



Natura 2000 in the Macaronesian region



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Photo © Carlos Ibero

The Macaronesian region – volcanic islands far out to sea

Within the EU, the Macaronesian region consists of three archipelagos: the Azores, Madeira (both Portugal) and the Canaries (Spain). All are of volcanic origin. This is reflected everywhere in the landscape. Large calderas, jagged mountains and vertiginous cliffs contrast sharply with the wide valleys and sheltered bays.

These contrasting landscapes, and the gentle climate, have created an ideal environment for a particularly rich array of species and habitats, many of which are endemic. Despite representing only 0.3% of the EU territory, the Macaronesian region hosts no less than 19% of the habitat types in Annex I of the Habitats Directive and 28% of the plants Annex II.

The surrounding seas are also abundant in wildlife. Many marine animals, from whales to seabirds, seek shelter and food in the deep inshore waters and nutrient rich upwellings from the sea floor.

Looking at each of the island groupings in turn, a number of distinguishing features stand out. The nine islands that make up **the Azores**, are, for instance, located far out to sea, a third of the way between the Iberian peninsula and Newfoundland in Canada. They have a relatively wet climate and a different species composition than the other archipelagos, being more heavily influenced by Northern European, rather than Mediterranean, species. The islands also have a relatively gentle topography with undulating hills and peaks rather than abrupt precipices.

This makes them ideal for dairy farming. In fact, the Azores produce 30% of Portugal's dairy products, which in turn provides employment for over a fifth of the islands' 237,000 inhabitants.

The archipelago of **Madeira** is situated 750 km further south and is much closer to the Portuguese mainland. It is made up of two main islands and a series of smaller uninhabited ones. Unlike the Azores, the topography of Madeira is precipitous and jagged. The highest peak rises quickly to 1,861 m. As a result, half the slopes have a gradient of 25% or more. This abrupt landscape has a strong influence on the local climate making it much wetter on the north facing slopes than on the southern ones. The tops of the mountains are also regularly shrouded in clouds. The smaller islands, by contrast, manage to escape these influences as they lie below the cloud belt.

Agriculture is the mainstay of Madeira's economy, although its rugged landscape means that this is mainly small-scale subsistence production. Tourism is also becoming increasingly important, generating 10% of the island's GDP and employing a significant proportion of the quarter of a million islanders.

	Azores	Canaries	Madeira
N° of habitat types**	26	23	11
N° of animals**	2	6	18
N° of plants**	26	66	46
N° SPAs*	15	27	4
N° SCIs	23	173	11
Total Area (ha)	33,965	419,291	42,517
Land area	25,051	280,469	21,916
% of land	10.7	37.6	27.5

* Considerable overlap between the SCIs and SPAs as they will have been designated under both Directives for different species and habitat interests.

** Listed in the Habitats Directive

The third group, **the Canaries**, is by far the largest, covering a total surface area of around 7,000 km² and supporting over one and a half million inhabitants. These islands are also the most easterly, situated just 115 km away from the African continent. As a result, the weather is generally much warmer and drier, creating arid, almost desert-like, conditions on the low lying islands like Lanzarote or Fuerteventura. The more westerly islands by contrast have a more dramatic topography, with high mountain peaks reaching up to 3,718 m. El Teide, on Tenerife, is in fact the highest mountain in Spain.

Tourism is the most important economic activity for the Canaries. With over 11 million tourists, this sector continues to expand, mainly along the coast. Mixed and terraced farming is still practiced inland but it is rapidly disappearing as more and more people abandon their land in search of better income elsewhere. In its place come the tropical and forced crops destined for the export market. This accounts for 75% of today's agricultural end production.

Macaronesian region:	Area (km ²)	Inhabitants	N° islands
Azores	2,333	237,580	9
Madeira	797	257,670	4
Canaries	7,242	1,606,549	7

Region	Countries involved	% of EU 25 territory
Atlantic	Ireland, United Kingdom, France, Belgium, Germany, Netherlands, Denmark, Spain, Portugal	20.0
Boreal	Sweden, Finland, Estonia, Latvia, Lithuania	20.4
Continental	Denmark, Sweden, Germany, Poland, Belgium, Luxemburg, France, Italy, Czech Republic, Slovenia, Austria	26.3
Alpine	Spain, France, Italy, Germany, Austria, Slovenia, Sweden, Finland, Poland, Slovakia	7.6
Pannonian	Hungary, Slovakia, Czech Republic	2.9
Mediterranean	Greece, Cyprus, Malta, Italy, Spain, Portugal, France	22.5
Macaronesian	Spain, Portugal	0.3

Source:
ETC Biological Diversity (European Environment Agency)
<http://biodiversity.eionet.eu.int/>

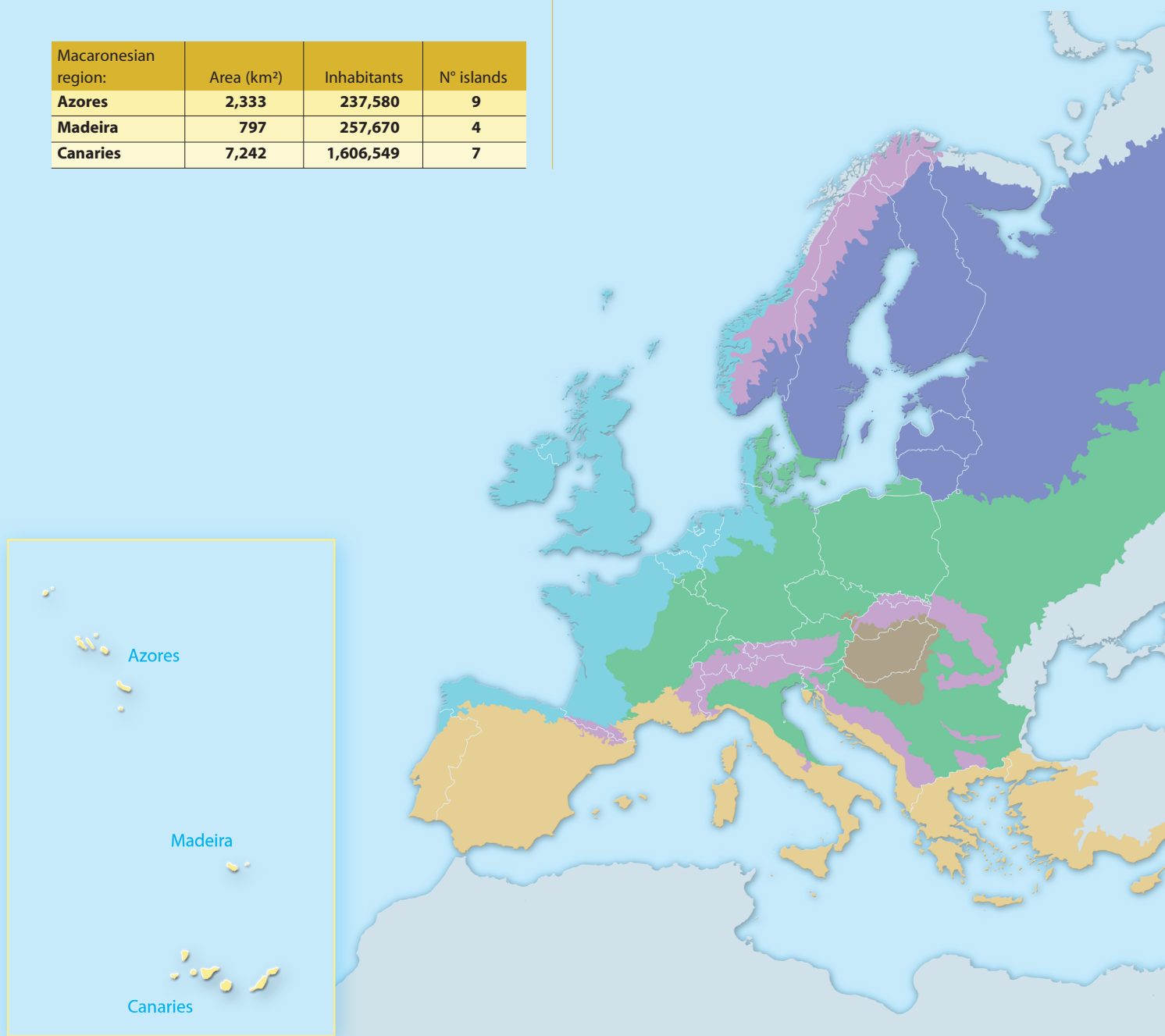




Photo: MAIN © S Vizinho, /magDop, INSET © Helder Fraga

Natura 2000 in the Azores

The Azores are spread out over a distance of 600 km in the middle of the Atlantic Ocean. Their climate is mainly oceanic with mild temperatures all year round and a high average rainfall. Being the wettest of the Macaronesian islands, they have an unusually high number of lakes, pools, temporary ponds and alpine rivers. This abundance of water has also allowed the formation of active raised bogs, blanket bogs and wet woods which do not exist on any of the other islands in the region.

The indented coastlines support a range of coastal habitats including rocky shores, saltmarshes, inlets, lagoons and vegetated sea cliffs. This latter is where many endemic species, such as the priority *Azorina vidalii*, a type of bellflower (Campanulaceae), are found. Other terrestrial habitats include ericaceous heaths, dry scrub, lava fields, rocky slopes and areas of lauriphyllous and juniper forest. Altogether there are 26 habitat types of the Habitats Directive in the Azores.

Because of their relatively gentle relief and rich soils, many of the islands have been used extensively for agriculture and are now heavily deforested. As a

consequence, only 2% of the original laurel forests remain. The endemic Azores bullfinch (*Pyrrhula murina*) is also highly endangered as a result. Once a common sight, its population is now reduced to 120 pairs within the few remaining patches of native forests on São Miguel.

Generally speaking, the Azores are not as rich in species as either Madeira or the Canaries because of their distance from the mainland, their predominantly northern European influences and heavy land-use (half the vascular plants are introduced species). The marine life around the Azores is, by contrast, one of the most plentiful in the Atlantic, thanks to the nutrient rich upwellings from the seabed. Some 24 marine mammals, including bottlenose dolphins, sperm whales and pilot whales frequent its waters.

The archipelago is also especially important for breeding seabirds as it represents a transition between the tropics and the temperate zones. The twilight air is often filled with the almost deafening sound of thousands of Cory's shearwaters returning to their nesting burrows from their daily fishing expeditions. During the breeding season, half the world's population can be found here. Other rare seabirds listed in Annex I of the Birds Directive also breed in the Azores in internationally significant numbers. These include the little shearwater (*Puffinus assimilis baroli*), Madeiran storm-petrel (*Oceanodroma castro*) and the roseate tern (*Sterna dougallii*).



Photo © Paulo Magalhães, /magDOP

The roseate tern *Sterna dougallii*

The roseate tern spends most of its life in Africa and at sea before coming onshore to breed in the summer. In Europe, three quarters of the breeding population are found on three islands in the Azores. The species rarely nests in isolation, preferring to seek the company of other tern colonies which are more aggressive and better able to defend their nests against predators. Its main threats come from human disturbance, predation and the deterioration of their cliff top breeding sites, for instance through overgrazing by rabbits. All EU breeding sites are now protected under Natura 2000 and populations are slowly recovering thanks to an international recovery programme launched 10 years ago.

The Macaronesian list of Natura 2000 sites

The list of Natura 2000 sites for the Macaronesian region was the first to be adopted in December 2001. It is made up of 208 Sites of Community Importance, covering over 5,000 km² of land and sea. In percentage terms, the terrestrial SCIs cover more than a third of the total landmass of these islands.

Not included in the figures below are the SPAs for these three archipelagos. These are however also extensive and, where they do not already overlap with the SCIs designated under the Habitats Directive add considerably to the Natura 2000 network.

Region	Habitat types	Animals	Plants
Atlantic	117	81	52
Boreal	87	68	58
Continental	144	149	83
Alpine	105	134	97
Pannonian	54	109	38
Mediterranean	146	160	270
Macaronesian	38	22	129

Source: ETC Biological Diversity (European Environment Agency) <http://biodiversity.eionet.eu.int/> December 2004

- the number of habitats and species per biogeographical region is not definite since the reference lists for the 10 new Member States have still to be finalised, the exception being the Macaronesian region
- the figures are not cumulative since many habitats and species occur in two or more biogeographical regions

Region	Natura 2000 sites	Total area covered	Terrestrial area covered	Marine area covered	% of terrestrial area of region
Atlantic	2,419	93,811 km ²	64,954 km ²	28,858 km ²	8
Boreal	5,026	82,377 km ²	73,003 km ²	9,375 km ²	12
Continental	4,958	49,194 km ²	40,838 km ²	8,356 km ²	6
Alpine	956	96,751 km ²	96,751 km ²	-	37
Mediterranean	2,783	180,609 km ²	167,898 km ²	12,712 km ²	19
Macaronesian	208	5,310 km²	3,516 km²	1,794 km²	34
Total EU 15	16,193	458,615 km²	397,488 km²	61,127 km²	12

Source: ETC Biological Diversity (European Environment Agency) <http://biodiversity.eionet.eu.int/> December 2004

- SPAs not included in the above table as they are not selected according to biogeographical region
- Figures for 10 new Member States are not included as the process of selection is still underway
- Figures for Mediterranean region are provisional since the list was not yet officially adopted at the time of publication of this brochure
- Some sites are on a border between two regions, the database does not allow for the possibility to split sites between regions, therefore some sites may be counted twice
- Percentage of marine areas not available

10 Lanzarote

11 Fuerteventura

12 Gran Canaria

13 Tenerife

14 La Gomera

15 El Hierro

14 Canaries Marine park, Teno Rascal

Photos © Consejería de Medio Ambiente del Gobierno de Canarias

13 Canaries El Teide

Photos © Consejería de Medio Ambiente del Gobierno de Canarias

15 Canaries El Hierro island

Photos © Consejería de Medio Ambiente del Gobierno de Canarias

12 Canaries Tamadaba

Photos © Consejería de Medio Ambiente del Gobierno de Canarias

11 Canaries Jandia



2
Azores
São Jorge



Photo © S Vizinho, ImagDOP



3
Azores
Bogs and caldera

Photo © S Vizinho, ImagDOP

1

Azores
Costa Nordeste



Photo © V Guerreiro, ImagDOP

Photo © M. Bolton, ImagDOP



4

Azores
Azores Bullfinch

Photos © Projecto LIFE Priolo Sociedade portuguesa da Aves



Photo © Peter Wirtz, ImagDOP

5

Azores
Marine park



Photo © Robert Hofrichter, ImagDOP



5

Santa Maria

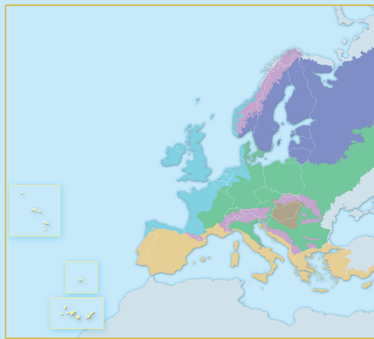
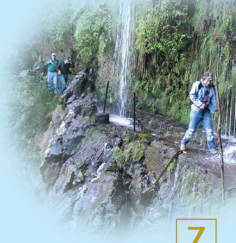


Photo © M.Freitas



7

Madeira
Laurel Forests

Photo © Parque Natural da Madeira



6

Madeira
Porto Santo

Photo © Parque Natural da Madeira



Photo © Cristina Abreu

6

Porto Santo



Madeira

8

Desertas



8

Madeira
Desertas

Photos © Parque Natural da Madeira



Photos © Carlos Ibero

10

Canaries
Lanzarote



Photos © Consejería de Medio Ambiente del Gobierno de Canarias

- SACs
- SPAs
- SPA and SAC

Map derived from site coordinates supplied by University of Leuven, Division SADL, December 2004



9

Madeira
Selvagens



Selvagens

9



Photos © Isabel Fagundes



Photo: MAIN © Kerstin Sundseth, INSET © Parque Natural da Madeira

Natura 2000 in Madeira

The Madeiran archipelago is the smallest of the three island groupings covering just 810 km². It is made up of two main islands, Madeira and Porto Santo, and a series of smaller uninhabited islands, Ilhas Desertas and De Selvagens.

With its vertiginous topography and high mountain peaks, the main island has a sub-tropical climate which is very heavily influenced by altitude. The northern slopes are consistently wetter than the south and the uplands beyond the tree line are often exposed to blistering winds, driving rain and even snow in winter. The other islands, by contrast, lie below the rain belt and are semi arid as a result.

Madeira was once completely forested (hence the name Madeira = wood). Although now reduced to 20% of the land surface, the island still hosts the largest expanse of laurel forest in the world. Where the forest has been cleared, but not further developed, a Macaronesian heath landscape has developed, which is also of considerable ecological value.

One of key features of Madeira is that it is exceptionally rich in endemic species. Over 120 endemic plants have been identified so far. Forty-six are listed on the Habitats Directive such as the rare geranium, *Geranium maderense* and scilla, *Scilla maderensis*. The world's rarest seabird, the Zino's petrel (*Pterodroma madeira*) also nests here. The total world population (40 pairs) is confined to a series of inaccessible ledges 1,600 m above sea level. Despite best efforts it remains under threat from overgrazing and predation from rats and cats.

The smaller island of Porto Santo is not as rich or diverse as its neighbour, largely due to its drier climate. Nevertheless, it hosts no less than 36 endemic land snails of which 13 are listed on the Habitats Directive. Its waters are also important for marine species such as the bottlenose dolphin and sea turtles.

The remaining two island groups are further offshore and considerably smaller. The Ilhas Desertas harbour one of the last populations of the Mediterranean monk seal (*Monachus monachus*) in this part of Europe and the only EU breeding colony of the globally threatened Fea's petrel (*Pterodroma feae*), whereas the tiny De Selvagens (245 ha) are home to other large seabird colonies and many rare endemic plants. Both these island groups are included in their entirety in Natura 2000 and are strictly protected.



Photo © *Columba trocaz*: Carlos Cabral

Laurel forests – emblems of the Macaronesian region

Of all the habitats found in the Macaronesian region none are more representative than the laurel forests. These ancient habitats were once widespread and, in the Tertiary era, covered large tracts of mainland Europe. Now they only exist in patches on some islands in the Atlantic. Because of their long evolution, they host a particularly rich array of species, many of which have become entirely dependent on the forests for their survival. This includes numerous endemic plants (of which 32 are listed in the Habitats Directive) as well as four species of laurel pigeon. The latter plays an important role in habitat regeneration, dispersing seed from the fruits of the laurel trees. Like the forest though, the laurel pigeons are now also highly endangered.

There are only 30,000 ha of original laurel forests left in the Macaronesian region, the majority is found on the island of Madeira. Most is now protected through Natura 2000 and efforts are underway across all three island groups to encourage its regeneration and expansion.



Photo © Carlos Ibero

Natura 2000 in the Canaries

The Canaries form the largest of the archipelagos, covering a total surface area of 7,242 km². They are also, biologically speaking, the richest and most diverse in the Macaronesian region. The fresh moist trade winds from the west and the hot dry winds from the Sahara region create many climatic contrasts which are reflected in the wide range of habitats present.

The western islands with their precipitous mountains and deep gorges regularly experience temperature inversions, which leads to the formation of a band of cloud around the mountains at 900–1,500 m. As a result, one can walk, in just a few kilometres, from a desert-like landscape along the shore to a moist cloud forest in the mountains.

Typical habitats on the western islands include the laurel forests. Around 18,000 ha are left in the Canaries but most is highly fragmented and only 6,000 ha correspond to mature forest. The best example is found on La Gomera (3,000 ha). Two other forest habitats are unique to the Canaries: the palm groves of *Phoenix* and the Canarian pine forests. The latter is usually located on dry montane slopes around 800–2,000 m and provides a last

refuge for the globally threatened endemic blue chaffinch (*Fringilla teydea*).

Other characteristic habitats include Macaronesian heaths, Canarian cushion heaths dominated by broom-like plants (above 1,900 m) and the unique lava fields that surround the El Teide volcano on Tenerife. On the lower slopes, another type of vegetation, known as the 'cardonales', grows well on lava. This is recognised by its cactus-like plants, which are in fact part the *Euphorbia* family. Other more typical Mediterranean habitats are also present including the Mediterranean scrub formations, olive woodlands and ancient juniper forests.

The flat eastern islands of Lanzarote and Fuerteventura are, by contrast, extremely arid. The landscape is dominated by immense coastal dunes and wetlands, and further inland extensive areas of pre-desert scrub and heath. The vegetation is, as a result quite different: vast grey dunes, embryonic dunes, coastal wetlands as well as pre-desert scrub and heath communities are more typical sights here.

In terms of species diversity, the Canaries are without a doubt one of top biodiversity hotspots of the world. Over 14,000 species have been identified so far and new discoveries are still being made. Around 45% of the fauna and 25% of the flora species are endemic. Altogether, there are 670 endemic plants in the Canaries of which 66 are listed in the Habitats Directive.



Photo © Consejería de Medio Ambiente del Gobierno de Canarias

The Hierro giant lizard *Gallotia simonyi*

The Canaries host some of the largest and most unusual lizards in the world. The rare Hierro giant lizard is a prime example. Measuring 70 cm in length, this gentle giant was discovered, as recently as 1999, high up on an inaccessible cliff on the island of Hierro. Its normal habitat is the juniper forest. However, the combined effects of habitat destruction and predation forced the species into less suitable areas and pushed it literally to the edge of extinction. Five years on, the situation is looking much better thanks to the success of a concerted re-introduction campaign which put captive bred specimens back into the newly protected juniper forests. The island, too, has benefited from the influx of tourists drawn to this elusive reptile. Little wonder that the Hierro giant lizard is now the island's mascot.



Photo © Kerstin Sundseth

Managing sites in the Macaronesian region

The insularity of the Macaronesian islands causes them to be highly fragile. Human activities have already destroyed and significantly transformed large areas. It is estimated that up to 20 million people visit the islands every year. As a result, massive tourism developments have sprung up almost everywhere around the coast. This in turn brings other problems from water shortages and pollution to forest fires and damaging recreational pursuits.

Further inland, the tourism pressure is significantly less but large-scale deforestation, especially of laurel forests, has brought its own set of problems. Because these belts of evergreen forest are almost permanently shrouded in



Photo © Kerstin Sundseth



Photo © Parque Natural da Madeira

Eradicating alien species

'Garden escapes', such as ginger lily (*Hedychium gardenerianum*), are a major threat to indigenous habitats and species. First introduced in 1934, this Himalayan species has undergone a phase of rapid colonisation, and is now widespread. On the island of Madeira, it has begun to invade the laurel forests, where it not only smothers other native plants but also prevents the forest from regenerating naturally. Eradication is a very labour intensive and back-breaking job. *Hedychium* spreads like a thick blanket along the forest floor and a new plant will begin to grow within months. There was no choice therefore but to do this work by hand, a task made no easier by the fact that the terrain is very difficult to access. So far the Madeira National Park has cleared a sufficient area to act as a 'cordon sanitaire' preventing further invasion into the forests. This, however will need to be kept in check. To help in the process, farmers have been asked to cultivate their plots immediately adjacent to the cordon sanitaire to prevent the *Hedychium* species from re-establishing itself.

mist, they act like sponges soaking up the rain and moisture from the clouds and filling the islands' aquifers, rivers and streams. They also prevent erosion on the steep mountain slopes. This dual function is particularly noticeable on those islands that have lost their forests. Rainfall is significantly lower than usual, leading to water shortages. When the rain does come, it sweeps down the mountainside gouging out huge scars and washing away much of the surface soil.

Agricultural practices are also changing rapidly across the region. Mixed subsistence farming in the form of terraces was once common place but is now being abandoned and replaced by more lucrative, intensive and industrial style exotic fruit production.

The islands in the Azores also suffer from heavy pollution and eutrophication due to the large numbers of cattle used for dairy production. Livestock grazing in general is a problem for the islands vegetation as indigenous plants have not had time to evolve appropriate defence mechanisms against such pressures. As a result, even 'normal' levels of grazing can have a very negative impact on the survival rates of many endemic plants and animals.

The high number of exotic species is another major concern. Introduced rats and cats predate on ground nesting birds, causing their populations to fall rapidly. Rabbits and goats prevent the natural regeneration of the native vegetation. Exotic plants out compete and eventually dominate endemic species.

In spite of these threats, all three autonomous governments have demonstrated a strong political commitment to biodiversity conservation by including a large proportion of their territories within the Natura 2000 Network (in some cases over a third of the island is included.) Not only does this provide the necessary impetus to address the above threats, but it also opens up a whole range of new opportunities for the islands, for instance through eco-tourism. This sector of the industry is growing at three times the rate of the classic mass tourism market.

All three island groups are ideally placed to capitalise on this growing eco-tourism market. They benefit from a warm climate all the year round, flights are generally cheap and they are able to offer a whole range of different activities to suit every taste – from hiking through mountains of the Canaries, whale watching in the Azores or walking the levadas of Madeira (ancient watercourses that carry rainfall from the mountains to irrigate the cultivated terraces). Most of the islands have already begun to see the benefits of these alternative forms of tourism. Unlike with mass tourism, the revenue from nature tourism stays on the islands and in the hands of the small tourism enterprises.



Photo © R Prieto, ImagDOP

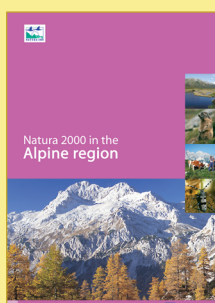


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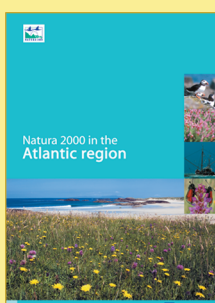
Whale watching codes of conduct

Situated almost in the middle of the Atlantic, the deep waters of the Azores are well known for their abundance of whales and dolphins. In recent years, several whale-watching operations have sprung up, encouraged by the general growth in tourism to the islands. In order to ensure that their activities are compatible with the marine mammals and the provisions of Natura 2000, the Azores government developed a mandatory code of conduct for whale watching in close cooperation with the operators. In exchange for respecting the regulations, local businesses are given valuable training in business management and marine conservation. Today, the Azores are rapidly gaining an international reputation for sustainable whale watching and local businesses are booming as a result.

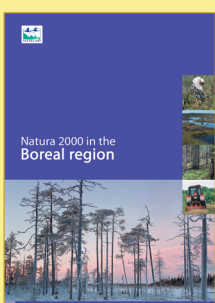
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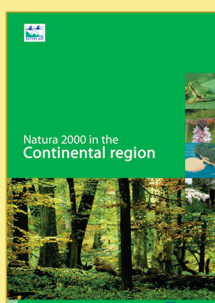
Natura 2000 in the Alpine region



Natura 2000 in the Atlantic region



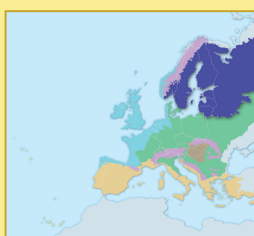
Natura 2000 in the Boreal region



Natura 2000 in the Continental region



Natura 2000 in the Macaronesian region



The European Union has seven biogeographical regions, each with its own characteristic blend of vegetation, climate and geology. Natura 2000 sites are selected according to each region on the basis of national lists submitted by each Member State within that region. Working at this level makes it easier to conserve species and habitat types under similar natural conditions across a suite of countries, irrespective of political and administrative boundaries. Together with the Special Protection Areas designated under the Birds Directive, the Natura 2000 sites selected for each biogeographical region make up the ecological Natura 2000 network which spans all 25 countries of the EU.



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