	confirmed	con-firmed
Spain	Montaña El Cardón - Jable de Bigocho	Montaña El Cardón - Jable de Bigocho	confirmed	con-firmed
Spain	Aguas de La Gomera - Teno	Aguas de La Gomera - Teno	confirmed	con-firmed
Spain	Malpaís de Rasca - Montaña de Guaza - Llano de las Mesas	Rasca lava fields-Guaza mountain-Las Mesas plain	confirmed	con-firmed
Spain	Riscos de Hermigua y Agulo	Step rocks of Hermigua and Agulo	confirmed	con-firmed
Spain	Parque Nacional de Garajonay	Garajonay National Park	confirmed	con-firmed
Spain	Costa de Vallehermoso	Vallehermoso coast	confirmed	con-firmed
Spain	Costa meridional de La Gomera	South-west coast of La Gomera	confirmed	con-firmed
Spain	Parque Nacional de La Caldera de Taburiente	La Caldera de Taburiente National Park	confirmed	con-firmed

Spain	Llanos de Nizdafe	Nizdafe plains	confirmed	con-firmed
Spain	Pinar de Tauro	Tauro pine woodland	confirmed	con-firmed
Spain	Los Rodeos - La Esperanza	Los Rodeos-La Esperanza	confirmed	con-firmed
Spain	Ladera de Tigaiga	Tigaiga slope	confirmed	con-firmed
Spain	Monte del Agua, Barranco de los Cochinos y Barranco de Cuevas Ne-gras	Mountain of Agua, gully of Los Cochinos and gully of Cuevas Negras	confirmed	con-firmed
Spain	Acantilado de Los Gigantes	Los Gigantes coastal cliff	confirmed	con-firmed
Spain	Pinar de Vilaflor	Vilaflor pine woodland	confirmed	con-firmed
Spain	Pinar de Arico	Arico pine woodland	confirmed	con-firmed
Spain	Montaña Centinela y Llano de la Esquina	Centinela mountain and La Esquina plain	confirmed	con-firmed
Spain	El Médano	El Médano coast	confirmed	con-firmed
Spain	Costa de Majona	Majona coast	confirmed	con-firmed
Spain	Costa occidental del Hierro	Western coast of El Hierro	confirmed	con-firmed
Spain	Bahía de Naos - Hoya de Tacorón	Naos Bay-Hoya de Tacorón	confirmed	con-firmed
Spain	Llano Grande - Malpaís Grande - Malpaís Chico	Llano Grande - Malpaís Grande - Malpaís Chico	confirmed	con-firmed
Spain	Costa y Aguas de Mogán - La Aldea	Costa y Aguas de Mogán - La Aldea	confirmed	con-firmed
Spain	Haría - Tabayesco	Haría-Tabayesco	confirmed	con-firmed
Spain	El Mojón	El Mojón	confirmed	con-firmed
Spain	Isla de Lobos	Island of Lobos	confirmed	con-firmed
Spain	Barranco de Río Cabras - Reserva de Tesjuate	Río Cabras gully	confirmed	con-firmed
Spain	Playa de Sotavento	Sotavento beach	confirmed	con-firmed

Spain	Barranco de Los Molinos - Llano de La Laguna - Alto de Matías	Los Molinos gully-Plain of La Laguna	confirmed	con-firmed
Spain	El Roque	El Roque coastal cliffs	confirmed	con-firmed
Spain	Roques de Salmor	Salmor rocky islets	confirmed	con-firmed
Spain	Barranco de Tenegüime	Tenegüime gully	confirmed	con-firmed
Spain	Salinas de Janubio	Janubio saltpans	confirmed	con-firmed
Spain	Cuchillete de Buenavista - Barranco de La Torre - Los Alares	Cuchillete de Buenavista-gully of La Torre-Los Alares	confirmed	con-firmed
Spain	Península de Jandía	Peninsula of Jandía	confirmed	con-firmed
Spain	Playa del Castillo - Costa de Esquinzo y Tebeto - Puertito de Los Moli-nos	Coast of Esquinzo-Puertito de Los Molinos	confirmed	con-firmed
Spain	Costa de Corralejo a Tostón	Coast between Corralejo and Tostón	confirmed	con-firmed
Spain	Roques de Anaga	Anaga rocky islets	confirmed	con-firmed
Spain	Roque de la Playa	La Playa islet	confirmed	con-firmed
Spain	Barranco de Tágara	Tágara gully	confirmed	con-firmed
Spain	El Canal y Los Tiles	El Canal y Los Tiles laurel forest	confirmed	con-firmed
Spain	Macizo de Ventejís	Ventejís mountain	confirmed	con-firmed
Spain	Monteverde de Frontera	Frontera laurel forest	confirmed	con-firmed
Spain	La Dehesa	La Dehesa grasslands	confirmed	con-firmed
Spain	Banco de La Concepción	Banco de La Concepción	confirmed	con-firmed
Spain	Riscos de Famara	Famara crag	confirmed	con-firmed
Spain	Llanos de las Maretas - Hoya de la Yegua (El Rubicón)	Plains of Mareta-Hoya de la Yegua	confirmed	con-firmed
Spain	Aguas y acantilados del Norte de La Palma	Aguas y acantilados del Norte de La Palma	confirmed	con-firmed

Spain	Atlantic, Northeast 4 - Marine	Atlantic, Northeast 4 - Marine	confirmed	con- firmed

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June 15th 2024

Solution proposal

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Solution proposal addressing Biodiversity and Conservation Gaps in the Azores and Madeira

Introduction

This proposal outlines solutions to address the identified gaps in biodiversity and conservation in the Azores and Madeira. The solutions focus on enhancing data accessibility, capacity building, realistic planning, and stakeholder engagement. The roadmap is based on the key challenges and priorities identified from the consultation with stakeholders and documents review related to regional ecosystem profiles and conservation efforts.

This document provides a comprehensive solution proposal to address the gaps identified in biodiversity conservation within the Macaronesia region. It includes detailed challenges, proposed solutions, and a clear stakeholder map to illustrate responsibilities. This roadmap aims to guide effective implementation and enhance conservation outcomes.

Key Challenges and Priorities

The Macaronesia region faces several critical challenges in biodiversity conservation. These include habitat destruction, invasive alien species (IAS), climate change impacts, and inadequate data for effective management.

Priorities identified to address these challenges include improving baseline data collection, controlling IAS, mapping ecosystems, implementing species conservation plans, evaluating ecosystem services, and enhancing communication with the public and policymakers.

Specific recommendations have been included as well addressing specific habitats and species.

Control and Eradicate Invasive Alien Species (IAS)

Challenges

Biological invasions are one of the main causes of biodiversity loss in island territories. Isolated ecosystems as oceanic islands have biodiversity that is in fact more sensitive to non-native species (lack of adaptation to predators, low genetic diversity, greater vulnerability to exotic pathogens, etc.). Invasive species outcompete native species for resources, act as predators, introduce diseases, and alter habitat conditions. The impacts are significant on species, habitats, ecosystem services, economic activities, and human health. Climate change exacerbates the issue by creating favorable conditions for invasive terrestrial and marine species to thrive.

The impacts of invasive alien species are the second most serious cause of loss of biodiversity globally, and can be broken down into competition for food and habitats, predation, disease vectors, hybridization and changes in habitat conditions. On ecosystem services they produce interference on Nutrient cycles and pollination, erosion and soil development affect the supply of resources such as wood, to the regulation of the water cycle, and produce interferences on cultural services such as aesthetic and landscape values.

Climate change perturbations can increase the risk of biological invasions, not only with respect to new invasive species but also with changes in the behaviour of exotic species which were not invasive but might start presenting an invasive character. The appearance and expansion of introduced species is also related with the increase of vegetable illnesses, in particular those coming from warmer regions. Pathogens, once introduced to the islands, can spread rapidly through warm areas and, progressively, colonize the midlands.

As an example, cases such as the red weevil (*Rhynchophorus ferrugineus*) or the palm weevil (*Diocalandra frumenti*) can be cited, two species of insects that affect palm groves, one of the most emblematic habitats and of priority interest in the Canary Islands; also the Guatemalan moth (*Tecia solanivora*), a pest of great economic impact for potato cultivation; or the ficus psylla (*Macrohomotoma gladiata*), a pest that affects garden areas in low areas and that progressively appears in mid-level urban gardens.

Solution: Focus on training and support for technicians and policymakers to handle large projects and implement effective biodiversity conservation strategies focusing on non-indigenous species.

Prevention is the most economical, desirable and effective strategy for the management of harmful invaders and should be the priority response to reduce the frequency with which they enter the territory. The early detection and rapid response, based on contingency plans, should be applied if prevention fails. In the case of invasions considered irreversible, the priority should be to mitigate the impacts and expansion of already established exotic species, restoring and protecting priority species and areas. The management of exotic species must be systematically implemented in prevention and addressing all stages of biological invasion: transport, release, establishment and expansion. In any case, it is much cheaper, more effective and efficient to manage the biological invasions in the early stages of the process (the example of the brown algae *Rugulopteryx okamurae* first detected in 2019 and now out of control in the Azores).

Biosecurity frameworks, which are lacking in the whole region (only in few azorean islets without people), should be implemented to contribute to mitigating new invasions. The significant increase in tourism (tourists and boats/cruises) increased the pressure and risks to introduction of new invasive species.

Specific actions:

Targeted Control and Eradication Programs: Implementing targeted and strategic control and eradication programs for high-impact invasive species, focusing on those that pose the greatest threat to native biodiversity. Prioritize conservation actions based on ecosystem service valuations and species/habitats affected. This requires an integrated and multiactorial approach involving a close and continue collaboration between regional governments, research institutions, environmental NGOs, and local communities.

Regulatory Measures to Prevent Introduction and spread: Developing and enforcing strict regulations to prevent the introduction and spread of new invasive species. This includes developing regional biosecurity frameworks, cargo inspections, quarantine measures, and public awareness campaigns. Implement rapid detection and control measures for invasive species. Stakeholders involved are regional governments, national governments, and environmental NGOs. In particular national authorities must also be involved since control at borders of goods and merchandise is of national competence.

Community Engagement in Monitoring: Deploy awareness raising activities and strenghten existing engagement activities to involve citizens and communities in monitoring and reporting invasive species and leveraging citizen science initiatives to enhance early detection and response. This action involves regional governments, local communities, environmental NGOs, private sector and research institutions.

Research and Monitoring Programs: Promoting research, extensive assessments and long-term effective monitoring programs for all islands to understand the impacts of invasive species and develop effective management strategies also in the perspective a new scenarios generated by climate change. Information systems on exotic species are essential to bring together, share, make predictions and make decisions regarding invasion management based on available data on current distribution and invasive potential of the species exotic species and data on the alterations expected by climate change. This involves research institutions, regional governments, and environmental NGOs.

Climate Change Adaptation, Species and Habitats Conservation and Recovery Plans

Challenges

Climate change has been identified as a major threat to the outermost regions' terrestrial and marine ecosystems, species and habitats, existing infrastructure and ongoing economic activities[1]. Climate change impacts, such as increased temperatures, reduced precipitation, and rising sea levels, threaten high-altitude and coastal habitats, leading to habitat loss and species displacement. Specific challenges include rising sea levels, increased frequency and intensity of heatwaves, and reduced rainfall leading to agricultural land loss and higher forest fire incidence.

Climate change perturbations can increase the risk of biological invasions, not only with respect to new invasive species but also with changes in the behaviour of exotic species which were not invasive but might start presenting an invasive character.

Elevated mean sea level will amplify the impact of coastal storms, leading to beach erosion and flooding, which are critical economic risks for the islands. The Canary Islands, for example, have experienced significant global warming, with a notable increase in cooling needs and heatwave frequency, leading to higher risks of coastal flooding, beach erosion, agricultural land loss, important forest fires and more frequent extreme storms events.

Madeira faces frequent severe natural events such as rough seas, heavy rainfall, and strong winds, which are expected to worsen with climate change, increasing the vulnerability of transport infrastructure and ecological imbalances. More

[1] European Commission, 2022

recently, the main island was affected by a severe fire that consumed a considerable part of the vegetation around the main city of Funchal, due to a dry spell and strong winds. Continues the importance of updating the legal coverage to the conservation of threatened species for the Azores and Madeira.

Solutions: Develop effective action plans for climate adaptation and mitigation, promoting the use of natural engineering techniques for sensitive areas

Most stakeholders highlight the need to first better understand the impact of climate change on all the protected habitats and species of Macaronesia, including the impact on invasive species.

Secondly, developing adaptation and mitigation plans and strategies targeting the different habitats and species is of utmost importance.

Specific actions:

Implement Recovery Plans for Endangered Species: Creating and executing recovery plans for endangered and critically endangered species to address climate change impact. This includes habitat restoration and protection, species monitoring, and, where necessary, reintroduction programs. In particular the habitats of the thermophilous forest has been highlighted as priority in Canary Islands. This action requires the involvement of research institutions, regional governments, and environmental NGOs.

Establish Micro-Reserves: Identifying and protecting small, critical habitats that are severely fragmented. These micro-reserves can act as refuges for threatened species and help maintain and enhance biodiversity. Involve local communities in the stewardship of micro-reserves. Local communities, municipalities, environmental NGOs, and regional governments are key stakeholders.

Develop Climate Adaptation and Mitigation Action Plans: Formulating and implementing comprehensive climate adaptation and mitigation actions that address the specific vulnerabilities of each island (and region). This includes updating climate scenarios, identifying high-risk areas, and integrating adaptation measures into regional planning. Research and preventive environmental management actions are needed to mitigate the impacts of climate change on biodiversity. This includes controlling invasive species and improving forest management to reduce fire risks. Stakeholders involved are regional governments, local communities, and environmental NGOs.

Promote Natural Engineering Techniques for sensitive areas: Implementing natural engineering techniques, such as the use of living shorelines and dune restoration, can help protect coastal areas from the impacts of rising sea levels and storm surges. Additionally, promote natural engineering techniques on high slopes and along waterlines to mitigate the effects of flooding and landslides. This action involves regional governments, municipalities, environmental NGOs, and research institutions.

Enhance Public Awareness and Education: Conducting awareness campaigns and educational programs to inform the public about the impacts of climate change and the importance of adaptation measures. This action involves regional governments, educational institutions, and environmental NGOs.

Map Marine Habitats and Management of Marine Protected Areas (MPAs)

Challenges

Marine ecosystems face pressures from overfishing, pollution, and invasive species. In the Canary Islands (NE Atlantic Ocean), a number of KBA sites are identified across the archipelago based on the irreplaceability and vulnerability criteria set by IUCN to safeguard populations of threatened marine species (Riera, 2020). According to this criteria, only nesting beaches and regular feeding grounds of sea turtles (*Caretta caretta* and *Chelonia mydas*) qualify as KBAs. This approach overlooks thus most of the biodiversity hotspots in the Macaronesia that include representative ecosystems of volcanic islands (e.g. marine caves) or habitats with high conservation importance in terms of productivity, regional rarity and diversity (e.g. seagrass meadows and maërl seabeds), as well as presence of locally threatened species.

In Azores, the Blue Azores programme sets as main goal the protection of 30% of the Azores sea, through the revision of the Network of Marine Protected Areas of the Azores, meeting the targets set out in the Kunming-Montreal Global Biodiversity Framework, the European Biodiversity Strategy 2030 and the National Strategy for the Sea 2030. Based on the new legislation, the new network of Marine Protected Areas of Azores will cover almost 300 thousand kilometres and will be the largest in the North Atlantic. In November 2021, the Madeira regional government also increased the marine protected area around the Selvagens Islands twenty-eight times. Its current area now extends almost 2,700 square kilometers. Madeira's Selvagens ('Savage') Islands are home to Europe's and the North Atlantic's largest fully-protected marine reserve. Fully-protected status is rare in marine reserves and means that no extractive activities can take place within its borders. This level of protection and oversight ensure the highest positive impact on habitats, plant and animal life.

Nonetheless, it should be highlighted that the process of MPA identification was made based exclusively on benthonic species, mostly due to lack of information regarding some pelagic species. It migh therefore be biased and not appropriate for the full protection of all species. Gathering and incorporating information about this species into the prioritization or even definition of new MPAs should also be a priority.

Highly or fully protecting 30% of the ocean may meaningfully help restore the ocean's biodiversity (Sala, et al., 2021). According to scientific models, this level of protection may also have a positive impact on fisheries by increasing global fish populations. The lack of implementation of current fisheries regulation is seen as a challenges, particularly in Canary Islands which does not enjoy the same level of protection for marine environment.

Obstacle for marine conservation and restoration actions are due to the difficulty to measure the impact on the species and habitats and the higher costs of implementation. For this reason, policy making finds in some cases more difficult to justify marine conservation initiatives compared with terrestrial ones.

On the other side, marine environment enjoy a higher degree of interest of citizens, due to the importance of certain tourism and sport activities, such as whale watching, scuba diving, surfing, etc. Existing networks and citizens science initatives such as REDPROMAR are successful example, which should tough be widened to all the Macaronesian region.

Solution: Establish and enhance marine protected areas (MPAs), improve monitoring, enforce regulations to protect marine biodiversity and evaluate interconnection in Macaronesia.

Effective conservation requires expanding marine protected areas, improving knowledge on species and habitats and improving regulatory enforcement. Delineation of marine KBAs is emerging as a powerful strategy when large-scale and long-term conservation of marine environments is urgently needed. Identification of a network of marine KBA sites should be regarded as a high priority particulary in Canary Islands.

Specific actions:

Expand and Effectively Manage Marine Protected Areas (MPAs): Increase the size and number of MPAs to ensure a larger portion of marine ecosystems is protected. Implement adaptable and effective management plans that encompass sustainable fishing practices, habitat restoration, recreational activities, and biodiversity monitoring.

Improve Monitoring and Enforcement of Regulations in Marine Areas: Develop and implement robust monitoring systems to ensure compliance with marine protection regulations, in particular with Fisheries. This includes regular patrols, community-based surveillance, and use of technology for real-time monitoring such as satellite tracking and drone surveillance.

For this two actions the involved of the following stakehoders is key regional governments, the private sector - in particular representatives of fisheries, tourism and nautical sports -, Environmental NGOs and Research Institutions. Local communities can also play an important role.

Support Conservation Projects Focused on Key Marine Species and Habitats: Specific fund and support projects aimed at the conservation of endangered marine species and critical habitats. This can include breeding programs, habitat restoration, and community engagement projects. This action requires the involvement of regional governments, environmental NGOs and research institutions

Conduct Marine Habitat Mapping to Identify Critical and Vulnerable Areas: Use advanced mapping techniques such as GIS and remote sensing to create detailed maps of marine habitats. This helps in identifying critical areas that need protection and in monitoring changes over time. In Canary Islands, seagrass beds and meadows have already been identified by the research community as a priority area to be protected. The implementation of this measures require the involvement of the regional and natinoal government, research institutions, environmental NGOs, representatives of the fisheries sector.

Redesign MPAs to Include Ecologically Significant Areas and Ensure Effective: Review and redesign existing MPAs to ensure they include all ecologically significant areas. Increase the information regarding pelagic species. This includes creating buffer zones and corridors to connect isolated MPAs. The implementation of this measures require the involvement of the regional and natinoal government, research institutions and environmental NGOs.

Capacity Building for technicians and policymakers

Challenges

Despite of existing communication and operational channel and established procedures to involve researchers in the definition of policy priorities, important gaps exists which hamper the deployment of more effective and efficient conservation initiatives.

On one side, research activity to support policy making are usually supported to provide knowedge-based response with a short term approach. Secondly, lack of knowledge on the impact and effects of climate change on specific habitats and species does not allow preparing adaptation and mitigation plans for biodiversity.

On the other side, administrative management of regional funds is considered too bureaucratic and the administrative procedures are not aligned with the real time of conservation initatives. This result in a higher work charge for administrative task and a limited time for the implementation of concrete conservation activities. With respect to LIFE funded project, a general lack of practical experience and capacitties in project development and implementation is registered among civil servants and public officers. Also, several stakeholders denounce the need to increase the number of human resources to manage and execute large-scale conservation initiatives.

Solutions: Focus on training and support for technicians and policymakers to handle large projects and implement effective biodiversity strategies.

Specific actions:

Training and Support Programs: Providing comprehensive training and support programs for technicians and policymakers to build their capacity in designing and managing of biodiversity projects and in the management of protected areas. Conduct training sessions for technicians and policymakers on data interpretation and use. Stakeholders involved are research institutions, regional governments, and environmental NGOs.

User-Friendly Data Platforms: Creating user-friendly platforms for accessing and sharing biodiversity data to ensure that data is easily accessible for practical use. This action requires the involvement of research institutions, regional governments, and environmental NGOs.

Collaboration with Experts: Collaborating with national and international experts to provide practical insights and examples of successful biodiversity conservation strategies. This action involves research institutions, regional governments, and environmental NGOs.

Knowledge Exchange: Facilitating knowledge exchange between academia and public institutions to ensure that research findings are translated into practical conservation and management actions. Stakeholders involved are research institutions, regional governments, and environmental NGOs.

Stakeholder and citizens engagement

Challenges

The awareness of society and citizens is particularly important to ensure positive behaviours and societal support for the implementation of measures such as the control of invasive species, which are in some cases domestic animals or breeding animals, such as the case of the cat and of the goat.

On the other hand a more aware population is able to influence policy making towards more sustainable policies and initiatives. Information and environmental awareness campaigns continue to be considered essential as the conservation of species necessarily involves knowledge and understanding by the public about the importance of their natural heritage.

The local population of the islands needs to continue to be involved and made more aware of the problems of nature conservation and biodiversity, and of possible solutions.

Citizens are also important actor for the collection of data on biodviersity threats, for monitoring species and habitats and ensure enforcement of legislation.

Solutions: Improve governance structures at regional and Macaronesian levels, to ensure effective and participatory decision-making. Engage local communities and businesses in conservation efforts through public-private partnerships.

Specific actions:

Improve Governance Structures: Enhancing governance structures to ensure the support of citizens for an effective decision-making and implementation of conservation initiatives. Set up of consultation processes for the definition of conservation and restoration strategies, including biosecurity, monitoring, and other key areas.. Stakeholders involved are regional governments, local authorities, research organization, environmental NGOs and other type of Associations. .

Engage Local Communities and Businesses: Involving local communities and businesses in conservation initiatives through public-private partnerships. This action requires the involvement of regional governments, local communities, and the private sector.

Public Awareness Campaigns: Launching public awareness campaigns to educate the public about the importance of biodiversity and the need for conservation. Stakeholders involved are regional governments, educational institutions, and environmental NGOs.

Community Engagement Programs: Promoting community engagement through citizen science and volunteer programs to involve local residents in conservation efforts. This action requires the involvement of local communities, environmental NGOs, and research institutions.

Educational Materials and Workshops: Developing educational materials and workshops for schools and local organizations to raise awareness about biodiversity conservation. Stakeholders involved are regional governments, educational institutions, and environmental NGOs.

Prevention and mitigation of renewable energy impacts

Challenges

The deployment of renewable energy technologies, such as wind and photovoltaic parks, impacts biodiversity and ecosystem services. Both researchers and practitioners have highlighted the impact of renewable energy technologies on species in particular in Canary Islands where both wind energy and photovoltaic parks have been established occupying a vast amount of land. Scientific-based information on the potential impact of wind turbine collisions on species and habitats is fundamental including research activities and studies on the impact of renewable energy on species, habitats and ecosystem services. Studies should focus on the most diffused renewable energy sources in Macaronesia: photovoltaic/solar, wind and offshore wind energy production.

The size of wind farms requires the use of large areas of land, which can damage native plant species. Likewise, for them to work, high-tension lines are required, and installing them involves felling. Large areas of land required for wind farms can damage native plant species, and high-tension lines disrupt habitats. The effect on birds is undoubtedly the best-known environmental impact of wind energy. The installations hinder the migratory routes of birds, which can also collide with their blades. The same goes for other animals such as bats and insects. The propellers modify the air pressure and cause them to collide, so studying the area is vital when starting these mills.

In the case of offshore wind energy, it is not possible to speak of zero impact either. May increase mortality of seabirds and the noise of machinery affects marine fauna, according to some studies. Offshore wind energy affects marine fauna due to noise pollution. The Canary Islands have designated areas for offshore wind energy, which necessitates careful impact assessment to mitigate biodiversity loss. Madeira has also a defined area that might be used for this purpose on the north shores of Madeira and Porto Santo Islands according to the Maritime Spatial Planning Situation Plan. Careful evaluation and mitigation of impacts on biodiversity are fundamental. Otherwise, renewable energies may lead to losses that further diminish the capacity for resilience to climate change and even to carbon neutrality, resulting in the loss of important carbon sequestration systems.

Solutions: assessing, planning and monitoring energy projects to minimize impacts on species and habitats

Specific actions:

Environmental Risk Screening and EIA: Integrating environmental risk screening and environmental impact assessment (EIA) into the permitting process for renewable energy projects. This ensures that biodiversity impacts are thoroughly evaluated and mitigated. Stakeholders involved are regional governments, environmental NGOs, and research institutions.

Spatial Planning for Renewable Energy: Developing spatial plans that account for biodiversity, ensuring renewable energy projects are sited in areas with minimal impact on ecosystems. This action requires the involvement of regional governments, environmental NGOs, and research institutions.

Biodiversity-Aligned Strategies in Projects: Encouraging renewable energy developers to adopt strategies that align with biodiversity conservation goals. This includes habitat restoration, wildlife corridors, and adaptive management practices. Stakeholders involved are private sector companies, environmental NGOs, and regional governments.

Improving Data Quality and Accessibility: Enhancing the quality and accessibility of data on biodiversity and its interaction with renewable energy projects. This supports informed decision-making and public transparency. This action involves research institutions, regional governments, and environmental NGOs.

Tourism Management to prevent and reduce impact

Challenges

The sharp increase in tourist visitation of the Azores Archipelago from 2015 onwards raises concerns about the impacts of recreational tourism on native habitats and species. Also Madeira continues to increase the number of tourists (and stakeholders mentioned some change from tourist that looked for nature tourism (trails, nature lover) to a more landscape and experiences tourism (sunset parties at Pico do Areeiro protected Area).

Increasing tourism increased pressure in some areas and habitats and create conditions to increase introduction and spread of marine and terrestrial invasive species. The recent increase in recreational tourist activities in native habitats of the Azores (SREA 2018) raises concerns about the use of trails being a threat to the already imperilled native forest biodiversity. Hiking trails in particular have been found to be promoting the spread of invasive plants (Barros and Pickering 2014), which may cause adverse cascading effects on species and habitats.

Also increased sources of pollution to marine and land ecosystems (water treatment systems with no capacity) and urban development of coastal areas (with more pressure) decreases the chances to restore native coastal areas. Increasing tourism in the Azores didn´t seem to increased impact on cetaceans and local companies work with authorities and scientific community to gather data (Monicet).

Involving relevant stakeholders, and fostering a culture of sustainable tourism, it is possible to mitigate the impact of tourism on the Macaronesian biodiversity. This approach ensures that tourism can coexist with the conservation of native species and habitats, promoting both economic development and environmental sustainability.

Solutions: Implementing a comprehensive strategy to monitor, prevent and mitigate tourism impacts on species and habitats with the involvement of all relevant stakeholders.

Specific actions:

Establish and Enforce Visitor Quotas in Sensitive Areas: Implement visitor quotas in ecologically sensitive areas to limit the number of tourists and reduce the impact on fragile ecosystems. This includes setting daily or seasonal limits and requiring permits for access. This action requires the involvement of regional governments, environmental NGOs, and private sector.

Develop and Promote Sustainable Tourism Practices: Promote sustainable tourism practices that minimize environmental impacts. This includes encouraging eco-friendly activities and accommodations, reducing waste, and promoting the use of environmentally friendly transportation. This action requires the involvement of regional governments, environmental NGOs, and private sector.

Implement Comprehensive Monitoring Systems: Establish monitoring systems to track the impact of tourism on biodiversity. This includes regular assessments of trails, habitats, and species populations, as well as monitoring pollution levels in marine and terrestrial environments. Stakeholders Involved are research institutions, regional governments and environmental NGOs.

Enhance Trail Management and Restoration Programs: Improve the management of hiking trails to prevent the spread of invasive species. This includes regular maintenance, restoration of damaged areas, and the installation of educational signage to inform hikers about the importance of staying on designated paths. This action requires the involvement of regional governments, environmental NGOs, and private sector.

Upgrade Water Treatment and Waste Management Systems: Invest in upgrading water treatment and waste management systems to handle increased tourist activity. This includes expanding capacity and improving technology to prevent pollution of marine and terrestrial ecosystems. Stakeholders Involved will be regional governments, local authorities, municipalites and the private Sector.

Promote Community-Based Tourism Initiatives: Encourage community-based tourism initiatives that involve local communities in tourism planning and management. This helps ensure that tourism benefits local communities while minimizing environmental impact. This action requires the involvement of regional governments, environmental NGOs, and private sector.

Conduct Public Awareness Campaigns: Implementation of public awareness campaigns to educate tourists about the importance of protecting biodiversity and promoting responsible behavior. This includes information on the impacts of tourism and ways to minimize them. This action requires the involvement of regional governments, environmental NGOs, and private sector.

Protection of specific endangdered habitats and species

Challenges

In Macaronesia, most protected species have this status as a result of the implementation at national level of European Habitats and Birds Directives. However, these Directives do not cover many threatened and endemic species which indeed have restricted distributions. A certain degree of non concordance between IUCN and Canary Islands regional list of protected species has been reported.

Since most funds for conservation activities are from European direct funding programme such as LIFE, those species which are not included in the IUCN Red List are not eligible or enjoy a lower funding rate. Updating legal protections and creating recovery plans for threatened and endemic species not covered by existing directives, is essential.

Similarly, conservation and restoration activities are needed for specific habitats which are not a priority under IUCN lists, as it is case for thermophilous forests and seagrass beds in Canary Islands. Despite of the implementation and projects such as the Juniperus Tenerife LIFE project, the forest is currently critically endangedered according to the results of the monitoring actions carried out by researchers of University of La Laguna.

Solutions: protection schemes for most vulnerable habitats

Specific actions:

Revise periodically existing lists of priority species: researchers suggest to revise criteria of the IUCN red lists and to update on a more continuos basis the regions lists of priority species. Research organization, environmental NGOS, regional and national authorities and IUCN should cooperation for the implementation of thise action.

Specific conservation actions for the thermopilous forest in Canary Islands: plan and implement dedicated conservation and restoration actions to recover the Thermopilous. This action require the involvement of the regional and local authorities, environmental NGOs, researchers and primary sector representatives.

Definition of seagrass meadows in Canary Islands as protected areas or KBAs: identification of priority seagrass meadows in Gran Canaria and establishment of a protected or priority regime. This action requires the involvement of regional and national authorities and research organization.

Stakeholder Map

Several groups of stakeholders must be involved for the implementation of the solutions proposed. The role of public authorities is key for most of the solutions proposed since they hold the competences for the legislation but also for the execution of conservation and restoration activities as well as for the management of protected areas.

Research organization and environmental organizations are also needed for most of the solutions as knowledge provider and knowledge facilitator.

The private sector role has become increasingly important as demand of biodiversity protection, as it is the case for instance of tourism and nautical sport businesses. The primary sector is also important for certain habitats and for the fight against invasive alien species.

Last but not least, citizens are a key group both as producer of knowledge and monitoring actor, in several citizen science initiatives, and as influencer towards the policy makers.

Stakeholder	Responsibility
Regional Governments	Policy-making, implementation of conservation projects, management of protected areas, funding
National Governments	Funding, support, legislative framework for conservation activities
Non-Governmental Organizations (NGOs)	Engage in conservation efforts, awareness campaigns, provide expertise

Universities and Research Institutions	Conduct research, provide scientific data, support policy development
Local Communities	Participate in conservation activities, awareness programs, benefit from ecosystem services
Private Sector	Engage in sustainable practices, support conservation through corporate social responsibility initiatives

Conclusions

The proposed solutions aim to address the most important gaps in biodiversity conservation and ecological restoration in Macaronesia. Almost all the solutions focus on the production of new knowledge or the increase of the existing one adopting a long-term persepctive – addressing for instance the impact of climate change - and taking more into account the endemicity of the Macaronesian archipielagos.

The revision of current protected species/habitats lists or KBAs is considered crucial to be more respondent to the current biodiversity status of Macaronesia.

Also actions require funding mechanisms to be more agile and consistent with the characteristics of the conservation and restoration actions in terms of timeframe, impact of the activities, etc.

Last but not least, knwoledge dissemination and awareness raising activities are deemed fundamental to improve both the formulation and implementation of conservation plan and initiatives.

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