

Natura 2000 in the **Mediterranean Region**









European Commission Environment Directorate General

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Contents

The Mediterranean Region – the cradle of Europe p. 3
Natura 2000 species in the Mediterranean Region p. 5
Map of Natura 2000 sites in the Mediterranean Region
Natura 2000 habitat types in the Mediterranean Region p. 8
Management issues in the Mediterranean Region p. 10

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The Mediterranean Region – the cradle of Europe

The Mediterranean basin stretches c.3,800 km east to west from the tip of Portugal to the shores of Lebanon and c.1,000 km north to south from Italy to Morocco and Libya. Within the European Union, the Mediterranean Region encompasses seven Member States either partially (France, Portugal, Italy, Spain) or completely (Greece, Malta, Cyprus).

The climate is characterised by hot dry summers and humid, cool winters but it can also be notoriously capricious with sudden torrential downpours or bouts of high winds (eg the Sirocco, the Mistral) occurring at various times of the year. These climatic conditions have a profound influence on the vegetation and wildlife of the region.

So does its varied and contrasting topography – the Mediterranean Region offers an ever changing landscape of high mountains, rocky shores, impenetrable scrub, semi-arid steppes, coastal wetlands, sandy beaches and a myriad islands of various shapes and sizes dotted amidst the clear blue sea.

Contrary to the classic 'sun, sea and sand' images portrayed in most tourist brochures, the Mediterranean is surprisingly hilly. One is almost never out of sight of the mountains, even on the islands.

Having escaped the last Ice Age, all these areas harbour their own special kind of wildlife and habitats. As a result, the Mediterranean has not only a very rich biodiversity but also a large number of species that exist here and nowhere else in the world. The rate of endemism is exceptionally high both on land and in the sea. Of the 25,000 flowering plants identified so far–representing around 10% of all known plants on earth – more than half are endemic to the region. Not surprisingly, the Mediterranean is considered one of the top biodiversity hotspots in the world.

Another distinguishing feature of the region is its very long association with man which has left its mark across much of the landscape. The ubiquitous Mediterranean scrub, with its profusion of flowers and aromatic plants, for instance, is a direct result of centuries of human-induced activities such as forest fires, clearances, livestock grazing and cultivation.

Because human intervention tends to be very localised, Mediterranean scrub has evolved into a complex and intricate mobile patchwork of habitats that goes through an regular cycle of degeneration and regeneration. The complexity of the vegetation structure also explains why these areas are so exceptionally rich in wildlife, especially plants and insects.

Whilst the Mediterranean scrub is synonymous with the region, it is by no means the only species-rich habitat here. Many areas are still dominated by large tracts of natural, virtually pristine, forests that remain relatively untouched by man. In contrast to most central and northern European forests that are dominated by only a dozen or so tree species, the Mediterranean forests are much more diverse, harbouring up to a 100 different tree species.

Other parts of the Mediterranean are simply too dry for trees or dense vegetation and are, instead, covered in vast swathes of grasslands. At first sight these semi-arid steppic areas may appear barren and lifeless but on closer inspection they reveal an equally rich wildlife. These are prime locations for the great bustard *Otis tarda*, little bustard *Tetrax tetrax* and a whole range of ground-nesting birds like the pin-tailed sandgrouse *Pterocles alchata*.

Elsewhere, the water is more bountiful but still very precious. Wetlands ranging from tiny coastal lagoons to vast deltas appear at regular intervals around the long coastline. Although a large number have since been destroyed or drained, those that remain harbour hundreds of species of endemic fish, amphibians and insects which, in turn, attract huge flocks of waders and dabbling ducks, especially during the migration season.

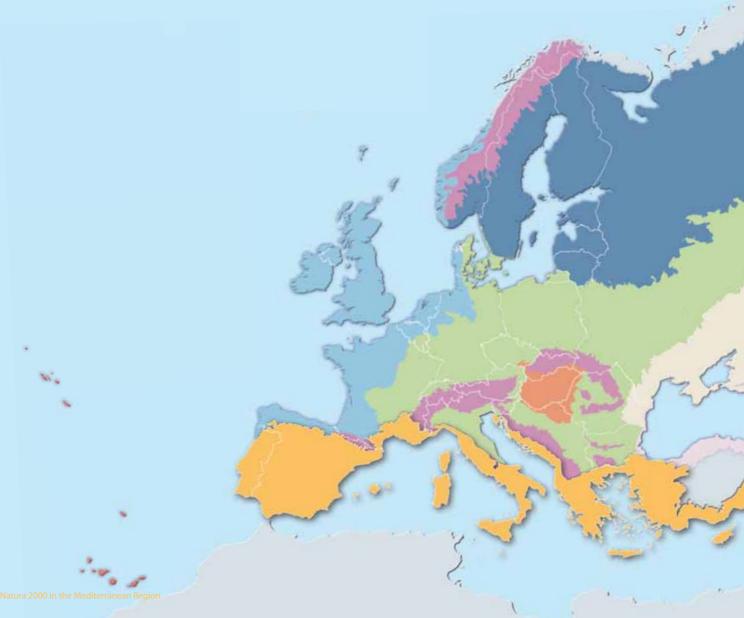
It is estimated that up to two billion birds migrate to, or through, the Mediterranean Region every year. Some are merely stopping over for a few days or weeks to refuel before their long journey across the Sahara, others come down to spend the winter here to escape the cold weather further north.

As for the Mediterranean Sea, its clear blue waters are famous throughout the world. Although not a very productive sea it nevertheless harbours a tremendous diversity of marine organisms, many of which are endemic to the region. It is estimated that the Mediterranean contains 8-9% of all the world's marine creatures. Many of the lesser-known sponges, sea squirts, sponges, crustaceans etc... can be found hidden amongst the vast underwater meadows or Posidonia beds that grow in shallow coastal waters.

The Mediterranean Region is however under tremendous pressure from humans. It is the number one tourism destination in the world. As a result much of the Mediterranean coastline has disappeared under concrete and there is a constant threat of forest fires and chronic water shortages. Inland many of the ancient pastoral regimes are being abandoned because they are no longer economically viable.

Region	Countries involved	% of EU territory
Atlantic	Belgium, Germany, Denmark, Spain, France, Ireland, Portugal, Netherlands, United Kingdom	18.4
Boreal	Estonia, Finland, Latvia, Lithuania, Sweden	18.8
Continental	Austria, Belgium, Bulgaria, Czech Republic, Germany, Denmark, France, Italy, Luxembourg, Poland, Romania, Sweden, Slovenia	29.3
Alpine	Austria, Bulgaria, Germany, Spain, Finland, France, Italy, Poland, Romania, Sweden, Slovenia, Slovakia	8.6
Pannonian	Czech Republic, Hungary, Romania, Slovakia	3.0
Steppic	Romania	0.9
Black Sea	Bulgaria, Romania	0.3
Mediterranean	Cyprus, Spain, France, Greece, Italy, Malta, Portugal	20.6
Macaronesian	Spain, Portugal	0.2

Source: European Topic Centre on Biological Diversity (European Environment Agency) http://biodiversity.eionet.europa.eu October 2008



Natura 2000 species in the Mediterranean Region

Almost half of the plants and animals listed in the Habitats Directive occur in the Mediterranean Region. This large number not only reflects the wide range of threats present but also the sheer abundance of species in the region. There are more plant species here than all the other European biogeographical regions combined.

The varied landscape has led to the development of an exceptionally high number of endemics, some of which are restricted to a just few localities like the Maltese rock-centaury *Cheirolophus crassifolius* which only occurs on the blustery cliffs of Malta or the pretty hellebore *Helleborus cyclophyllus* which is restricted to the Rhodope Mountains on the border between Greece and Bulgaria.

Like other species of the Mediterranean basin, plants have developed many ways to cope with the relentlessly hot summers and long periods of drought. Many flower very early on in the season in a race against time to set seed before the sun gets too hot. Others develop leathery, aromatic leaves to help reduce water loss.

With so many plants here, it is no surprise that there is also a high diversity of insects and other invertebrates in the region. Many have developed close associations with specific plants and are now entirely dependent on their presence for their survival. The two tailed pasha *Charaxes jasius* for instance is only found in the presence of the strawberry tree *Arbutus unedo*, on whose leaves it lays its eggs. Similar associations have evolved amongst the myriad bees, wasps and other important pollinator species.

The majority of Europe's reptiles are found in the Mediterranean Region. They include the rare leopard snake *Elaphe situla*, the Iberian rock Iizard *Lacerta monticola* and the curious looking European leaf-toed gecko *Phyllodactylus europaeus*. All are listed in the Habitats Directive in view of their vulnerable conservation status.



The Iberian lynx *Lynx pardinus*

With a population of just 100–150 individuals, the Iberian lynx is now the most endangered mammal in the world and perilously close to extinction. Agricultural intensification and infrastructure developments, such as new motorways, have carved up and fragmented its habitat to such an extent that it is now confined to a few isolated pockets like the Sierra de Anducar in south west Spain which contains one of the best preserved Mediterranean forests and scrublands on the Iberian Peninsula.

In contrast to the Eurasian lynx *Lynx lynx* which is almost twice its size, the diminutive Iberian lynx is a specialised hunter, feeding almost exclusively on rabbits. This has contributed further to its demise. Successive epidemics of the disease Myxomatosis, and more recently the Rabbit Haemorrhagic Disease, have swept through the rabbit populations in past decades decimating their numbers and so depriving the lynx of their staple diet.

Above all the Mediterranean is of major importance for migrating birds. The mild winter, combined with the availability of tranquil wetlands and other habitats provide an ideal refuge for the millions of birds who migrate to or through the region every year. As for the sea, it too is teeming with life. Dolphins and sea turtles are of course high profile but there is also an abundance of other weird and wonderful sea creatures lurking beneath the waves. Amongst them is the highly endangered Mediterranean monk seal *Monachus monachus*.



Hermann's tortoise Testudo hermanni

Hermann's tortoise is distributed from north-eastern Spain, across southern France, western and southern Italy to Romania and Turkey. It also occurs on a number of islands in the Mediterranean, including the Balearics, Corsica, Sardinia and Sicily. Hermann's tortoise is distinguished by its attractive black and yellow patterned carapace, which can be anywhere from 8–28 cm long. Like all tortoises, they are particularly long-lived, sometimes reaching 30–50 years or more.

Whilst it is thought to favour evergreen Mediterranean oak forest and thick scrub, it can sometimes also be found in dry meadows, arid hillsides and farmland. In the past it was threatened by exploitation but, today, its number one threat is habitat destruction. Urban development, road construction and increased tourism in Southern Europe have all had a major impact, leaving their range smaller and fragmented. Wildfires are also a serious problem for this slow moving species.

Map of Natura 2000 sites in the Mediterranean Region

The list of Natura 2000 sites in the Mediterranean Region was first adopted in July 2006, and further updated in March and December 2008. Altogether, within the Mediterranean Region there are 2,928 Sites of Community Importance (SCIs) under the Habitats Directive and further 999 Special Protection Areas (SPAs) under the Birds Directive. There is often considerable overlap between some SCIs and SPAs which means that the figures are not cumulative. Nevertheless, it is estimated that together they cover around 20% of the total land area in this region.

Number of habitat types in Annex I and species or sub-species in Annex II of the Habitats Directive.

Region	Habitat types	Animals	Plants	
Atlantic	117	80	52	
Boreal	88	70	61	
Continental	159	184	102	
Alpine	119	161	107	
Pannonian	56	118	46	
Steppic	25	25	14	
Black Sea	58	79	6	
Mediterranean	146	158	270	
Macaronesian	38	22	159	

Source: European Topic Centre on Biological Diversity (European Environment Agency)

- http://biodiversity.eionet.europa.eu
 the figures are not cumulative since many habitats and species occur in two or more biogeographical regions
- biogeographical regions

 Birds from Annex I of the Birds Directive are not listed as they are not categorised according to biogeographical region



				T-end					
1	Region	N° SCI	Total area covered (km²)	Terrestrial area covered (km²)	% of total terrestrial area	N° SPA	Total area covered (km²)	Terrestrial area covered (km²)	% of total terrestrial area
ŕ	Atlantic	2,747	109,684	68,794	8.7	882	76,572	50,572	6.4
Ų,	Boreal	6,266	111,278	96,549	12.0	1,165	70,341	54,904	6.8
A	Continental	7,475	150,014	135,120	10.8	1,478	147,559	128,432	12.4
	Alpine	1,496	145,643	145,643	39.7	365	93,397	93,397	31.1
	Pannonian	756	15,858	15,858	12.3	100	19,965	19,965	17.5
	Steppic	34	7,210	7,210	19.4	40	8,628*	8,628	24.4
	Black Sea	40	10,243	8,298	71.8	27	4,100	3,561	30.8
	Mediterranean	2,928	188,580	174,930	19.8	999	147,358	142,350	16.0
	Macaronesian	211	5,385	3,516	33.5	65	3,448	3,388	32.3
	TOTAL	21,612	655,968	568,463	13.3	5,004	486,571	429,615	10.5

Source: European Topic Centre on Biological Diversity (European Environment Agency) http://biodiversity.eionet.europa.eu October 2008

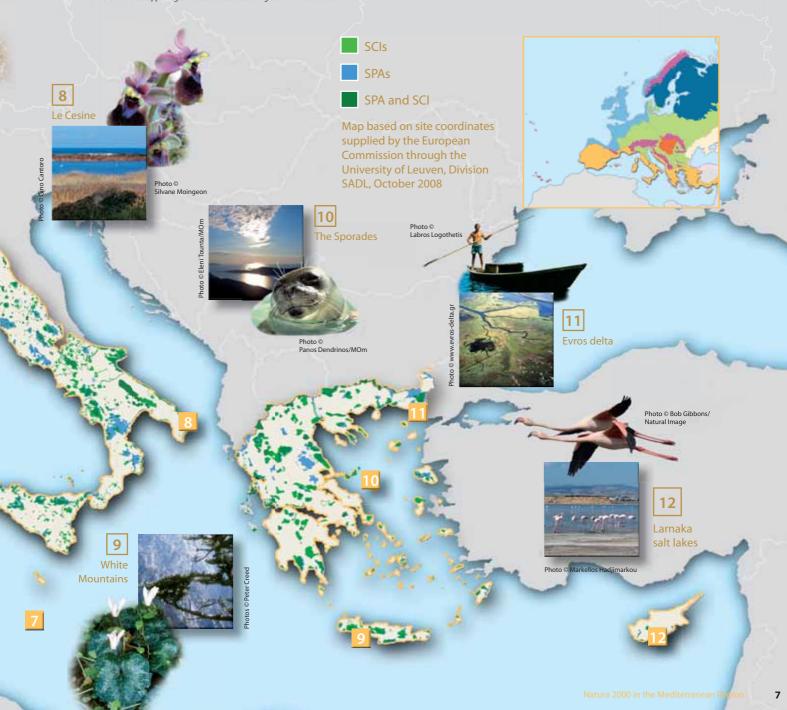
- SPAs and SCIs are not cumulative as there is considerable overlap between them

- Some sites are on the 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

- SPAs are not selected according to biogeographical region

- SPA area for the Steppic Region are calculated according to available GIS data





Typical Mediterranean scrub in full bloom in Greece © Rob Gibbons/Natural Image

Natura 2000 habitat types in the Mediterranean Region

The Mediterranean Region harbours more than half of the habitat types listed in the Habitats Directive. Of these 37 occur only in this region. The large number reflects not only the region's warm climate, variable geology and complex topography with many isolated areas but also the fact that much of the region was spared the ravaging affects of the last Ice Age that spread across Europe some 10,000–15,000 years ago.

Over half of the land is covered by forests and scrub. Because of the hot dry conditions, Mediterranean forests tend to be more open which allows for the growth of a rich understory of shrubs and bushes. They are also much more species diverse than northern forests.

The lowlands tend to be dominated by various types of oak *Quercus* spp but as one increases in altitude sweet chestnut *Castanea sativa*, and coniferous species of *Abies*, *Pinus*, *Juniperus* and *Taxus* spp tend to take over.

As for the ubiquitous Mediterranean scrub, this comes in a variety of shapes and sizes and is often given such exotic names as matorral, maquis, garrigue and phrygana depending on their location, soil, degree of degradation, human usage and species composition, but in reality these habitat types often merge into one another to form an intricate yet inherently mobile mosaic pattern across the landscape.

The height of the scrub can sometimes be used as a simple rule of thumb. Maquis, for instance, tends to form dense impenetrable thickets 1–4 metres high and is usually dominated by small trees like the strawberry tree *Arbutus unedo*, the lentisc *Pistacia lentiscus*, the wild olive *Olea europaea* or the myrtle *Myrtus communis*, or less frequently juniper and laurel.



Posidonia beds

The marine plant *Posidonia oceanica* is endemic to the Mediterranean Sea. It forms dense underwater meadows along the seafloor at a depth of up to 40 metres. Much like the grasslands on land, these Posidonia beds are exceptionally rich in wildlife. They provide a safe-haven for millions of tiny marine organisms and act as a vital nursery ground for many commercially valuable fish species.

Posidonia beds also play a key role in protecting the coastline by trapping sediments, oxygenating the water and preventing coastal erosion. Because they can only grow in very clean nutrient-poor waters they are also a good indicator of water quality. However, the metre long fronds are very fragile and readily damaged by fishing activities, recreational boating, dredging, pollution and sand abstraction amongst others. It is estimated that almost half of the Posidonia beds in the Mediterranean have regressed or disappeared in the last 30 years or so.



emi-arid steppic grassland, La Serena, Spain © Aixa Sopeña, INSET Calandra lark © Vince Smith

Garrigue on the other hand is more open and the vegetation barely reaches knee height. Here leathery-leaved plants like the rock-roses *Cistus* spp. and aromatic shrubs like lavender, thyme and rosemary are most in evidence, filling the air with their intoxicating perfume. Phrygana, which occurs in the eastern part of the Mediterranean, usually along the coast, is the lowest form of scrub of all and is composed of spiny cushion forming bushes and ground-hugging shrubs that vary from one area to another.

The complexity of the vegetation structure makes the Mediterranean scrublands exceptionally rich in wildlife. They harbour a colourful range of flowers such as tulips, narcissus, crocuses and alliums as well as many species of bee or mirror orchids. Together they put on a brief but spectacular display of flowers every spring.

Agricultural lands and grasslands occupy 40% of the region and varies between large intensively used areas of crops and olive or citrus groves to more low key mixed farming systems. The latter are much more in keeping with the natural environment and create a characteristic patchwork of alternating habitats across the landscape that is generally very rich in wildlife.

Some grassland areas are exceptionally dry. Yet even in these austere looking semi-arid steppes, farmers have found ways to grow oat, barley and chickpeas on the poor soil by rotating their crops over long periods in order to allow the soil to recover. This in turn has created a number of different micro-habitats that are a haven for steppic birds such as the melodious calandra lark *Melanocorypha calandra* or little bustard *Tetrax tetrax*.

Apart from a few major rivers, most of the wetlands are to be found along the coast. Various deltas and lagoons of significant size are present such as the Coto Donana or Ebro Delta in Spain, the Camargue in France or Nestos and Amvrakikos Deltas in Greece. Each one supports an enormous number of birds as well as many rare and endemic fish, amphibians and insects such as dragonflies.

As for the Mediterranean coastline, this is exceptionally complex and varied. Even within short distances it can alter from a rocky cove to a white sandy beach backed by extensive dunes to a high cliff face or a vast subterranean sea cave. These are home to many of Europe's breeding sea birds, like the Eleonora's falcon Falco eleonorae or the Mediterranean shag Phalacrocorax aristotelis ssp. desmarestii.

Mediterranean Pine forests with endemic black pine

These dense forests, often dominated by various sub-species of black pine *Pinus nigra*, are found at montane level within the Mediterranean basin. They grow on a variety of substrates including limestone, dolomitic or volcanic soils but have a very fragmented distribution. Mature black pine forests develop a closed canopy with trees reaching over 30 metres in height. As such, they help protect against erosion and torrential rainfall in an otherwise fragile environment.

The large flat crowns of mature black pines also provide ideal nesting sites for rare European raptors like the Cinerous vulture *Aegypius monachus*. In Corsica they are the sole habitat for the Corsican nuthatch *Sitta whiteheadi* which is endemic to the island. Their main threats include unsustainable forestry, the spread of exotic species, defoliation by pest species, overgrazing and fires.





Sheep grazing in the debesas Extremadura Spain © Fundacion Global Nature

Management issues in the Mediterranean Region

The Mediterranean Region is often referred to as the cradle of Europe's civilization. Livestock rearing, cereal production, fruit and vegetable cultivation are all thought to have originated here thousands of years ago. The source of much of today's agricultural products around the world also comes originally from the Mediterranean Region.

Barley, wheat, oat, olives, grapes, almonds, figs, dates, peas and other innumerable fruit, vegetables and medicinal or aromatic herbs are derived from wild plants found in this region. According to the FAO, the Mediterranean area is one of the most important centres of origin for crop plants of worldwide importance.

The low intensity and localised nature of thousands of years of subsistence style farming activities has had a

profound effect on the landscape, creating a complex mosaic of alternating semi-natural habitats rich in wildlife. Because of the persistent hilliness of the landscape, many slopes were transformed into cultivated terraces. These terraces provide an ideal environment for the growth of fruit and vegetables as they not only prevent soil erosion but also help retain water. Both soil and water are precious resources in this hot dry climate and much coveted.

Vineyards and ancient olive groves are also still a characteristic feature of the Mediterranean landscape. Both the vine and the olive tree are well adapted to growing in harsh conditions with a limited water supply and poor soil conditions. Some olive trees are said to be over 1,000 years old and are still producing olives, much in the same way as they did in ancient Greek or Roman times.

On flatter land and in the plains various forms of sustainable agro-sylvo-pastoral farming systems have evolved that make best use of natural resources. The dehesas and montados of the Iberian Peninsula are a prime example of a sustainable multifunctional agricultural system, capable of producing a whole range of different goods and services.



The dehecas and montados of the Iberian Peninsula

The dehesas and montados of Spain and Portugal are ancient agro-pastoral farming systems that strike a delicate balance between productivity and wildlife conservation. These wooded pastures still cover vast areas (50–60,000 km²) of the Iberian Peninsula. As multifunctional farming systems they are capable of providing a wide variety of goods and services. These range from shade and food for livestock, cereal production, timber charcoal and cork. Cereal cultivation is done in rotation to allow the poor soils to recover after the first harvest and, during the summer months, livestock is moved hundreds of kilometres along old drovers' roads to the lush mountain pastures in order to escape the deadening heat.

These activities have resulted in a particularly complex vegetation structure which, combined with their dynamic management, provides a wealth of habitats and micro-habitats for wildlife. Golden orioles *Oriolus oriolus*, European rollers *Coracius garrulus* and hoopoes *Upupa epops* are a common sight throughout the year. They are joined in winter by thousands of migrating white storks *Ciconia ciconia*, cranes *Grus grus* and other birds. But advances in modern-day agriculture have put these ancient sustainable agri-pastoral systems under pressure. Many are now being lost through opposing pressures of land abandonment and agricultural intensification.



However, whilst small scale farming is still practiced in many parts of the region, the last 50 years has seen a massive change in agricultural practices across large parts of the Mediterranean. Ancient vineyards, orchards and olive groves have been ripped out to make way for industrial scale fruit or olive plantations and mixed rotational farming has been replaced by intensive monocultures.

This has not only caused the loss of wildlife-rich habitats but has also had a major socio-economic impact on large parts of the region as many small-scale farmers have been forced to abandon their land to go and search for jobs elsewhere. On top of this comes the devastating effects of the wild fires that regularly sweep across the region in late summer causing untold damage to property and wildlife.

Modern farming practices also put an inordinate amount of pressure on the surrounding environment through their high demand for pesticides, fertilisers and water irrigation. More than 26 million ha of farmland is now under irrigation in the Mediterranean basin and in some areas up to 80% of the available water is used for irrigation, which is leading to a severe over-exploitation of both ground and surface waters.

Natural wetlands, deltas and other water bodies have also been systematically drained to provide water and land for agriculture. Even today farmers seldom have to pay the true cost of water. The Common Agricultural Policy bears a part of the responsibility, having subsidised the production of water-intensive crops in the past.

Increasing urbanisation and tourism development has contributed further to chronic water shortages. Not only do tourists use water for food, drink and personal hygiene but leisure facilities such as swimming pools, water parks and golf courses are also very hungry in water. The balance between water demand and availability has now reached a critical level in many countries of the Mediterranean. If it continues like this it is predicted that by 2025 half of these countries will use more water than can be regenerated naturally.

Tourism development has also had a major physical impact on the coastline, leading to the destruction of many valuable natural habitats and wildlife areas. In the Mediterranean Region, international tourist numbers have risen from 58 million in 1970 to more than 228 million in 2002, with France, Spain and Italy combined taking in about 75% of the current influx (UNEP, 2005).

This in turn has led to a sustained period of construction along the coast as hotel complexes, holiday homes or expanding cities have sprawled out in all directions. As a result, large parts of the coastline have now disappeared under concrete. According to the Blue Plan for the Mediterranean more than half of the entire Mediterranean coastline could be under concrete by 2025 as compared to 40% already in 2000.

This exceptionally rapid growth in tourism and urban development in coastal areas combined with the abandonment of small-scale farming practices puts immense pressure on the region's rich biodiversity. This pressure is likely to continue unless major policy changes are made in the coming decades.



In this series.



Natura 2000 in the **Atlantic Region**



Natura 2000 in the **Boreal Region**



Natura 2000 in the **Continental Region**



Natura 2000 in the **Alpine Region**



Natura 2000 in the **Pannonian Region**



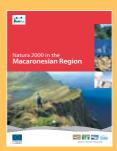
Natura 2000 in the **Steppic Region**



Natura 2000 in the **Black Sea Region**



Natura 2000 in the **Mediterranean Region**



Natura 2000 in the **Macaronesian Region**



The European Union has nine biogeographical regions, each with its own characteristic blend of vegetation, climate and geology. Sites of Community Importance 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 Sites of Community Importance selected for each biogeographical region make up the ecological Natura 2000 network which spans all 27 countries of the EU.

