The Challenges for Biodiversity Conservation in the Mediterranean

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With its great biological and cultural wealth, the Mediterranean region faces the challenge of protecting its biodiversity from the threats of the modern world: high population growth, habitat loss and fragmentation, and overexploitation of natural resources. The efforts made to conserve Mediterranean biodiversity over the last 40 years are reflected in numerous conventions and agreements between Mediterranean countries to identify priority areas for biodiversity and implement measures to protect and manage them. The challenge in the coming years will be to ensure comparable implementation of these conventions in all the region's countries.

The Value of Biodiversity

Biodiversity, understood as the variability of all life forms in a given region, is a valuable resource, as the genomes of each species, and even each population, hold the accumulated information of millions of years of evolutionary adaptations. The current benefits provided by all the different species are relatively unknown, as is the future potential of such a vast wellspring of information.

The Mediterranean Basin is considered to be one of the most biodiverse regions in the world. The physiographical complexity resulting from its specific climate conditions and geological history has given rise to a high diversity of plant life based on an intricate combination of factors such as climate, geomorphology, soil, hydrology and land use. This situation enables the existence of one of the largest concentrations of endemic plants in the world. The region is home to an estimated 22,500 plant species, including some 11,500 found nowhere else. By way of comparison, non-Mediterranean Europe is home to about 6,000 species. Thus, symbolic and high-value tree species, such as the Lebanon cedar, the argan in southwestern Morocco, or the oriental sweet gum and Cretan date palm tree in Greece and Turkey, are found exclusively in the Mediterranean region.

However, plants are not the only highly diverse group in the region. Some 319 mammal species (89 of which are endemic); 489 bird species (25 endemic); 230 reptile species (77 endemic); 79 amphibian species (27 endemic); and 253 endemic species of freshwater fish have been recorded in the region to date. The situation is similar with regard to the region's marine life. Although the Mediterranean Sea accounts for less than 1% of the global water surface, it is home to 7% of the world's macroscopic marine species, of which between 25% and 30% are endemic (Table 14). Furthermore, most of the biodiversity figures mentioned so far include only the most well-known and studied groups of organisms; however, these account for only a fraction of the total number of species found in the Mediterranean. Indeed, the marine environ-

TABLE 14 **Biodiversity in the Mediterranean Region***

	Estimated Total Species	Endemic Species	Endangered Species	Data-deficient Species
Plants	25,000	11,700	119 [1]	1
Aquatic Plants	473[2]	150	73	12
Birds	601	16	22	0
Mammals	334	89	54	30
Whales & Dolphins	8	0	5	3
Amphibians	106	68	27	0
Reptiles	355	170	46	19
Freshwater Fish	253[2]	253	142	41
Saltwater Fish	600	74	47	180
Freshwater Crabs	12	5	1	0
Dragonflies & Damselflies	165	23	31	6

Source: IUCN.
* Estimated total number of species, endemic species and species included in any category (Critically Endangered, Endangered or Vulnerable) of the IUCN Red List of Threatened Species. The number of data-deficient species reflects the high degree to which certain groups in the region remain unknown.
1. To date, 50 plant species have been assessed on 12 Mediterranean islands.
2. The figure refers to the number of species assessed to date for the Mediterranean Red List

ment alone is home to an estimated 17,000 species (Coll et al., 2011).

A Biodiversity 'Hotspot'

Changes in the landscape and land ecosystems have increased in recent decades, especially in the Mediterranean. The main pressures on these ecosystems and their biodiversity come from tourism, urban development in coastal areas, overfishing, intensive farming and irrigation, and the abandonment of traditional agricultural practices. Some of the effects of these activities, such as the changes in the vegetation cover, can be easily estimated. For example, only 5% of the region's original vegetation is thought to remain relatively intact. However, the effects of the contamination generated by these activities on biodiversity and the way ecosystems function are harder to identify and quantify.

Because of the fast rate at which its ecosystems are being destroyed, the Mediterranean region, so rich in exclusive species, is considered a biodiversity hotspot. This term is used to designate regions with a high number of endemic species, that is, species unique to the region, and with a habitat that has been gradually degraded in recent years, making its conservation a priority in order to prevent irreparable harm to global biodiversity.

Given this rapid loss of biodiversity, measurement tools must be used to somehow assess the magnitude and evolution of the process. In order to measure the likelihood of species' extinction, the International Union for Conservation of Nature (IUCN) has developed the "Red List Categories and Criteria," designed to make it possible to measure the extent to which any living species is threatened using precise and quantifiable criteria.

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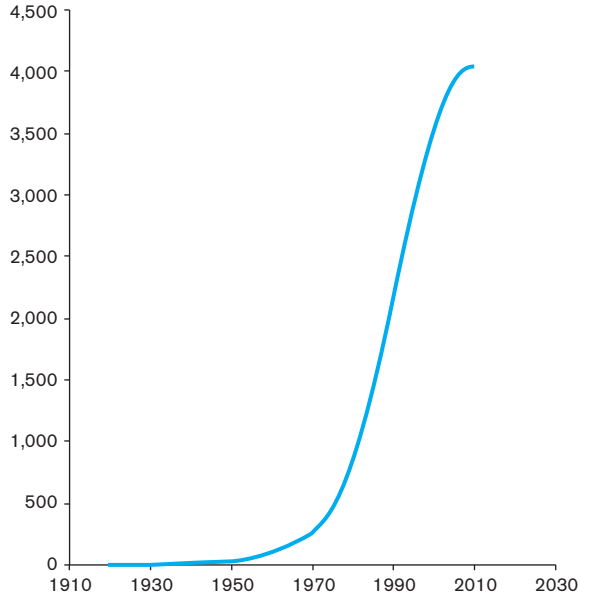
The results of the Red List for the Mediterranean confirm the environmental problems plaguing the region and the threats to its traditionally high biodiversity: 54 mammal species, some endemic, such as the Mediterranean monk seal, the Barbary macaque or the Iberian lynx, are critically endangered. Likewise, more than 142 endemic freshwater fish and, more broadly, a total of 442 animal and plant species have been classified as endangered. The real figure is no doubt higher, but to date only around 3,000 species from certain groups of organisms, mainly vertebrates and terrestrial species, have been assessed. There are very significant gaps in the knowledge of the region's species, including with regard to well-studied groups, such as mammals.

TABLE 15 **Key Figures for the Mediterranean Region**

Area (km^2)	2,085,292
Remaining vegetation (km^2)	98,009
Species assessed at the regional level on the Red List	2,948
Endangered species	368
Extinct species†	16
Human population (inhabitants)	452,000,000
Protected areas (km^2) in categories I-IV*	316,739

Source: IUCN, IUCN and UNEP, Conservation International.
† Extinctions registered since the year 1500.
* IUCN categories I-IV correspond to the highest levels of protection.

CHART 29 **Number of Declarations of Protected Areas in Mediterranean Countries (IUCN Categories I-IV)***



Source: IUCN and UNEP. *The number of protected areas in the Mediterranean has grown considerably in the last 40 years; however, the different stakeholders still require greater capacity to design and implement management plans for these areas.

Threat Factors

Much of the Mediterranean's diversity is linked to human activity. There is probably no other region in the world where the development of ecosystems has been so closely associated with humans for so long. For, in addition to thousands of plant and animal species, the Mediterranean is inhabited by a broad diversity of cultures. Today, the region has an estimated population of about 452 million inhabitants, not counting the 170 million tourists who visit each year. This figure is expected to burgeon to 523 million by 2025. In the coastal zones, the population will jump from 143 million inhabitants in 2000 to 174 million in 2025 (UNEP/MAP-Plan Bleu, 2009). However, the impact of human activity has been different in the north and south of the region, due to differences in aridity, land use, socio-economic conditions and, above all, demographic pressure. At present, the GDP of the countries of Mediterranean Europe is about five times higher than the GDP of Southern and Eastern Mediterranean countries (UNEP/MAP-Plan Bleu, 2009). The current model of economic development increases the pressure on the environment, whilst poverty increases dependence on natural resources. The resulting loss of biodiversity affects economic growth potential, reducing the welfare of the human populations (health, food, ecosystem services) and limiting their options. The challenges and possibilities for biodiversity conservation are therefore largely influenced by economic inequity.

The Answer: Set Common Goals

The need to minimise and reverse the loss of biodiversity calls for a collective response from international institutions, governments and the body public. To this end, governance, understood as management of social or environmental policy, makes it possible to tackle this situation by allowing social and institutional stakeholders to share their experience and knowledge and is the basis for meeting the challenges of biodiversity conservation. One sign of progress on this issue is the large number of multilateral agreements signed and ratified in the last 40 years to protect the region's biodiversity (see Chart 29).

The design and implementation of natural resource management policies requires the development and measurement of indicators of the status of biodiversity. For example, the assessment of the risk of extinction of species at the Mediterranean level is a relevant indicator for regional political initiatives such as the Barcelona Convention. To this end, the Red List gives an idea of the status of biodiversity and offers scientific data for the development of natural resource conservation and management policies. These data make it possible to determine whether or not a country has met its commitments and objectives under different international agreements, such as the objective of stopping the loss of biodiversity by 2020 agreed in the Convention on Biological Diversity (see Table 16).

Protected areas lie at the core of the efforts to protect the world's endangered species, and their pivotal role not only as essential providers of ecosys-

TABLE 16 **Relevant International Conventions for Biodiversity Conservation in Mediterranean Countries (IUCN Categories I-IV)***

	Barcelona Convention	Ramsar Convention	CITES Convention	Convention on Biological Diversity	Bern Convention	African Convention on the Conservation of Nature and Natural Resources	Bonn Convention	Habitats Directive
Albania								
Algeria	■	■	■	■		■	■	
Bosnia & Herzegovina	■	■	■	■	■			
Croatia	■	■	■	■	■		■	
Cyprus	■	■	■	■	■		■	■
Egypt	■	■	■	■			■	
Slovenia	■	■	■	■	■		■	■
Spain	■	■	■	■	■		■	■
France	■	■	■	■	■		■	■
Greece	■	■	■	■	■		■	■
Israel	■	■	■	■			■	
Italy	■	■	■	■	■		■	■
Jordan		■	■	■			■	
Lebanon	■	■		■				
Libya	■	■	■	■		■	■	
Malta	■	■	■	■	■		■	■
Morocco	■	■	■	■	■	■	■	
Monaco	■	■	■	■	■		■	
Montenegro	■	■	■	■	■		■	
Serbia	■	■	■	■	*		■	
Syria	■	■	■	■			■	
Palestinian Territories								
Tunisia	■	■	■	■	■	■	■	
Turkey	■	■	■	■				

* In the process of joining.

GOVERNANCE IN THE MEDITERRANEAN: INTERNATIONAL CONVENTIONS RELATED TO BIODIVERSITY CONSERVATION

CBD (Convention on Biological Diversity): The convention has three main aims: the conservation of biological diversity, the sustainable use of the components of biological diversity, and fair and equitable trade and sharing of the benefits arising from the use of genetic resources.

CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora): The convention aims to ensure that international trade in specimens of wild plants and animals does not threaten their survival. The convention accords varying degrees of protection to more than 33,000 plant and animal species and establishes a regulatory system for imports and exports with a view to preventing overexploitation of the species included on the list.

African Convention on the Conservation of Nature and Natural Resources: It is a regional convention that urges Contracting States to adopt the necessary measures to ensure conservation, utilisation and development of soil, water, flora and fauna in accordance with scientific principles, with due regard to the best interests of the people.

Barcelona Convention: The convention aims to reduce the pollution of the Mediterranean Sea and protect and enhance the marine environment in the region, thereby contributing to its sustainable development.

Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats): The aims of the convention are to conserve wild flora and fauna in their natural habitats, especially those species and habitats whose conservation requires the cooperation of several States, and to promote such cooperation. Although this convention is specific to Europe, Tunisia and Morocco formally observe it.

Ramsar Convention: The convention maintains a list of "Wetlands of International Importance" and works to promote the wise use of all wetlands with a view to preserving the ecological characteristics deriving from such systems.

CMS (Convention on Migratory Species or Bonn Convention): The objective of the convention is to conserve terrestrial, marine and avian migratory species threatened with extinction throughout their range. The parties undertake to strive to strictly protect these species, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them.

Habitats Directive: The aim of this directive is to maintain biodiversity by means of the conservation of natural habitats and of wild fauna and flora in the territory of Member States. To this end, it establishes an ecological network of special areas of conservation, called "Natura 2000." To contribute to the coherence of the network, provisions are made for supplementary activities in the spheres of surveillance and monitoring, the reintroduction of native species, the introduction of non-native species, research and education.

MAP 5 **Distribution of Protected Area in the Mediterranean***

Source: IUCN and UNEP.
* Protected areas are unevenly distributed among Mediterranean countries. More than 90% of such areas are located in the Northern Mediterranean.

PROTECTED AREA MANAGEMENT CATEGORIES

The IUCN's protected area management categories are a leading international framework, recognised by the Convention on Biological Diversity, for classifying the different types of protected area management:

- I Strict protection
- II Ecosystem conservation and protection (i.e. national park)
- III Conservation of natural features (i.e. natural monument)
- IV Conservation through active management (i.e. habitat/species management area)
- V Landscape/seascape conservation and recreation (i.e. protected landscape/seascape)
- VI Sustainable use of natural resources (e.g. managed resource protected area)

tem services and biological resources but also as key components in strategies to mitigate climate change is increasingly recognised. Moreover, at times they have proven to be crucial to protecting certain threatened human communities and places of great cultural and spiritual value. However, conservation activities have not been equally implemented in the countries of the Mediterranean Basin. Despite being home to a considerable diversity and wealth of species, some countries suffer from structural deficiencies and a lack of work methodologies that weaken their ability to protect sensitive or important areas for biodiversity. This notwithstanding, the number of protected areas in the Mediterranean has increased considerably in the last 30 years. More than 4,200 such areas, subject to varying degrees of protection, have been declared throughout the region. The brunt of these areas is found in Northern Mediterranean countries, which are home to 95% of the areas with the highest categories of protection (I-IV). Nevertheless, the number of areas under some form of regulated management has steadily increased in the Southern Mediterranean, too, and some 200 areas in the region have been accorded one of the highest levels of protection (categories I-IV) (see Map 5).

The number of protected areas in the Mediterranean has increased considerably in the last 30 years

The data presented here show that Mediterranean biodiversity requires further study, as there are still

insufficient reliable data to enable comparisons across time and space regarding its actual status, the pressures exerted on the ecosystems and their effects over time. Whilst there is ever more information on biodiversity in the Mediterranean, and it is increasingly available to decision-makers, it is also fragmented, rarely covers all countries and does not include sufficient analyses to facilitate the work of the different stakeholders. The confluence of so many factors in and around the Mediterranean Sea leads to a strong interdependence between the region's countries in terms of their impact on biodiversity. Inevitably, its use and conservation requires the involvement of each and every one of them. Consequently, in order to achieve good results in terms of biodiversity, common data and methodologies must be developed that enable the implementation of coordinated biodiversity conservation plans and policies.

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