



Natura 2000 in the Continental Region



**European Commission
Environment Directorate General**

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Hainich beech forest in Spring, Germany. Photo © Buchenwaldinstitut.eV

The Continental Region

– the heartland of Europe

The Continental Region covers over a quarter of the European Union and extends in a broad band from west to east, starting in central France and continuing to the eastern edge of Poland in the north and Romania in the south. Outside the EU it stretches to the Ural mountains, on the border with Asia. In the south, the region is almost split in two by the high mountain ranges of the Alpine zone and the steppic plains of the Pannonian Region. Parts of the Adriatic and Baltic coastlines are also included.

Altogether 13 EU countries have all or part of their territory in the Continental Region. This includes major areas of France, Germany, Italy, Poland, Czech Republic and Bulgaria as well as significant parts of Denmark, Belgium, Austria, Slovenia and Romania. Only Luxembourg is entirely within the Continental Region. Sweden, on the other hand, has just 3% of its country in this region.

The climate is generally characterised by strong contrasts between the cold winters and hot summers. The continental climate becomes more pronounced on moving from west to east. In the east, the extreme conditions of hot and cold, wet and dry, are more commonplace and have a strong impact on the vegetation.

Moving west, the characteristics become less noticeable due to the oceanic influences of the Atlantic Region which bring milder conditions. January temperatures in Warsaw, for instance, are usually well below freezing whereas in Alsace they tend to remain above 0°C.

The landscape of the Continental Region is generally flat in the north and hillier in the south, with the exception of the extensive floodplains in the Po and Danube basins. The Great North European Plain covers much of northern Germany, Denmark, Poland and Russia.

Formed by advancing and retreating glaciers, this vast area was once covered in lowland deciduous beech forests, interspersed with extensive floodplains, marshland and bogs. However, much of this forest has since been cleared for fuel and timber and replaced by large scale agricultural production. The transformation is so great that this area is now often referred to as the 'bread basket' of Europe.

Below the plains, there exists a moraine belt containing thousands of lakes, fens and mires around the Pomeranian Region in East Germany and Poland. This is one of the least populated areas of the Continental belt, due not only to the difficult terrain but also to its strategic location after the World Wars as a border region between East and West.

Further south, the vegetation starts to be heavily influenced by the Mediterranean and sub-alpine conditions. The lower elevations of the Alps, Apennines and Carpathians and the hilly areas of the Vosges, Ardennes and Black Forest, for instance, harbour many species and habitats that are also found in the Alpine Region.

Some of Europe's most important rivers flow through the Continental Region like the Danube, Loire, Rhine, Po, Elbe, Oder, Vistula.... These rivers have played a major economic role over the years connecting the north and the south through internal waterways. As a result, most have been canalised and regulated, leading to a dramatic loss of extensive areas of floodplain habitats and species.

Despite these transformations, the Continental Region is still relatively rich in biodiversity. Being at the crossroads between so many different biogeographical zones, it shares many species with other regions.

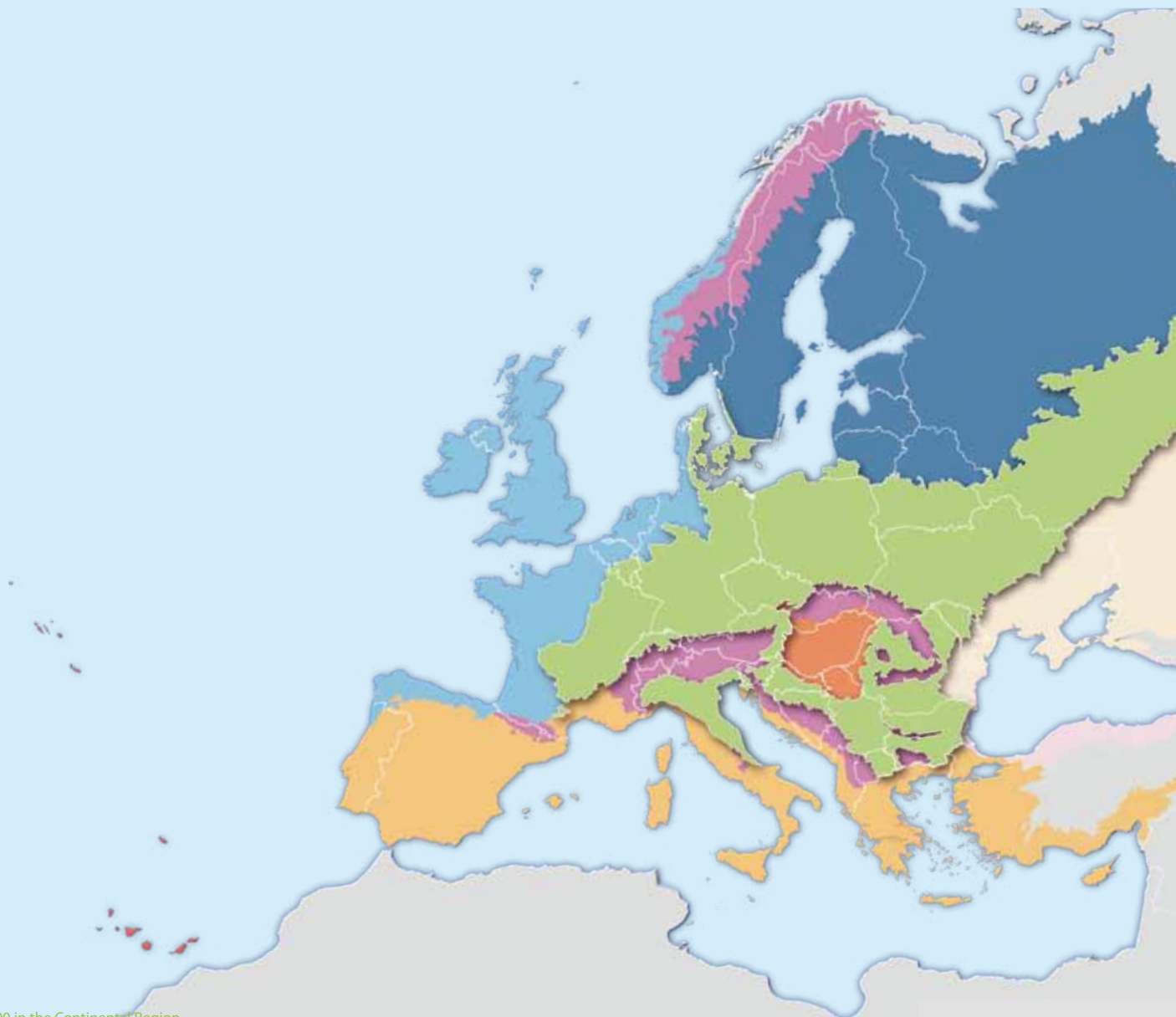
After the last ice age, plants and animals recolonised central Europe via a number of different routes. Some came back down from the Alps and Carpathians, others migrated northwards from the Mediterranean or from the Balkan Peninsula. Yet others moved in from the east. The resulting diversity of plants, animals and habitat types is notably high, even if few are truly endemic to the region.

In terms of human use, population levels are generally high, especially in the northern urban areas of Germany, Denmark and Poland. Central Europe was for many years the industrial heartland of Europe, providing much of its supply of coal, iron ore, copper and steel. Whole areas are dominated by large industrial zones, such as in the Ruhrgebiet in western Germany.

Similar areas exist in eastern Germany, Poland and the Czech Republic. Known as the Black Triangle, this district has suffered from massive industrial pollution. Open cast mining, copper extraction, burning of brown coal (lignite) etc... all produced large quantities of noxious by-products. As a result, the Black Triangle remains to this day one of the most polluted areas of Europe.

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 Continental Region

The Continental Region harbours 184 animals and 102 rare plants listed in the Habitats Directive as well as over a third of the birds listed in Annex I of the Birds Directive. Many are associated with the characteristic beech, oak and hornbeam forests that are typical for the region. Typical bird species include the black woodpecker *Dryocopus martius*, red kite *Milvus milvus*, hazel grouse *Bonasa bonasia* and collared flycatcher *Ficedula albicollis*, amongst others. Beneath the canopy, a myriad insect and plant species have found a niche for themselves amidst the wide range of forest microhabitats.

Because of the large number of rivers, marshes, floodplain meadows and other wetland habitats in the Continental Region, freshwater species are also well represented. The otter *Lutra lutra*, for instance, is still relatively widespread although under increasing pressure from pollution and habitat loss.

The number of fish species is also particularly notable. Over two thirds of those listed in the Habitats Directive occur here, including some rare endemics such as the zingel *Zingel zingel* or the Danube salmon *Hucho hucho*.

The Continental Region also harbours many rare amphibians. Eight species listed in the Habitats Directive occur in the Italian Po basin alone. They include a rare subspecies of the European spadefoot toad *Pelobates fuscus insubricus*, two species of cave salamander *Hydromantes ambrosii* and *H. strinatii* as well as the elusive olm *Proteus anguinus*.

The latter is in fact more characteristic of the cave systems of Slovenia where it is known locally as the 'human fish' because of its pallid skin colour. Reaching 25 cm in length, this rare amphibian has baffled scientists for years by its ability to reach sexual maturity without undergoing metamorphosis.

As in other regions of Europe, much of the continental landscape has been heavily influenced by agriculture. Although intensive large-scale farming is now prevalent,



Photo © Lubomir Hlasek

The fire-bellied toad *Bombina orientalis*

Aptly named for its brilliantly coloured underbelly, which it uses to warn off predators, the fire-bellied toad leads an otherwise unassuming life in and amongst its sheltered sun-exposed ponds. Its favourite habitats are the extensively grazed meadows on calcium-rich soils in central and eastern Europe.

The adults hibernate on land, but spend most of the spring and summer months in their breeding tarns. At these times the air is filled with the mournful sounds of its mating calls. Unfortunately, many such habitats are now also intensively used for agriculture and as a consequence most suitable ponds have been ploughed up or heavily polluted. Populations of the fire bellied toad have crashed as a result. Efforts are now underway to restore the ponds and their surrounds in various countries such as Denmark and Germany. Captive bred specimens are also being re-introduced in the hope of re-enforcing the existing populations.

important pockets of semi-natural grasslands and meadows are still being managed extensively, especially in the eastern and southern parts of the region. They attract species like the corncrake *Crex crex* or white stork *Ciconia ciconia* which depend on extensive farming systems for their survival. It is estimated that there are some 40,000 storks in Poland alone, with one quarter of the world population breeding in the grasslands between the Oder and Bug rivers.

The grasslands and wet meadows are also particularly rich in plant species and include such rare plants as the Bohemian bellflower *Campanula bohemica* or the gentian *Gentianella germanica*.

The Danube salmon *Hucho hucho*

This central European salmonid lives exclusively in freshwater. It can reach two metres in length and weigh up to 100 kg. Once widespread in Austria and southern Germany, its range shrank dramatically following the construction of a series of large hydroelectric power plants, which effectively blocked access to many of its natural spawning streams. Nowadays, it is restricted to four separate tributaries of the Austrian Danube. One of the last strongholds is the Pielach-Melk river system in Lower Austria. Here the spawning grounds are still relatively intact, but their access is restricted by no less than 13 obstacles, such as weirs and small hydroelectric mills, located over a distance of 45 km. Since 1999, work has been underway to render each of these obstructions passable for the salmon and, ultimately, to create a river continuum over 78 km, which would help to reconnect isolated populations.



Photo © A. E. Zitek

Map of Natura 2000 sites in the Continental Region

The list of Natura 2000 sites in the Continental Region was first adopted in December 2004 and later updated in November 2007 and again in December 2008. Altogether, within the Continental Region there are 7,475 Sites of Community Importance (SCIs) under the Habitats Directive and a further 1,478 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 more than 10% of the total land area in this region.



1
Champagne Ardennes

Photo © D. Depree

Photo © A. Balthazard



2
Elsenborn grasslands

Photo © G. Raeymeakers

Photo © F. Vassen

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

- SCIs
- SPAs
- SPA and SCI

Map based on site coordinates supplied by the European Commission through the University of Leuven, Division SADL, October 2008

Region	N° SCI	Total area covered (km ²)	Terrestrial area covered (km ²)	% of total terrestrial area	N° SPA	Total area covered (km ²)	Terrestrial area covered (km ²)	% of total terrestrial area
Atlantic	2,747	109,684	68,794	8.7	882	76,572	50,572	6.4
Boreal	6,266	111,278	96,549	12.0	1,165	70,341	54,904	6.8
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

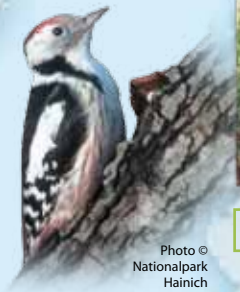


Photo © Nationalpark Hainich



Photo © Buchenwalkinstitut.eV

4 Hainich



Photo © D. Kjaer



Photo © R. Clement/www.our-photos.lu

3 Our Valley



Photos © K. Sundseth

5 Mols Bierge

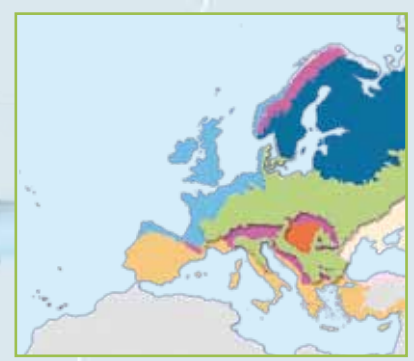
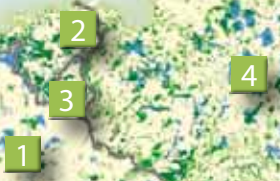


Photo © Biebrza National Park

6 Biebrza Marshes



Photo © G. Klosowscy



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Photo © Sumava National Park

7 Sumava National Park

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Photo © J. Hlasek

8 Lahnitz river Valley

9

Photo © A. Hodalič

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11

12



Photo © BBL Hartberg

Photo © A. Sylwester



Photo © Parco Delta del Po



Photo © www.lalupusinfabula.it

10 Po Delta



Photo © I. Modic

9 Rakov Škocjan

Photo © R. Czech



Photo © eif_14/flickr.com

11 Cheile Nerei



Photo © Mladen Vasiliev www.neophron.com

12 Srebrna lake



Photo © Chavdar Nikolov www.neophron.com



Wet meadow with irises, Slovakia. Photo © M. Lohmann, INSET White stork. Photo © J. Hlasek

Natura 2000 habitat types in the Continental Region

Before agriculture, much of the Continental Region was dominated by deciduous forests. The climatic conditions and soils are particularly well suited to broadleaved forests, such as beech *Fagus sylvaticus* which are at the centre of their distribution here. Further east, beech is gradually replaced by oak and hornbeam whereas in the north, on high ground and in poorer soils, natural stands of conifers take over with increasing frequency, especially on the cooler north facing slopes.

These exceptionally rich habitats play an important role for species dispersal as they provide a natural

ecological corridor for wildlife to move through what is fast becoming an increasingly impermeable landscape. Unfortunately, most of these riverine habitats have since disappeared or become disconnected and much reduced in size.

Important tracks of bog woodland, alluvial forests and riparian mixed forests were also once commonplace along most river valleys and in the floodplains. These exceptionally rich habitats play an important role as natural corridors through the broader landscape. Most have however disappeared and are now increasingly scarce.

The transformation from forest to arable fields, meadows and pastures was mostly completed by early settlers hundreds of years ago. The resulting semi-natural habitats eventually evolved into valuable reservoirs for native species but these too are under threat from a decline in traditional management and agricultural intensification. Today, grasslands cover around a sixth of the Continental Region, ranging from sub-alpine meadows and calcareous



Photo © www.lalupusinfabula.it/Attivita/Acque/fiumi-laghi-mari.htm

The Po Delta

Situated along the Adriatic coast in the Continental Region, the low-lying Po Delta is the largest wetland in Italy and one of the most productive in the Mediterranean. It covers some 1,300 km², over a third of which is protected as an SPA under the Birds Directive. Over 280 species of birds can be seen here including the rare squacco heron *Ardeola ralloides*, pygmy cormorant *Phalacrocorax pygmaeus* and ferruginous duck *Aythya nyroca*. The high species diversity is due to the sheer complexity of the terrestrial, fluvial and coastal habitats present. Rivers, marshlands, sand dunes, coastal lagoons, freshwater wetlands, ancient pinewoods and mixed oak woods all blend together in a rich patchwork of intertwining habitats. Species from the Continental Region live side by side with those from the Mediterranean Region. The long history of human use has contributed further to this complexity. But the sheer level of activity and industrial scale development in recent times has taken its toll on the Po Delta's natural riches. Efforts are now underway to develop a more unified approach to the long term management of the entire delta across all sectors.

grasslands on higher elevations to lowland hay meadows and flooded alluvial grasslands.

Alluvial grasslands were once also extensive, covering large areas along river valleys. Although much reduced in size they still provide a refuge for many rare wetland species such as the Siberian iris *Iris sibirica*, the corncrake *Crex crex* and aquatic warbler *Acrocephalus paludicola*.

Other typical wetland habitats include lakes and bogs as well as extensive freshwater marshes and fens. The Biebrza river valley, in north-eastern Poland, for instance, harbours one of the largest and least disturbed marshland complexes in Central Europe. This is thanks to the fact that the river itself retains a relatively intact hydrology which allows it to spread its watery load far and wide across the flat plain.

Elsewhere, extensive cave systems permeate through the karst landscape. These represent an important stronghold for many rare species of bats as well as other specialised fauna and flora. The Sumava Caves of the Czech Republic and the Postojna Caves in Slovenia are some of the largest cave systems in Central Europe, each providing an important refuge for some of Europe's rarest bat species.

Inland dunes are another unusual but characteristic habitat of the Continental Region. In the last Ice Age, sands were deposited across much of central Europe or brought down as sediment by large rivers. As with coastal sand formations, great efforts were made to stabilise these wastelands, through conifer plantations and soil enhancement. As a result, the remaining dunes and their specialised fauna and flora are now much reduced and heavily fragmented.

A wide range of coastal habitats are also found along the northern and southern coastlines of the Continental Region. Open sea habitats, beaches and shingle features, salt meadows, lagoons, dunes and dune heaths and coastal woodlands are all present and support a wealth of wildlife. Two of the largest mobile dune systems in Europe, at Raabjerg Mile in Jutland and Slowinski Strait in Poland are found here.



Photo: © Andrzej Keczyński

Bialowieza Forest

Covering some 120,000 ha, the Bialowieza Forest on the border between Poland and Belarus is one of the largest surviving areas of virgin mixed forest in Europe. Once a private hunting reserve for Polish kings and Russian tsars, it has been protected as a strict nature reserve since the 1920s. As a result, few forestry activities have taken place here which has allowed the formation of an exceptionally rich species diversity. Up to 632 vascular plant species have been recorded so far, representing almost a third of all plants found in Poland. Over 230 bird species have also been recorded including many species of eagle, owls and woodpeckers.

Important populations of wolf, lynx and otter are also present but, perhaps, the forest is best known for its European bison population. This species was exterminated in 1919 but successfully reintroduced ten years later under strict supervision. The population has since grown to over 700 but because of the small number of source animals it remains highly vulnerable to genetic inbreeding. The forest, and its centuries-old trees, is also under threat from encroaching forestry activities.

Photo: © F. Vassen



Calaminarian grasslands

Calaminarian grasslands occur on soils containing elevated levels of heavy metals, such as lead, zinc, chromium or copper. The greatest extent of the habitat occurs on artificial sites associated with past mining activities (the habitat is in fact named after one of the oldest zinc mines in Belgium, the 'calamine'). Near-natural examples on natural rock outcrops and river gravels are more localised.

Although heavy metals are usually toxic for plants, some species such as the zinc violet *Viola calaminaria*, the spring sandwort *Minuartia verna* or Young's helleborine *Epipactus youngiana*, have become especially well adapted to the presence of these noxious substances. The low nutrients and heavy metals help to keep the vegetation open and retard succession which allows these more specialised plants to thrive without competition from the usually vigorous colonisers.



Selective forestry in Hainich National Park using horses. © Nationalpark Hainich



Black woodpecker. Photo © J. Hlasek

Management issues in the Continental Region

Much of the Continental landscape has been significantly transformed through centuries of changing land uses. Large areas of beech forest were cleared to provide wood for industrial furnaces and to make way for intensive large-scale farming. Wetlands and floodplain meadows were drained to further increase agricultural holdings. Rivers were dammed, canalised and regulated to prevent floods and to provide inland navigation routes.

By the 19th Century, heavy industries were omnipresent in key areas like the Ruhrgebiet or in the Black Triangle between Germany, Poland and Czech Republic. Local human populations increased substantially as people moved into these areas looking for jobs. The impact on the environment was substantial. Large tracts of land were urbanised and transformed into industrial zones. Pollution began to cause major problems.

Only the habitats on poorer soils, such as bogs, marshes and heaths escaped major transformation. These were managed extensively, if at all. Such is the case for the areas around Pomorania, Central Bulgaria or on the Massif Central in France. All still harbour large areas of valuable bogs, marshes, forests and grasslands.

Many areas located in the border regions between the old East and West frontiers also remained relatively

Photo © J. Hlasek

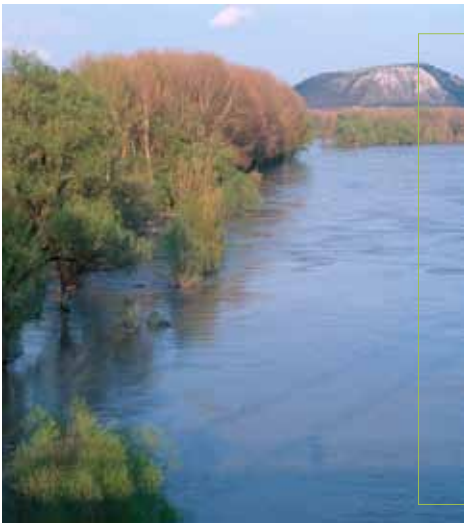


Managing Annex IV species – the case of the hamster

The European hamster *Cricetus cricetus* was once widespread in farmlands across the Continental Region. It could be found in almost every type of crop from wheat, rye, oats, barley and corn to sugar beet where it would dig complicated burrows into the loamy soil and collect seeds and other food at night. For years it was persecuted as a farmland pest and trapped for the fur trade but then the species began to decline following the move towards intensive mechanised farming. Populations dropped so dramatically that it is now strictly protected under Annex IV of the Habitats Directive in most countries.

In order for the increasingly fragmented populations of hamster to survive over the long term however, active management measures are also required. Several countries have recently introduced conservation plans for the hamster in which they promote hamster friendly management contracts with local farmers. Farmers can receive supplementary payments under the EU's agri-environmental schemes in some countries if they agree to carry out a number of simple measures that are beneficial to hamsters. These include measures such as growing strips of alfalfa along field margins, limiting the use of fertilisers, rodenticides or herbicides, or ploughing only shallow furrows no more than 20 cm deep and harvesting after mid-October.

Photo © Nationalpark Donau-Auen



International co-operation for the Danube River basin

The Danube flows over thousands of kilometres from its source high up in the Black Forest to its mouth in the vast delta plains along the Black Sea. It crosses numerous countries along the way. For centuries, the river has been of major ecological, cultural and economic value to all of these countries.

Recognising the immense value of the river, efforts have been underway since 1985 to try to stop or even reverse some of the worst excesses of pollution and development. An International Convention on the protection and management of the Danube was signed by all riverine countries in 1991 and a Strategic Action Plan adopted by Environment Ministers in 1994.

An international Commission for the Protection of the Danube River was set up at the same time to take this action plan forward. It has since also been nominated as the authority to coordinate the elaboration of the Danube River Basin Management Plan under the Water Framework Directive.

unchanged for decades after World War II. It is as if time has stood still. With the recent collapse of the communist regimes and the re-opening of national borders however land uses are changing rapidly here too, either through land abandonment or intensification.

The reform of the Common Agricultural Policy and the introduction of area based payments decoupled from production may help to slow this process down. The fact that Natura 2000 is now specifically mentioned in the EU's Rural Development Regulation is an important political step forward in achieving a better integration of farming and conservation.

Whilst the landscape is still well forested compared to the Atlantic Region (about 27% of the land area) only a small proportion of the woodland is semi-natural broadleaf. It is estimated that over 75% of the original forest has been lost and what is left has been severely altered by commercial management practices.

Scots pine *Pinus sylvestris* which under normal conditions is confined to poorer soils is now the dominant species within commercial plantations. In Germany alone it accounts for 72% of all forests.

Air borne pollution from industrial activities has also taken its toll on the region's biodiversity and on the forests in particular. High emissions of sulphur dioxide, nitrogen oxide or ammonia are, for instance, the principal cause of acid rain.

Not only does this lead to extensive damage to the forest vegetation but it also makes stands more vulnerable to natural destructive forces such as high winds and storms, or to introduced pests and diseases. It is estimated that a significant proportion of the trees in Poland and Czech Republic are partly defoliated as a result.

The region's rivers, floodplains and other wetlands have also suffered badly from the high levels of industrial and agricultural pollution. Many of the watercourses have become sterile as a result.

Most rivers also underwent major physical changes over the last 200 years. They have been canalised, straightened, deepened, embanked and dammed. Some, like the Rhine were transformed into major navigation routes. Others were extensively modified for hydroelectric power. The surrounding floodplains were also drained and transformed to make way for agriculture or to prevent flooding.

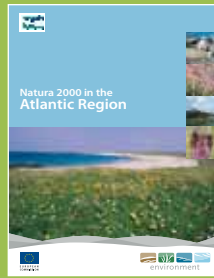
Yet despite these dramatic changes, fragments of the original natural and semi-natural habitats do still exist along most major rivers, albeit in a severely reduced form.

Recognising the economic as well as the ecological value of these rivers, efforts are underway to adopt softer management solutions and where possible restore part of the rivers' natural dynamics. Thanks to the Water Framework Directive an integrated management approach is now required for the entire length of major rivers and their catchment areas, irrespective of political or sectoral boundaries.

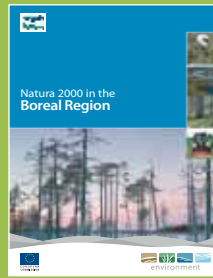


Corncrake.
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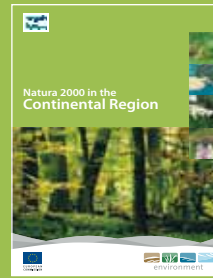
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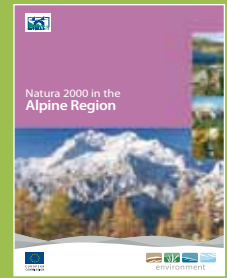
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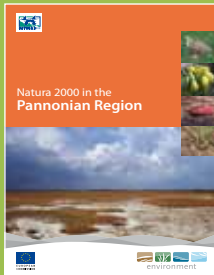
Natura 2000 in the Boreal Region



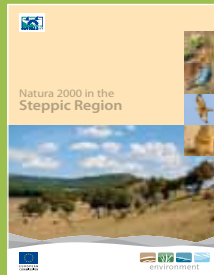
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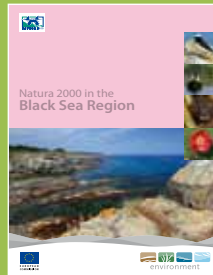
Natura 2000 in the Alpine Region



Natura 2000 in the Pannonian Region



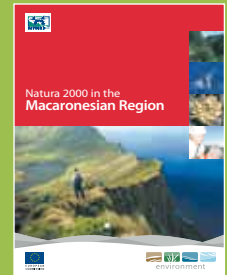
Natura 2000 in the Steppic Region



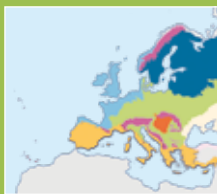
Natura 2000 in the Black Sea Region



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.

