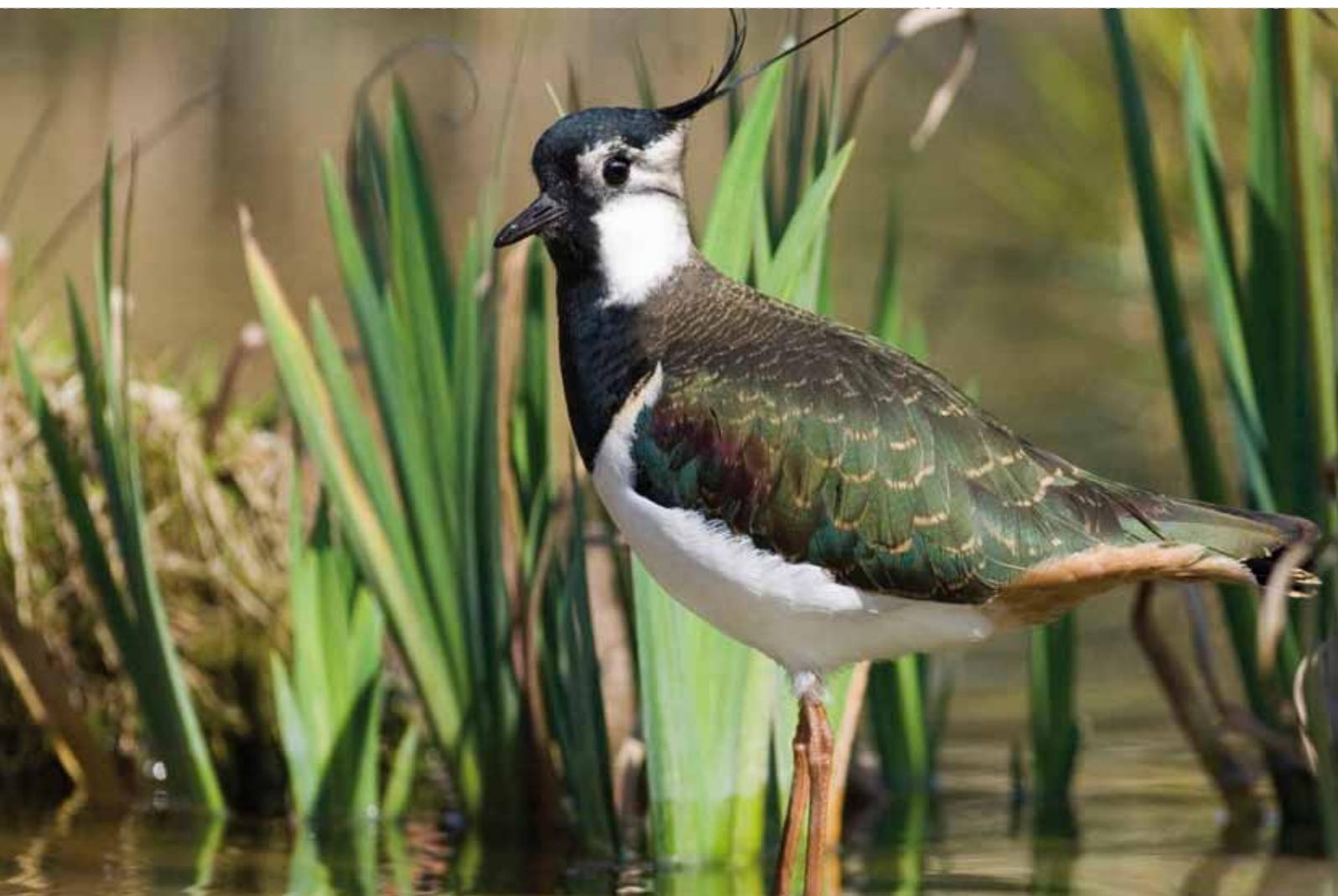


10 messages for 2010 Cultural landscapes and biodiversity heritage



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10 messages for 2010

Cultural landscapes and biodiversity heritage

This document is the tenth and last in a series of assessments under the title '10 messages for 2010'. Each message provides a short assessment focusing on a specific ecosystem or issue related to biodiversity in Europe. More detailed information on the published and forthcoming messages can be found at www.eea.europa.eu/publications/10-messages-for-2010.



Cultural landscapes and biodiversity heritage

Key messages

- Diverse climatic conditions, varied geology and morphology and centuries of pre- and post-industrial land use created Europe's diverse mosaic of cultural and natural landscapes, rich in biodiversity.
- Europe's landscapes have become highly fragmented and homogenised, threatening their biodiversity and affecting their multifunctional role.
- By managing its multifunctional culture-historical landscapes and related biodiversity sustainably, Europe can secure valuable ecosystems services while preserving its cultural and natural heritage.
- Various legal instruments and initiatives address European biodiversity heritage at the landscape level. Incorporating these into regional and local planning and involving local communities is necessary to secure Europe's biodiversity heritage and maintain multifunctional landscapes.

1 Europe's mosaic of cultural and natural landscapes results from centuries of human intervention

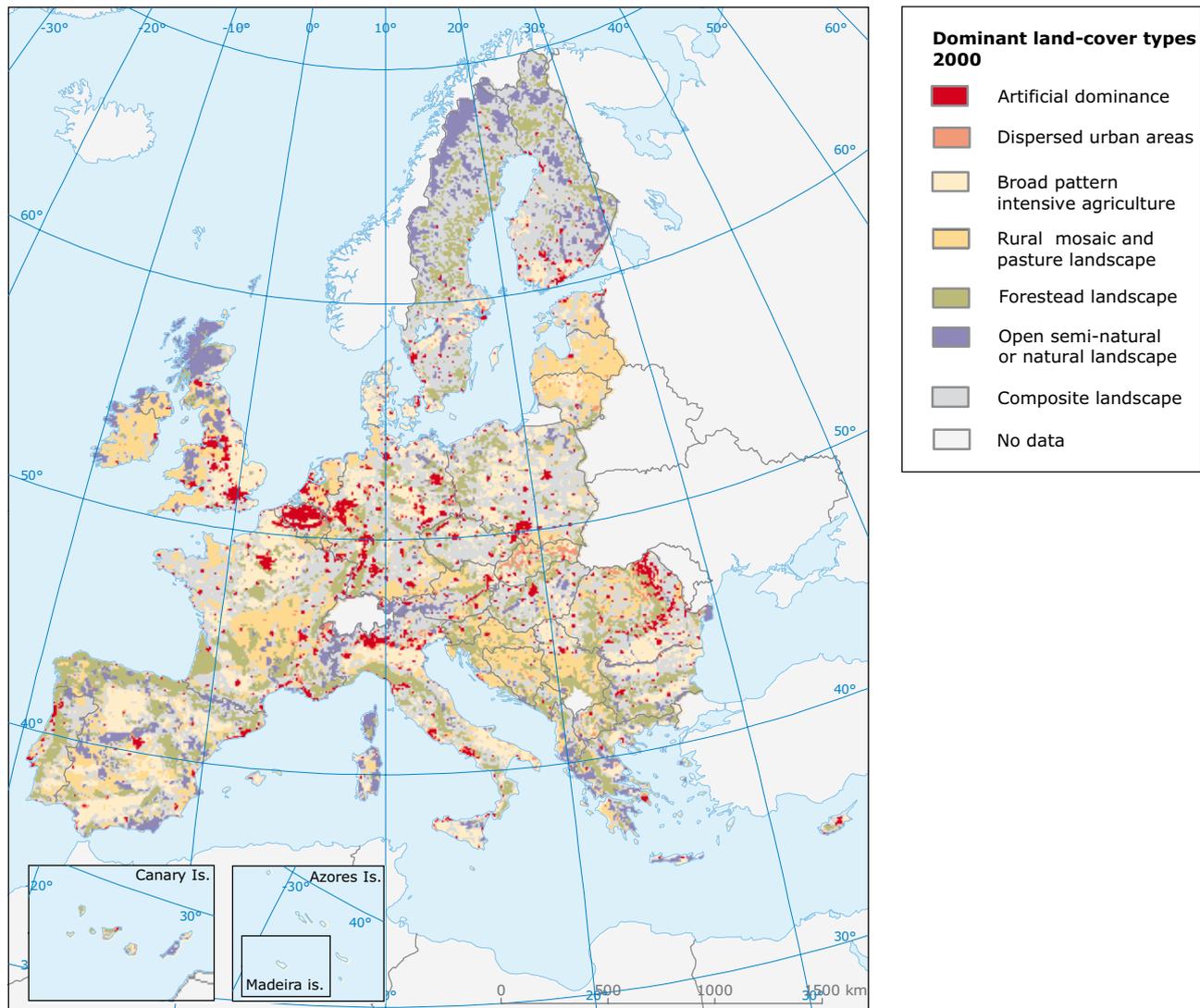
Europe's mosaic of landscapes is the product of intense human intervention over many centuries. These landscapes reflect the diversity of climatic, geological and morphological conditions in which human settlements developed. Human interventions have in turn shaped natural habitats and diversity today, ranging from intensively managed agricultural crop fields in lowlands to low-input pastures in mountain areas, from urban settlements to remnants of natural habitats, such as alluvial forests along naturally flowing rivers (Emanuelsson, 2009; Ellenberg, 1988; Otero and Bailey, 2003; MCPFE, 2005; Map 1).

Compared to other large land areas of similar size (i.e. the Russian Federation, Australia and parts of North America), Europe's human population density is much higher, with direct impacts on the type of landscapes and the corresponding biodiversity.

The history of land utilisation and conversion in Europe dates back a long time, with large-scale human impacts starting in Neolithic times (c. 3000–1100 BC). Hunting, cultivation (of cereals, crops and fruits) and settlements altered natural ecosystems and shaped Europe's landscape (Vos and Meeke, 1999). Until the 18th century, however, European landscapes preserved many remnants and structures of the remote past. Then, expanding industrialisation and technical development in the 19th century fundamentally altered European economies through the progression to mass production in factories. Corresponding changes in social relations were reflected in a different mentality towards using nature and rural landscapes in Europe.

After the Second World War, land use intensified in many parts of Europe and infrastructure development and urbanisation caused landscape fragmentation (Antrop, 2005; Emanuelsson, 2009; Pedrolí *et al.*, 2007).

Map 1 Dominant landscape types in Europe based on Corine Land Cover 2000 survey



Source: EEA, 2008.

Box 1 Cultural landscapes and biodiversity heritage

UNESCO's World Heritage Committee defines cultural landscapes as geographical areas 'representing the combined work of nature and man'. The concept is particularly relevant in Europe, where much of our surroundings are the result of complex interactions between humans and the environment. Humans have greatly influenced the continent's biodiversity and landscapes, especially through agriculture, industry and other economic activities. Equally, the natural world has been hugely important in shaping our societies and cultures.

An important element in the concept of cultural landscapes is the recognition that humans often ascribe significant cultural value to their surroundings. Besides providing food and other necessities for our existence, ecosystems are treasured for the spiritual, aesthetic, recreational opportunities they provide.

Just as we inherit cultural traditions and pass them on to future generations, we are also the guardians of a hugely valuable biodiversity heritage. We have a duty to future generations to preserve biodiversity at all scales. That includes protecting prized landscapes and natural wonders, such as the Dolomites in Italy. It includes the diversity of species, notably those endemic to specific countries or localities. And it includes the genetic diversity that underpins ecosystem resilience and offers opportunities for innovation in the pharmaceutical sector and beyond.

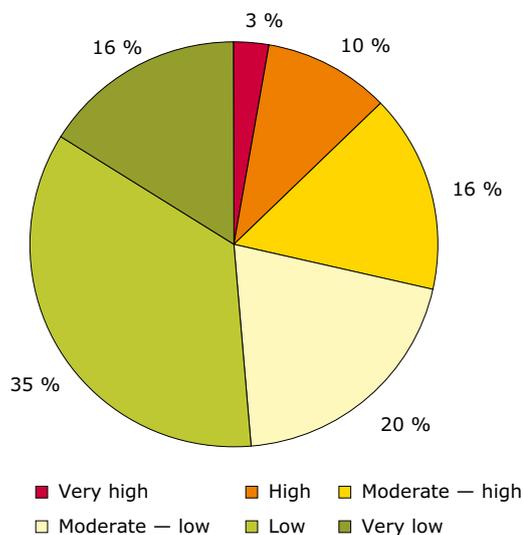
2 Europe's landscapes have become highly fragmented and homogenised, affecting their multifunctional role

Europe's landscapes are highly fragmented as a result of urbanisation, transport infrastructure and intensive agriculture (see Figure 1).

In addition to fragmentation, Europe's landscape has become more homogenised since the Second World War as a result of both increased agricultural intensification and abandonment of farmed land, uniform forest plantations and canalising rivers and streams (Jongman, 2002, 2004; Pinto-Correira and Vos, 2004; Mander and Kuuba, 2004). The same process has occurred in cities, with constructions on open green space and clearance of spontaneous wild flora and fauna (Sukopp, 2008).

European landscapes have become less multifunctional, reducing their capacity to provide ecosystem goods and services. For example, changing agricultural practices have altered Mediterranean landscapes, which were traditionally characterised by a mosaic structure of agro-, silvo- and pastoral agricultural systems

Figure 1 Landscape fragmentation in the EU-27 (% of total terrestrial area)



Source: EEA, 2010.

(Pinto-Correira and Vos, 2004). These integrated farming-forestry systems were supported by local cultures that adapted their management practices to the particular climatic and physiographic conditions of the landscape over hundreds of years

Box 2 Landscape biodiversity heritage of 'montado' in Alentejo (Portugal) and 'dehesa' in Extremadura (Spain)

Characterised by gentle slopes, poor soils and a Mediterranean-continental climate with strong annual fluctuations, the region of Alentejo in southern Portugal has been extensively managed since the Roman times using a mainly (agro-)silvo-pastoral land use system known as 'montado'. Portugal's montados are similar to Spain's 'dehesas', which are a protected habitat type ('Dehesas with evergreen *Quercus spp.*') under Annex I of the EU Habitats Directive (EC, 1992).

Montado is a complex land-use system with various components and multiple outputs such as honey, aromatic plants and mushrooms from the understorey; rotational cereal production; meat from livestock grazing; and cork, wood and charcoal from the trees. The traditional field rotation cycle includes cereals, fallow land and grazing of cattle (the Alentejo breed is small and light), sheep, goats or Iberian black pigs. Nutrient input is maintained by livestock that feed on acorns, shrubs and grasses under the trees. The soil is aerated by pigs that loosen the ground, allowing rain to infiltrate. Trees are either cork oaks or holm oaks or a mixture; their shade helps retain soil moisture and provides cover for the livestock in summer.

This mixture of trees and open grasslands or fields with extensive livestock grazing creates a diverse landscape of traditional land use, which has recently attracted tourism to the region. During recent decades, however, various factors have been destroying this cultural heritage in parts of the Iberian Peninsula. They include intensified farming, damage to trees or conversion into monospecific plantations of eucalyptus and more recently of pines (Pinto-Correia and Mascarenhas, 1999), and land abandonment followed by succession to shrub.

Contrastingly, it has been shown that sustainable cork harvesting — a common practice in the Alentejo region for more than 200 years — is keeping jobs, protecting biodiversity and helping preserve ecosystem services (Williams, 2008).

Source: Pinto-Correira and Vos, 2004; Pérez-Soba *et al.*, 2007.

in pre-industrialised agricultural times (Vos and Meekes, 1999). Northern European natural and cultural landscapes have likewise become less multifunctional, for example through the loss of traditionally managed rural biotopes in south-west Finland (Berghäll and Pesu, 2008).

3 Europe is preserving its biodiversity by managing its multifunctional landscapes sustainably

The landscapes resulting from human land use are part of the identity and culture in Europe. Their great diversity reflects a multitude of historical layers in an intricate spatial pattern. People's sense of belonging is very much determined by the environment in which they have grown up. Perceptions of landscapes are thus an essential component of a community's well-being and of visitors' enjoyment (Pedroli *et al.*, 2007). Increasingly, the type and quality of landscapes are linked to the certification of high quality local products, as reflected in the French term 'terroir' (Marchenay and Bérard, 2009).

Two centuries ago, about 80 % of the population still lived in the countryside. Since then, new technologies, new crops, new fertilisers and pesticides, and new management techniques (all implemented on varying timescales and in different environmental conditions) have led to complex interactions between humans and nature, resulting in a rich amalgam of cultural landscapes in Europe (Mücher and Washer, 2007). New ecosystems and habitats were created in urban and rural areas as a result of this interaction (Vos and Meekes, 1999).

In cities, new species migrated and evolved through adaptation to the urban landscape (Rebele, 1994; Zerbe *et al.*, 2003; Müller and Werner, 2010). Alien (non-native) species have become a typical part of urban ecosystems. For example, alien plant species make up between 20 and 60 % (40 % on average) of the plant species in 54 cities in central Europe (Pyšek, 1998). In our increasingly disturbed ecosystems a percentage of these alien species may become opportunistic and then invasive. It is estimated, for example, that about one in every 2 000 introduced plant species in central Europe becomes invasive from a nature conservation point of view, threatens human health or causes economic costs (Sukopp, 2005).

Native and non-native species took time to adapt and integrate within the evolving human-dominated landscapes, becoming an important part of

European heritage. They sustain important ecosystem services and provide essential goods for the quality of life in rural and urban areas such as pollination, filtering dust, reducing noise, providing oxygen, guaranteeing soil fertility, controlling insect infestations, providing aesthetic pleasure, and supporting recreational and educational activities (Daily *et al.*, 1997).

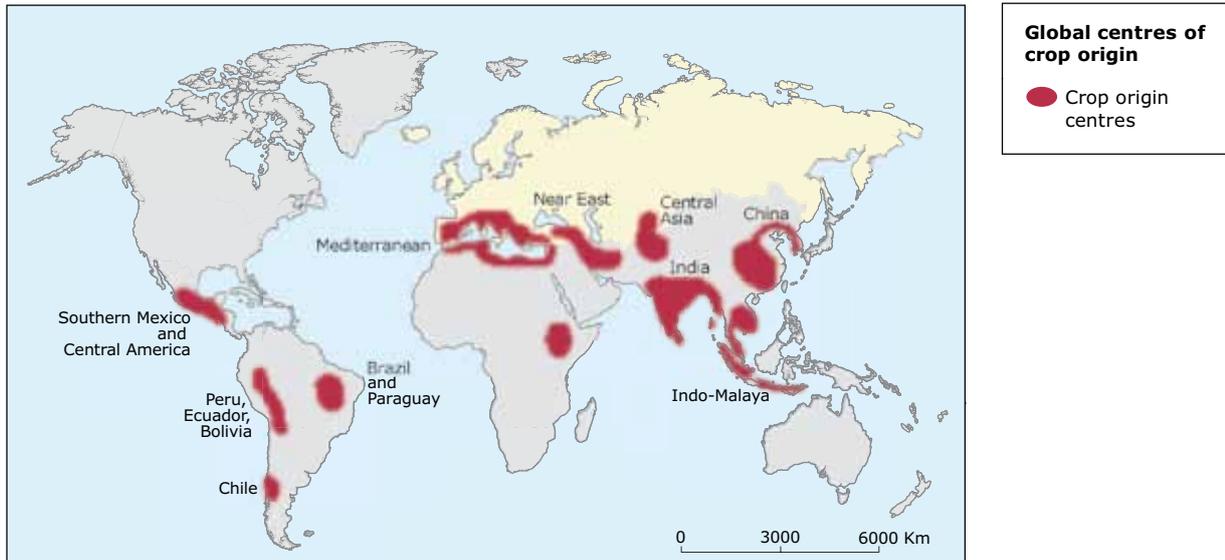
Some parts of Europe are also very rich in Crop Wild Relatives (CWR). CWR are the origin of major food crops such as wheat (*Triticum aestivum* L.), barley (*Hordeum vulgare* L.), cabbage (*Brassica oleracea* L.) and olive (*Olea europaea* L.) and signal the cultural and historical nature of agricultural land use in Europe.

The Mediterranean region is the most important area in Europe in terms of diversity of crops and their wild relatives (Kell *et al.*, 2008; Map 2). Crop Wild Relatives are essentially used to provide pest and disease resistance and abiotic stress tolerance, increase yields, improve trait quality and influence crop fertility (Hajjar and Hodgkin, 2007). However, Crop Wild Relatives themselves are faced with genetic erosion caused by pollution, habitat destruction and fragmentation, extreme weather impacts due to climate change and genetic pollution such as from planted genetically modified crops that cross into the wild (Bettencourt *et al.*, 2008).

Apart from wild relatives of crop plant species, genetic diversity of domesticated animals in European landscapes is an important element in our biodiversity heritage. For example, for centuries farmers have been managing cattle, sheep and goats in a sustainable manner, adapted to the local conditions of European landscapes. However, many modern breeds with higher productivity suffer from inbreeding and the use of many traditional breeds has been abandoned; some are already extinct (Taberlet *et al.*, 2008).

Various EU quality schemes support the certification of local produce, helping to protect local breeds and traditional activities. Protected Designation of Origin (PDO), Protected Geographical Indication (PGI), and Traditional Speciality Guaranteed (TSG) are EU denominations that support both public and private certification schemes for agricultural farm products and foodstuffs, wines and spirits. They help guarantee quality standards and assist consumers in making informed choices (EC, 2009c). The DOOR database includes products registered as PDO, PGI or TSG and in the process of applying for registration. E-BACCHUS is the database of designations of origin and geographical indications

Map 2 Global centres of crop origin



Source: EEA, 2007.

protected in the European Union for wines originating in Member States and third countries.

In recent years in Europe, environmental labelling initiatives at the regional and local scales have grown steadily. Some of them prioritise biodiversity conservation. For example the 'Ue-li-je' project, a cooperation between the Friuli Venezia Giulia Region in Italy and Slovenia, produces olive oil at a small scale, restoring diversity at genetic and landscape level and minimising negative environmental impacts of the production system. Consumers can identify the produce via a labelling scheme based on local folklore (Biala, 2009).

An interesting initiative of the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management are 'Genuss regions', which are trademark protected (Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft, 2010). The initiative informs consumers about the origin and quality of Austrian food and conveys the message that the cultural landscape and high-quality food produced there lend each region its individual character (Biala, 2009).

European landscapes also host many endemic species. Indeed, endemic species make up a large proportion of the species of Community interest

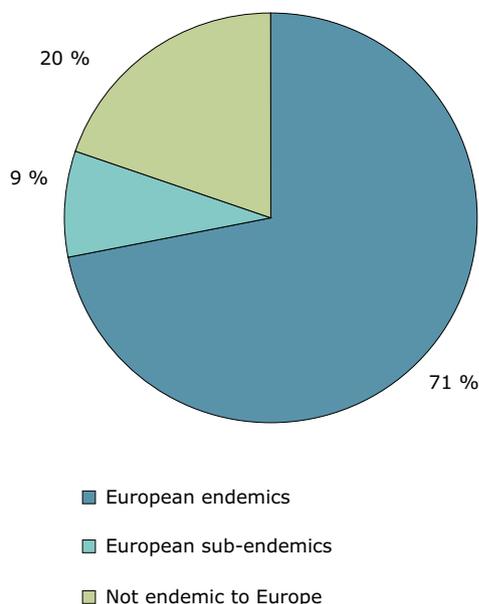
Box 3 Restoring culturally important wetland management for biodiversity and landscape heritage on the Hortobagy Steppes in Hungary

Two EU LIFE projects, approved in 2002, have helped restore the wetlands and natural dynamics of the damaged landscape on the Hortobagy Steppes in Hungary. Traditional breeds, notably the Hungarian grey and flecked cattle, Mangalica pigs and Racka sheep, were introduced to graze the puszta landscape, thereby maintaining an open vegetation structure. The artificial irrigation infrastructure of 500 km of dykes and irrigation channels was abolished and 300 unused concrete water management structures were removed.

Together these actions restored almost 10 000 hectares of habitat defined as 'Pannonic salt steppes and salt marshes' in Annex I of the EU Habitats Directive (EC, 1992). It is a hot spot for birdwatchers from all over Europe and the EU LIFE projects have promoted increased tourism by laying out tracks and observation points.

Source: EC, 2010a.

Figure 2 Proportion of species of Community interest (Annex II and IV of the EU Habitats Directive) endemic to Europe



Note: Europe is defined for this analysis as the continent of Europe (with its Eastern boundary being the Ural Mountains) and associated islands (such as Svalbard, Iceland, Azores, Canary Islands, Madeira and the islands of the Mediterranean Sea, including Cyprus), as well as the adjacent areas of sea. 'European sub-endemics' are species that have their main distribution range in Europe but also occur beyond. 'Not endemic to Europe' are those species, which have their main distribution outside Europe.

Source: ETC/BD, 2010.

listed in Annexes II and IV of the EU Habitats Directive (Figure 2). The Mediterranean region is the second richest area of endemic plant species (13 000 species) in the world. A variety of factors contribute to the high diversity of the Mediterranean mountain flora, including the number of distinct elevation zones; the geological variety; the sharp latitudinal and broad oceanic-continental gradients from coastal areas to inner mountain regions; the frequent isolation of mountains; and human intervention (Regato and Salman, 2008). Centres of plant richness and endemism in the Mediterranean basin can be found mainly on islands and in mountain areas, but also on the lower mainland (Médail and Quézel, 1999). In particular, 114 of the 214 mountain species of Community interest (Annex II and IV of the EU Habitats Directive) in the EU are endemic to the Mediterranean, 51 to the Macaronesian region and 42 to Alpine biogeographical region (ETC/BD, 2010).

Another example of species richness and endemism in European landscapes is the Caucasus ecoregion, which has the highest level of endemism in the temperate world, with over 6 500 vascular plant species, at least 25 % of which are unique to the region (Wilson, 2006). Much of this European biodiversity heritage is now under threat. The European Red List includes several threatened mammals, amphibians, reptiles, butterflies, dragonflies and selected saproxylic (i.e. on wood decay depending) beetle species that are endemic to pan-Europe and the EU-27 (Table 1).

Table 1 Threatened species endemic to pan-Europe and the EU-27, according to the IUCN European Red List

	Amphibian species	Reptile species	Butterfly species	Dragonfly (sub)species	Selected saproxylic (i.e. on wood decay depending) beetle species
Number of threatened endemic species to pan-Europe	19	22	22	8	29
Number of threatened endemic species to the EU-27	15	20	16	6	24

Source: Adapted from IUCN, 2010.

4 Various initiatives address European biodiversity heritage at the landscape level

The Council of Europe's European Landscape Convention ⁽¹⁾ came into force in 2004. It acknowledges that 'the landscape contributes to the formation of local cultures and that it is a basic component of the European natural and cultural heritage, contributing to human well-being and consolidation of the European identity'.

Among other things, the Convention aims 'to integrate landscape into its regional and town planning policies and in its cultural, environmental, agricultural, social and economic policies, as well as in any other policies with possible direct or indirect impact on landscape'. The general public, local and regional authorities, and other concerned parties are expected to participate actively in identifying, analysing and assessing landscapes and defining landscape quality objectives (CoE, 2010).

When sufficiently engaged, local communities can make an important contribution to sustainable management by retaining and using traditional land use practices and knowledge (Kiene, 2006). The EU Council acknowledges this in its 'Conclusions

on biodiversity post-2010', in which it 'insists that the EU action allow for the full involvement of all stakeholders at local and national levels in the development of policies and initiatives; and trusts that such participatory approaches will in return generate necessary and complementary "bottom up" initiatives from those who directly participate in land and sea use management, and in particular local communities' (EU, 2010).

As an example of the integration of cultural and natural heritage, UNESCO-designated 'biosphere reserves' aim to create a worldwide network of sites combining conservation of biodiversity (ecosystems, species, genes), landscape development for a sustainable future, and research and monitoring (UNESCO, 2005, 2008a). There are 260 biosphere reserves in 33 countries all over Europe (UNESCO, 2010). UNESCO's World Heritage List covers cultural, as well as natural heritage sites of global importance throughout Europe (UNESCO, 2008b).

The Natura 2000 network of the EU Member States aims to protect rare and endangered habitat types and species in European landscapes. It covers about 17 % of the EU-27 land area (around 730 000 terrestrial km²), and more than 150 000 km² marine area (EC, 2009a). In addition, approximately

Box 4 Parc National des Cévennes in Southern France

UNESCO declared the Parc National des Cévennes part of the 'World Network of Biosphere Reserves' in 1985. The only French national park permanently inhabited by humans, it hosts an extraordinary biodiversity due to its range of different climatic conditions (oceanic, continental and Mediterranean), varied geology (granite, limestone and schist) and range of altitudes (from 400 to 1 700 m). The variety of ecosystems includes forests, moors, steppic grasslands and meadows.

The Parc is home to some 2 200 plant species and more than 2 400 animal species, which makes up 50 % of the French fauna and flora on just 0.6 % of the national territory. More than 40 000 people live in the National Park, mainly farmers and livestock breeders. They play a crucial role in maintaining the landscape heritage through their use of traditional agricultural practices. At the same time, local people themselves represent an essential part of the area's culture-historical identity — a fact expressed in the local dialect's terms for different grassland and wetland types (Kiene, 2006).

An estimated average unemployment rate of 10 % in 2007 and the aging local population may seriously threaten the long-term vitality of the region and thereby its historical landscape management (Lefebvre *et al.*, 2009). The 1968 national census showed that the population in the Cévennes had fallen to 30 % of the level in 1850 following a dramatic rural exodus from the region that continued for well over a century. The primary causes were crises in chestnut and silkworm farming, the two world wars, and better job opportunities in mining and viticulture further south. This trend looks likely to reverse following an influx of people, which began in the 1980s and shows no sign of diminishing. Such changes clearly alter the perspectives for local development (Genrich and Perry, 2010).

⁽¹⁾ As of 9 April 2010, 30 European countries had ratified or acceded to the Convention.

44 000 km² (about 1 %) of the terrestrial landscapes in the EU-27 are exclusively protected by national legislation, which places them into IUCN protected area categories Ia, Ib, II, III, IV (ETC/BD, 2010, based on EEA, 2009a).

IUCN protected areas in category V, 'Protected Landscape/Seascape', focus mainly on landscape or seascape conservation and recreation (IUCN, 1994; Brown *et al.*, 2005). Such areas cover wide parts of, for example, Germany (27.7 % of the country's land surface in 2008). But with fewer restrictions on land use, this level of protection is not always effective due to competition with other interests (BfN, 2008). The EU LIFE programme has funded over 1 100 nature conservation projects in the EU for species and habitat types of Community interest listed in the EU Birds and Habitats Directives and related European landscapes, with a total budget of more than €1 700 million since 1992 (EC, 2010b).

In addition to designating national and European protected areas, the planned development of green infrastructure for Europe intends 'to strengthen and regenerate functional ecosystems at a broader landscape level, and to safeguard and maintain Europe's biodiversity, inter alia, by ensuring the ecological coherence of the Natura 2000 network' (EC, 2009b). Depending on local conditions and demands, spatial connectivity between existing habitats can be increased using landscape elements such as hedgerows, wildlife strips in fields, small natural watercourses and standing waters. Landscape permeability in general will be improved to help wildlife disperse, migrate and adapt. This will be especially important for coping with climate change but will also be valuable to overcome other hindering landscape use impacts. 'Multifunctional zones' will be identified where multiple landscape benefits can arise based on 'healthy functional ecosystems', for instance involving farming, wildlife and recreational activities, as well as taking into account the biodiversity values of providing other

ecosystem goods and services (EC, 2009b; EC, 2010c; EC, 2010d).

Merely focusing on size and connectivity of reserves does not fulfil the need for dynamic ecosystems (Bengtsson *et al.*, 2003) that provide ecosystem goods and services to humans, habitats for species and ongoing ecosystem processes. Integrated, participatory management of landscapes at the wider countryside level is therefore needed to safeguard and enhance European biodiversity heritage. This requires concerted action at all scales: global, European, national, regional and local.

While ensuring multifunctional and sustainable management of its landscapes, Europe should support the protection of ecosystems and landscapes in other regions. The ecological footprint of Europe beyond its borders is an important issue that needs to be addressed. The ecological footprint of a country, region, or city measures the biologically productive land and sea in terms of the area that is needed to produce resources (including food, fibre, timber, etc.), and to absorb the resulting waste (WWF, 2007). The EU-27 alone utilises twice the size of its biocapacity with an ecological footprint of 4.7 global hectares per person (EEA, 2009b).

The latest output from the United Nations Environment Programme's The Economics of Ecosystems and Biodiversity (TEEB) initiative exemplifies local authority engagement. The new report, entitled 'TEEB for Local and Regional Policy Makers', calls on local policymakers to understand the value of their natural capital and the services it provides and focus on nature's benefits in local policy areas such as urban management, spatial planning and protected areas management (TEEB, 2010).

This as well as previous reports clearly show that preserving our biodiversity heritage safeguards our natural capital for future generations.

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