



BIODIVERSITY AND CLIMATE CHANGE

The role of the Natura 2000 network

IN FOCUS

- Mitigation & adaptation strategies for climate change

ON SITE

- LIFE & Europe's coastline

ENLARGEMENT

- Bulgaria and Romania

nature



EUROPEAN
COMMISSION



environment

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Natura News

Theme of this issue: BIODIVERSITY AND CLIMATE CHANGE



Editorial

Biodiversity protection and climate change adaptation: two sides of the same coin



The impact of climate change on Europe's biodiversity can already be observed – for example in changing distributions of species, flowering times and bird migrations. The EU is committed to reducing greenhouse gas emissions and mitigating climate change, but must also address the impacts of unavoidable climate change in the next few decades. The focus is thus increasingly turning to the question of *adaptation* to climate change – including how we can help biodiversity adapt.

Biodiversity will be more resilient to climate change, more able to adapt, if we maintain our ecosystems in a healthy state. This will be vital also to human adaptation to climate change, because our prosperity and wellbeing depend on the services that healthy ecosystems supply.

Natura 2000 – which aims to maintain habitats and species in favourable conservation status – is in this context a critical climate change adaptation measure. Our protected area network provides space for nature and helps sustain nature's 'adaptation options'.

Establishing Natura 2000 – a 'nature infrastructure' – is crucial, but resilience and adaptation will also require actions outside the Natura 2000 network to enhance connectivity and coherence, including through habitat restoration and creation ('re-wilding') – facilitating the movement and dispersal of species as their 'climate space' moves. Facilitating nature's adaptation to climate change also involves reducing 'conventional' pressures on biodiversity such as intensification of land-use, fragmentation of habitats, overexploitation, invasive alien species and pollution. Without such action, Europe's biodiversity will become increasingly simplified, dominated by common and 'weedy' species, and unable to sustain the flow of essential ecosystem services.

I believe that the maintenance of diverse, functioning ecosystems across the wider terrestrial, freshwater and marine environment must be a guiding principal as we move to 'climate proof' our policies. A clear action plan to this end was presented in last year's *Communication on Halting the Loss of Biodiversity by 2010 – and Beyond*. Full implementation of this plan will do much to maintain healthy ecosystems and to sustain the flow of ecosystem services in the EU and must therefore be a cornerstone of Europe's climate change adaptation strategy. The Commission looks to Member States, regions and local partners to play their part in ensuring this implementation.

Ladislav Miko

Director, Directorate B - Protecting the Natural Environment, DG Environment.



The Natura 2000 Newsletter is produced by the LIFE and Nature & Biodiversity Units of the Environment Directorate General (DG ENV) of the European Commission. The newsletter is produced twice a year and is available in English, French, German, Spanish and Italian.

Cover photo: Arctic fox (*Alopex lagopus*) by Keith Morehouse

Natura 2000's role in combating the impact of climate change

"Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." This was one of the main conclusions of the latest report on climate change by the Intergovernmental Panel on Climate Change (IPCC)¹. On pages 3-7 and 10-13 we examine the current and projected impacts of climate change on Europe's biodiversity and explore the role the Natura 2000 network can play in future nature management and conservation actions that take account of these effects.

1 IPCC (2007) "Climate Change 2007: The Physical Science Basis", IPCC Fourth Assessment Report

Climatic changes have occurred throughout the Earth's geological history. The last Ice age ended about 12,000 years ago. However, there is mounting scientific and political consensus that most of the warming observed in the past 50 years is due to increased release of greenhouse gases – mainly carbon dioxide (CO₂) but also methane and nitrous oxide – largely as a consequence of human activities, and this is unprecedented on Earth. Climate change is now accelerating at a speed ten times faster than during the ice ages. As well as higher temperatures, the impact of human activities is also discernible on other climatic indicators such as Arctic temperatures and ice, precipitation levels (rain, snow and hail), ocean salinity, wind patterns and frequency of extreme weather (droughts, floods, heat waves and cold spells). As a result, climate change is increasingly recognised as a serious threat to biodiversity (along with pollution and land-use change). Based on a sample

Photo: LIFE00 NAT/E/7340



Mountains habitats, especially the Mediterranean ones, are among the most affected by climate change

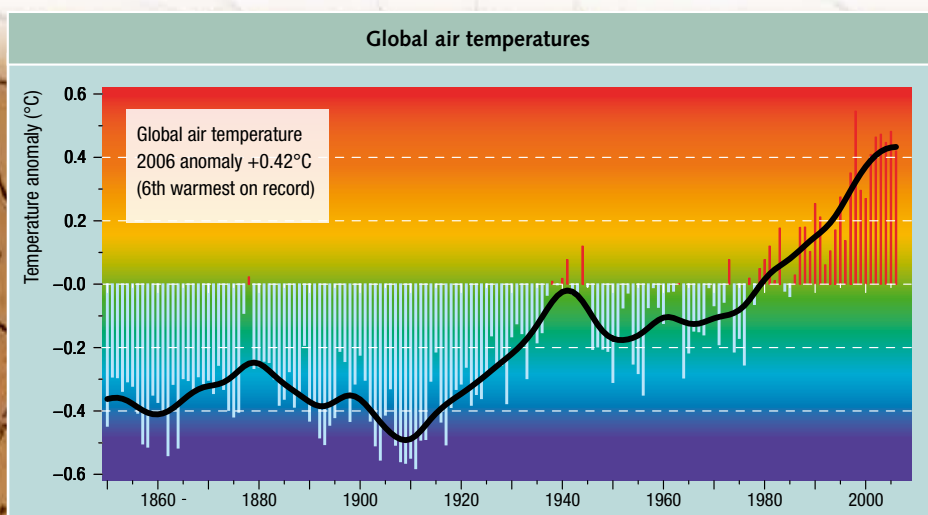
of species distributions models, it has been estimated that 20-30% of species face extinction if temperatures increase by 1.5-2.5°C².

Our climate is warming

According to the IPCC assessment report (February 2007), the concentration of CO₂ in the atmosphere has increased from its pre-industrial level of 280 parts per million

(ppm) to 379 ppm CO₂-equivalent³. At the same time, the climate in most parts of the world, including Europe, is warming. Eleven of the last 12 years (1995-2006) rank among the 12 warmest years since comparative records began (1830). Global temperatures have increased by 0.76°C on pre-industrial levels.

3 CO₂ equivalent - A metric measure used to compare the emissions from various greenhouse gases based on their global warming potential.



Source: Hadley Centre for Climate Change and CRU University of East Anglia



Photo: Sander van der Molen

Holly blue (*Celastrina argiolus*) is appearing earlier in Britain as spring comes forward

The IPCC report predicts an estimated increase in global temperatures of between 2.5°C to 4.8°C on pre-industrial levels by the year 2100. (An earlier study by the European Environment Agency (EEA, 2004)⁴, estimated that average temperatures would further increase in Europe by 2–6.3°C by the same date.) Precipitation patterns show considerable regional variations with central and northern Europe receiving more rain than in the past, while southern and south-eastern Europe have become drier. Such observed changes are expected to continue in the future. Though cold extremes (the number of days of frost) are less frequent, the likelihood of other extreme weather conditions has increased.

Such changes in physical systems have an impact on natural systems, according to the IPCC report. In the cryosphere, temperature increases have led to an increased number and larger glacial lakes, greater ground instability in mountain and other

permafrost regions, and changes in some Arctic and Antarctic flora and fauna. Rising temperatures are also having a biological impact, the report says, including “earlier timing of spring events, and poleward and upward shifts in ranges in plant and animal species”.

Biodiversity and climate change policy

Climate change policy was first shaped by the 1992 United Nations Framework Convention on Climate Change and has been aided by the first report of the IPCC (Intergovernmental Panel on Climate Change). The IPCC report proposed actions for the reducing of greenhouse gas emissions that were strengthened by the 1997 Kyoto Protocol.

In Europe, heads of state and government announced in March 2007, a “firm independent commitment to achieve at least a 20% reduction of greenhouse gas emissions by 2020” compared with 1990 levels. The 27 Member States have agreed to go even further and cut emissions by an overall 30% “provided that other developed countries” such as the US “commit themselves to comparable emissions reductions”. On 10 January 2007, the European Commission’s Communication “Limiting Global Climate Change to 2° Celsius: The way ahead for 2020 and beyond.” set out proposals and options for keeping climate change to manageable levels. The Communication, part of

a comprehensive package of measures to establish a new energy policy for Europe, is a major contribution to ongoing discussions at international level on a future global agreement to combat climate change after 2012, when the Kyoto Protocol’s emissions targets expire. These new targets are significantly higher than the 8% overall target the EU agreed to reach by 2012 under the Kyoto Protocol.

The European Commission’s recent Communication on Biodiversity [COM(2006) 216] – halting the decline of biodiversity in the EU by 2010 – addresses the connection between biodiversity and climate. It is intended to complement the 1998 biodiversity strategy and the 2001 action plans. On climate change, the Communication stresses the need for both mitigation – the necessity of substantial cuts in global greenhouse gas emissions – and adaptation – calling for strategic measures and a task force to help biodiversity adapt to unavoidable climate change by *inter alia* strengthening the quality and coherence of the Natura 2000 network.

The Communication states that impacts on biodiversity in the EU are “already measurable” and warns that “climate change has the potential, over a period of a few decades, to undermine our efforts for the conservation and sustainable use of biodiversity”.

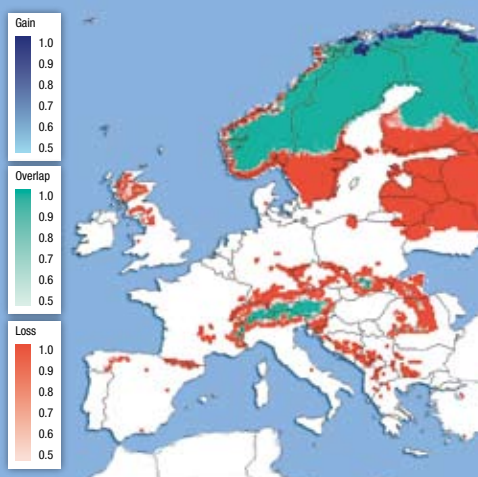
Protecting biodiversity

Protection of biodiversity can help limit atmospheric greenhouse gas concentrations because forests, peat lands and other man-made ecosystems

Capercaillie (*Tetrao urogallus*) – an Annex I Birds Directive species



Projected change in simulated climate space for capercaillie in 2050



Source: BRANCH (www.branchproject.org.uk)

⁴ EEA (2004) “Impact of Europe’s changing climate”, EEA, No2/2004

tems and habitats store carbon. Data on the impact of climate change on the biological resources of European ecosystems comes from two main sources: long-term monitoring of species or ecosystems and projections of future impacts using modelling. These assessments demonstrate that climate change is influencing the 'phenology' (climate-related natural timing of events such as migration or breeding), reproductive success, changes in abundance, range size and range position shift of plant and animal species. Such changes have observable effects on individuals as well as whole communities.

Many such effects have already been documented in a wide range of species and communities. For example, a recent study (2006)⁵ on the impact of climate change on amphibian and reptile species in Europe concluded that "... most European species of amphibian and reptiles modelled in this study would be projected to lose suitable climate space by 2050. This would conditionally support the hypothesis that climate change might have caused or – more rigorously – cause further decline of herpetile species (particularly amphibians) in the future".

Bird species, in particular, are a well-studied group. They have a very high metabolism rate and are highly sensitive to climatic disturbances. Moreover, they are very mobile and can react immediately to environmental changes.

5 Araújo, Thuiller, and Pearson (2006) "Climate warming and the decline of amphibians and reptiles in Europe", *Journal of Biogeography* 33: 1677-1688, www.blackwellpublishing.com/geb



Photo: LIFE03 NAT/S/00073

Climate change is posing problems for species such as Arctic fox (*Alopex lagopus*) in relation to the timing of their seasonal adaptive change of coat. Results just published by a LIFE-Nature project reveal new insights into how species respond to climate change. (PNAS – Apr 9, 2007; doi:10.1073/pnas.0701341104)

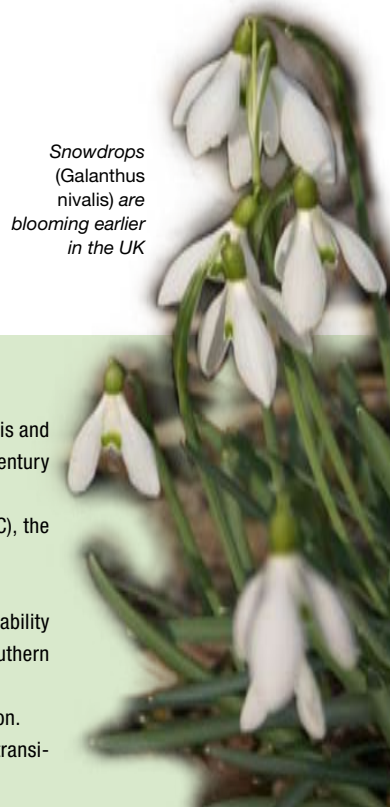
A 2006 study⁶ of migratory birds concluded that global climate change had "already influenced the species richness and composition of European bird communities". From models showing the relationship between climatic factors and bird communities in Europe, the study predicted changes for 21 communities (See box below) for projected impacts of climate change on European flora.

European plant species are already showing a shift towards earlier bud burst and flowering times, especially early-blooming and herbaceous species. In Britain, a 30-year survey of "nature's calendar" can be seen on <http://www.naturescalendar.org.uk/> the website of the UK Phenology Network. Snowdrops (*Galanthus*) are blooming earlier and butterflies such

as holly blues (*Celastrina argiolus*) are appearing earlier, as spring comes forward and autumn moves back. It also shows that swallows (*Hirundinidae*) are now migrating to the UK a week earlier, on average, than they did in 1970.

The distribution of wildlife species is expected to alter through adaptation to changes in climate. In fact, the Royal Society for the Protection of Birds⁷ says that this is already happening: "In broad terms, species move

.....
7 "Climate change and wildlife in the UK", RSPB



Snowdrops (*Galanthus nivalis*) are blooming earlier in the UK

Projected impacts of climate change on European flora

A survey by Thuiller *et al.*, 2005, within the European project "Advanced terrestrial ecosystem analysis and modelling" (ATEAM-website www.pik-potsdam.de/ateam/) on projected changes in the late 21st century distribution of 1,350 European plants species under seven climate change scenarios concluded:

- Even under the least-severe scenario considered (mean European temperature increase of 2.7 °C), the risk to biodiversity appears to be considerable.
- More than half of the species studied could be vulnerable or threatened by 2080.
- Different regions are expected to respond differently to climate change, with the greatest vulnerability in mountain regions (about 60% loss, including many endemic species) and the least in the southern Mediterranean and Pannonian regions.
- The boreal region is projected to lose few species, although gaining many others from immigration.
- The greatest changes, with both loss of species and large turnover of species, are expected in the transition between the Mediterranean and Euro-Siberian regions.

Photo: João Pedro Silva



Red-necked phalarope (*Phalaropus lobatus*) an Annex I Birds Directive endangered species that could disappear from northern Europe due to rising temperatures

polewards and to higher elevations to stay with their preferred climate. Those species that already live in mountainous areas or who are at the southern edge of their ranges in the UK – such as the red-necked phalarope wader (*Phalaropus lobatus*) and ptarmigan (*Lagopus muta*) – are likely to be hit hard by shifting climate zones and may disappear from the UK altogether. Species that occur in the UK, but are more common further south, are likely to become better established here if the habitat is right.”

Analysis of the implications of climate change for wildlife by the EEAC (European Environment and Sustainable Development Advisory Council)⁸ suggests there are likely to be major changes in the ‘natural range’ of some European species leading to changes in vegetation communities and species assemblages. The resulting challenges to conservation may also be increased by changes in the relationship between species such as plants and pollinators.

Some of the worse prediction concern arctic species – for example the arctic fox (*Alopex lagopus*) in Europe – which are threatened by reductions to sea ice. Conversely, the prospects are good for some species that are characteristic of warmer climates. Our ecosystems are also expected to become more vulnerable to introduced species that can adapt to new climate regimes.

.....
8 EEAC (2006) “Climate Change and Biodiversity – meeting the challenge”

In agriculture, the total growing period is expected to become shorter in southern Europe, as a result of drier and hotter summers, and longer but harder to realise winters in northern Europe. Forests will be at a greater risk of fire.

Implications for Natura 2000

Even with substantial reductions in greenhouse gas emissions, the climate is forecast to continue to change over the coming decades and centuries. Urgent preparation for the consequences of climate change is clearly required. As it continues to expand, the Natura 2000 network of Special Protection Areas under the Birds Directive and Special Areas of Conservation under the Habitats Directive is expected to play a pivotal role in ensuring that future nature management and conservation efforts take into account the likely impact of climate change on Europe’s biodiversity. According to the EEA, the most vulnerable European habitats and species are found in mountain, arctic,

coastal wetland and the Mediterranean regions. The effects of climate change are expected to exacerbate threats from existing stress factors, particularly habitat fragmentation and pollution, and ecosystem depletion. Migration capacity, for instance, will become crucial for species. As a result, efforts to improve resilience, connectivity and promote ‘ecological coherence’ of the network (an obligation under Article 10 of the Habitats Directive see p. 12) should strengthen the adaptive capacity of Europe’s ecosystems to climate change. Huge efforts are required.

The EEA is currently undertaking a study of the ‘spatial coherence’ of the Natura 2000 network based on increasingly available spatial data – location of sites, distribution of habitats types and species etc. The aim is to integrate this data with the growing understanding of ecological impacts, and to draw conclusions about the network’s coherence in the face of climate change.

Under risk: Europe’s amphibian species e.g., *Salamandra salamandra*



Photo: Arge Naturschutz LIFE00 NAT/A/007055

Mitigation strategies for climate change

Climate change can be combated by reducing greenhouse gas emissions and through the capturing and storing of carbon dioxide from the atmosphere – a process known as sequestration in which biodiversity has a key role to play.

Substantial cuts in greenhouse gas emissions are required to mitigate the long-term threat to climate change. But it is also widely acknowledged and highlighted, in particular, in the EU's Communication on Biodiversity that "biodiversity can help reverse the negative impacts of climate change". Protection of healthy ecosystems can help limit atmospheric greenhouse gas concentrations because forests, peatlands and other habitats store carbon and act as natural 'CO₂ sinks'. Healthy ecosystems can also limit the negative impacts on habitats and species of extreme weather conditions, which are projected to increase with global warming. Good coastal wetlands, for example, can improve protection against rising sea levels, and healthy floodplain and other wetland ecosystems can limit the effects of river flooding.

Maintaining Europe's key 'carbon sink' habitats

Natura 2000, a Europe-wide network of conservation sites, can enhance prospects for the maintenance at a 'favourable conservation status' of the main 'carbon sink' habitats, namely peatlands, forests and wetlands. Peatland areas, for example, account for around a third of the total global soil carbon pool resource, and thus their conservation represents a significant contribution towards limiting greenhouse gas emission.

The Müritz National Park (Germany) peat-bog initiative, co-funded by LIFE-Nature is a good example of the peat-habitat restoration projects currently being implemented around Europe. By raising the water levels around the lake Zotzensee in the Upper Havel area, the project helped to reduce the carbon dioxide released by mineralising peat. Since water levels were lowered in the 1970s and drainage ditches built, 20% of the peat soil had disappeared and the ground level had fallen in many places by as much as 40 cm. By arresting this decline, the LIFE project reduced CO₂ emissions by 174 tonnes a year (the equivalent of the emissions from 139 cars).



Project reference:

LIFE98 NAT/D/005081

Website:

<http://www.nationalpark-mueritz.de>

Impact of renewable energies on Europe's biological diversity

Substantially increasing the use of renewable energies offers significant opportunities for Europe to reduce its greenhouse gas emissions and to diversify and secure energy supply. Europe's commitment (March 2007) to achieve at least a 20% overall reduction in greenhouse gas emissions by 2020 includes a new 20% target for



Photo: LIFE98 NAT/D/005081

Bogs can work as natural CO₂ sinks – Müritz National Park, Germany

renewables (the current target is 10% by 2010). However, the installation of the infrastructures required to support the necessary rise in renewable energies could have a detrimental impact on Europe's biological diversity. The Communication on Biodiversity warns: "Care must be taken in prevent, minimise and offset any potential damages to biodiversity arising from climate change adaptation and mitigation measures".

Wind energy

Wind energy has undergone a tremendous growth in recent years in

continued on p.10 ➤

Wind farms can create problems for some bats and birds' species



Photo: DG Environment

Nota Bene:

- The Natura Barometer is managed by the European Topic Centre for Biodiversity and based on information officially transmitted by Member States.
- Numerous sites have been designated according to both nature Directives, either in their entirety or partially. It is therefore not possible to combine the numbers implemented under the two directives to get an overall figure for Natura 2000.
- The surface area percentage relates only to the terrestrial area that has been designated, which is the overall SPA (Birds Directive), proposed SCIs, SCI or SAC (Habitats Directive) area, not including the marine area. Some Member States have designated substantial portions of their marine waters. These are included in the number of sites and areas proposed but not in the percentage surface area or indications of progress. The sufficiency of national proposals for several marine habitats and species cannot be concluded, as further work is needed for the successful application of Natura 2000 under both directives, especially in the area of offshore marine environment.
- Several Member States have proposed large areas including "buffer zones", while others have proposed only the core areas. In both cases, Article 6 of the Habitats Directive also applies to new activities, which are foreseen outside a Natura 2000 site but likely to affect it.
- The 10 new Member States who acceded to the EU on 1 May 2004, had a duty to classify SPAs and propose SCIs by the date of their accession. All countries have submitted their lists and evaluations are ongoing.
- Concerning Bulgaria and Romania, who acceded to the EU on 1 January 2007, the next Natura 2000 Newsletter will bring details on their designations.
- The global assessment of national lists may be revised upwards or downwards, following more complete scientific analysis of the data, particularly at the relevant biogeographical seminars.

MEMBER STATES	SPECIAL PROTECTION AREAS (SPAs)					
	Number of sites	Total area sites (km ²)	Terrestrial area (%)*	Number of marine sites	Marine area (km ²)	Progress
BELGIË/BELGIQUE	229	2,964	9.7	0	0	
ČESKÁ REPUBLIKA	38	6,936	8.8	—	—	
DANMARK	113	14,709	5.9	59	12,173	
DEUTSCHLAND	568	48,102	8.9	14	16,216	
EESTI	66	12,161	12.8	26	6,394	
ÉIRE/IRELAND	131	2,815	2.9	66	810	
ELLAS	151	13,703	10.0	16	567	
ESPAÑA	512	92,378	18.3	20	574	
FRANCE	369	45,500	7.7	62	3,260	
ITALIA	566	34,683	11.3	18	763	
KYPROS**	7	788	13.4	1	21	
LATVIJA	97	6,751	9.6	4	520	
LIETUVA	77	5,435	8.1	1	171	
LUXEMBOURG	12	139	5.4	—	—	
MAGYARORSZÁG	55	13,519	14.5	—	—	
MALTA	12	14	4.5	0	0	
NEDERLAND	77	10,109	12.5	7	4,913	
ÖSTERREICH	95	9,413	11.2	—	—	
POLSKA	72	33,156	7.8	3	8,794	
PORTUGAL	50	9,956	10.1	10	622	
SLOVENIJA	27	4,656	23.0	1	3	
SLOVENSKO	38	12,236	25.1	—	—	
SUOMI	467	30,868	7.5	66	5,567	
SVERIGE	530	28,764	6.2	107	3,033	
UNITED KINGDOM	258	14,967	5.8	3	710	
EU	4,617	454,723	9.9	484	65,111	















* % of SCI or SPA terrestrial area compared to Member State terrestrial area.

** This area of the MS and the % corresponds to the area of Cyprus where the Community acquis applies at present, according to protocol 10 of the Accession Treaty of Cyprus.

For further information on SPA classification, contact: Micheal O'Brain, DG ENV.B.2.

- notably insufficient
- incomplete
- largely complete
- recent significant progress

SITES OF COMMUNITY IMPORTANCE (SCIs)

Number of sites	Total area sites (km²)	Terrestrial area (%)*	Number of marine sites	Marine area (km²)	Progress	MEMBER STATES
278	3,221	10.0	1	181		BELGIUM
864	7,244	9.2	—	—	BE	CZECH REPUBLIC
254	11,136	7.4	118	7,959		DENMARK
4,617	53,294	9.9	48	18,086		GERMANY
509	10,591	15.9	34	3,419	BE	ESTONIA
413	10,561	14.2	92	3,386		ÉIRE/IRELAND
239	27,641	16.4	102	5,998		GREECE
1,380	119,104	22.6	88	5,191		SPAIN
1,305	48,942	7.9	90	5,603		FRANCE
2,286	44,979	13.9	160	2,244		ITALY
36	711	11.5	5	50	BE ↑	CYPRUS**
331	7,651	11.0	6	556	BE	LATVIA
267	6,664	10.0	2	171	BE	LITHUANIA
47	383	14.8	—	—		LUXEMBOURG
467	13,929	15.0	—	—	BE	HUNGARY
27	48	12.6	1	8	BE	MALTA
141	7,510	8.4	9	4,025		THE NETHERLANDS
165	8,885	10.6	—	—		AUSTRIA
192	13,124	4.2	0	0.0	BE	POLAND
94	16,503	17.4	23	490		PORTUGAL
259	6,360	31.4	3	0.2	BE	SLOVENIA
382	5,739	11.8	—	—	BE	SLOVAKIA
1,715	48,552	12.7	98	5,460		FINLAND
3,981	62,557	13.7	327	5,848		SWEDEN
613	25,109	6.5	41	9,131		UNITED KINGDOM
20,862	560,445	12.2	1,248	77,807		EU



notably insufficient



incomplete



largely complete



recent significant progress



being evaluated in the context of biogeographical seminars

The situation regarding Natura 2000 sites is constantly evolving and therefore this barometer represents only a 'snap-shot' of the situation for December 2006 prior to the accession of Bulgaria and Romania.

The Natura 2000 Barometer: commentary on progress

The present barometer monitors the progress of implementing both the Habitats and the Birds Directives of the 25 Member States to December 2006. There has been significant progress in SPA designations for Cyprus, Finland, France, Germany, Italy, Malta and Sweden. Likewise, there has been notable progress in proposing SCIs by Cyprus, Finland, France, Germany, Italy and Sweden.

With the adoption of the first list of SCIs for the Mediterranean biogeographical region on 19 July 2006, there are now initial lists of SCIs for all six EU15 biogeographical regions.

The proposed SCIs for the new Member States are being evaluated through biogeographical seminars to determine whether they cover sufficiently the relevant habitats and species.

In the case of evaluating the completeness of national SPA networks, there is no biogeographical screening process, but the Commission makes use of different scientific references, including national inventories, where they exist, and the Important Bird Areas' (IBAs) publications of Birdlife International.

Europe. According to EEA indicators for energy¹, between 1990 and 2002 it was the fastest-growing renewable energy source with an average increase of 38% per year. Initially onshore, wind energy is now also being deployed offshore. However, wind farms cause various problems for species and habitats. These include:

- Collision of birds and/or bats with moving turbine blades;
- Disturbance of breeding birds caused by the presence of the turbines, and underwater noise disturbance of marine mammals;
- Barriers to movement – disrupting ecological links; and
- Change or loss of habitats due to the wind turbines and other construction.

Article 6 of the Habitats Directive calls for an appropriate ‘environmental assessment’², to be carried

1 “The European Environment – State and outlook” (EEA, 2005)

2 Directive (97/11/EC) amending Directive (85/337/EEC), on the assessment of the effects of certain public and private projects on the environment



The removal of deadwood could endanger the habitats of the threatened hermit beetle

out for all wind energy plans or programmes that are likely to have a significant effect on a Natura 2000 site. The EU is currently working on the development of guidelines on this issue.

Finally, on a positive note, the EEA study says that additional environmental pressures on biodiversity, and on soil and water resources,

from bioenergy production “can be minimised”, for example, by growing low-impact bioenergy crops and not allowing the ploughing of permanent grasslands or by adapting the intensity of residue extraction to local soil conditions. “Applying a number of environmental rules and standards seems therefore necessary when increasing bioenergy production,” the study concluded.

Biomass

According to another report from the EEA¹, “How much bioenergy can Europe produce without harming the environment?” around 4% [69 million tonnes of oil equivalent (MtOE)] of the EU’s total primary energy consumption is currently met by biomass production. (Biomass includes a wide range of products and by-products from forestry and agriculture such as trees, arable crops, algae and other plants, as well as municipal and industrial waste streams). Already accounting for two thirds of the total energy produced from renewables², this sector looks set to increase rapidly in the coming years

1 Report No 7/2006, EEA
2 Eurostat

Hermit beetle (*Osmoderma eremita*), Sweden



in order to meet the EU’s 2020 targets. However, increased production of biomass could cause additional pressures on agricultural and forestry biodiversity, and on soil and water resources, the EEA says.

High nature value farmland, for instance, holds key Natura 2000 habitats (such as grasslands) that are affected by agricultural intensification for the production of biomass crops (cereals, sunflower, potatoes etc). And forests hold key Habitats and Birds Directive species that are highly dependent on the natural dynamics of the forest ecosystems including deadwood. Increased forest biomass extraction would therefore compromise the deposition of dead-

wood. For example, the habitats of the Annex II priority species, hermit beetle (*Osmoderma eremita*), are in serious decline across Europe due to fragmentation and a lack of successors to its favoured deadwood – mainly old oak trees. To preserve its declining habitats and to raise awareness of its plight, a major conservation initiative, co-funded by LIFE-Nature, has been undertaken at 37 Natura 2000 sites in Sweden.



Project reference:

LIFE97 NAT/S/4204

Website:

<http://www5.e.lst.se/laderbagge/index.html>

Biomass extraction and the production of biofuels pose a possible threat to certain species and habitats



Adaptation strategies for climate change

Climate change is already impacting on biodiversity in Europe. Changing temperatures and water levels have serious implications for ecosystems. A 1°C increase would wipe out nearly all coral reefs worldwide. Such effects are expected to increase during the 21st century threatening the survival of those species and habitats that are unable to adapt. Nature conservation actions implemented both within and outside the Natura 2000 network could reduce the threat of climate change to species and habitats and increase their adaptive capacity.

Habitats and their associated species should be assisted in adapting to climate change, and other stress factors such as land-use intensification and fragmentation, in two main ways: by increasing their resilience to disturbance and improving the connectivity between their core areas.

Maintaining ecosystem resilience

The Natura 2000 network has a key role to play in halting the loss of biodiversity through climate change. By maintaining at Favourable Conservation Status species and habitats of Community interest, the network should help to increase their resilience i.e. their capacity to adapt after a disturbance such as climate change. The EU's most urgent priority is therefore to reinforce the implementation of the network of sites and to strengthen significantly its connectivity and cohesion. Such a cohesive network will allow the most resilient habitats and species to migrate and is therefore most likely to provide the source for shifting ranges of habitats and species.

Many protected sites, however, risk isolation from the rest of the network

through being surrounded by areas of urban development or agriculture. Such fragmentation of the network strongly limits the long-term adaptive capacity of species and habitats to survive climate change. Furthermore, as climate change pressures increase, the long-term survival of populations

within these isolated locations may become unsustainable, and species may become extinct if they are not able to move to another suitable area ('climate space')¹.

Natura 2000 facilitating adaptation by ensuring connectivity

Recent scientific models, which take into account the effects of climate change, have shown that species are shifting over time towards northern latitudes and higher elevations in search of their optimum 'climate space'. Other key European studies exploring adaptation strategies, through modelling techniques include: the "BRANCH" project in North West Europe funded by INTERREG IIIB; and the ongoing (to November 2007)

Mouflon (ovis ammon musimon) on the island of Corsica - a LIFE-Nature project shows climatic changes, for example the heat-wave of summer 2003 and the harsh spring of 2004, are threatening the survival of this Annex II Habitats Directive species



LIFE03 NAT/F/000099

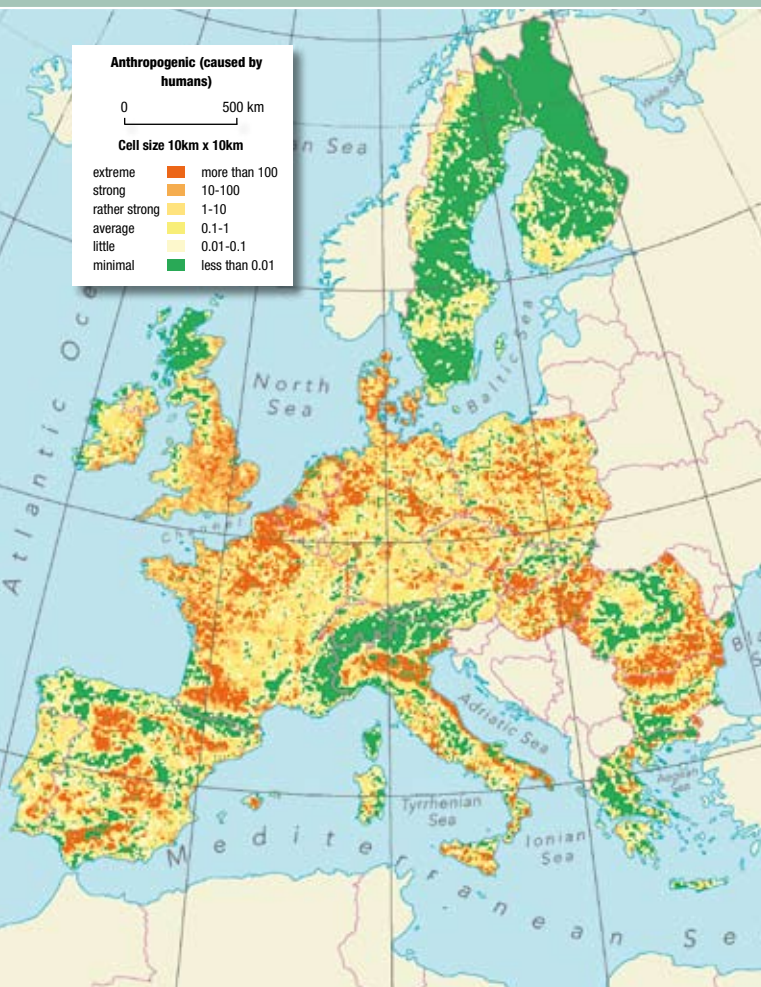
Photo: LIFE02 NAT/A/008518

Maintaining habitats and species at a favourable conservation status improves their resilience to extreme weather events, for example floods - the River Danube, Austria (2002).



¹ Thuiller et al, (2005) "Climate change threats to plant diversity in Europe", PNAS 102: 8245-8250

Fragmentation of natural areas by urbanisation, infrastructure and agriculture



Source: Copyright EEA, Copenhagen. See website <http://www.eea.europa.eu>

EU-wide DG Research project "MACIS" (see p. 13).

In practice, the promotion of coherence and interconnectivity in Europe means the implementation of Article 10 of the Habitats Directive (see box above right) and the actions set out in Objective 9 of Commission's Communication on Biodiversity, including the application of biodiversity climate change adaptation tools, such as flyways, buffer zones, corridors and stepping stones (connecting where appropriate neighbouring and third countries).

National strategies for adaptation to climate change have been drawn up by countries such as Finland, Denmark, the UK and Germany. These can provide the foundations of a more integrated policy framework through which Europe's natural environment can be conserved, enhanced and managed under climate change. For example,

Photo: LIFE98 NAT/IT/5114

Finland's national strategy, which was completed in 2005, outlines a wide range of measures to protect biodiversity. Although many of these ideas are already integrated into nature conservation policies in Finland, the strategy stresses the need to anticipate the impacts of climate change by:

- Reducing the pressure of human activities on the environment by controlling land use and reducing pollution.
- Improving the monitoring, planning and information systems for biodiversity, including conducting an evaluation of the impacts and threats

Trees advancing into alpine meadows partly in response to warmer temperatures - Italian Alps



Climate change and implementing Article 10 of the Habitats Directive

Ecological coherence refers to the sufficient presence of habitats and species to ensure their favourable conservation status across the whole of their natural range. Article 10 of the Habitats Directive requires Member States to strengthen "coherence" of the Natura 2000 network. The scientific community has long since recognised that ecological coherence as well as habitat quality is essential for the long-term survival of many species and habitats. Protected sites that make up the Natura 2000 network, however, are often not adjoining, and in many areas of the network little attention has been paid to ecological and spatial coherence. The directive gives the example of river management plans that ensure continuous and connected habitats for migrating species.

But such management plans must also take into account the effects of climate change on the habitat. Management plans that strengthen coherence can be an effective tool in safeguarding habitats and in particular migrant species whose habitats may disappear as a result of climate change.

In recognition, however, that more attention needs to be paid to Article 10 of the Habitats Directive, a workshop on ecological networks and coherence was held in May 2005, at the International Nature Conservation Academy on the Isle of Vilm. The workshop concluded that "ecological coherence of protected areas is a key element to securing the target to maintain or restore biodiversity and will be a major step towards reaching the target to halt the decline of biodiversity by 2010. [It] is of particular relevance when considering the impacts of climate change."

Mapping tools are also useful for improving coherence in the Natura 2000 Network. The monitoring activities of some LIFE programmes along with other initiatives – for example the European Environment Agency study of the Natura 2000 network – help map out the network's vulnerability to climate change. Such a map will inform approaches to the implementation of Article 10.

MACIS – exploring climate change impacts on biodiversity

The two-year “MACIS” (Minimisation of and Adaptation to Climate change Impacts on biodiversity) project, that runs until November 2007, will review and analyse existing projections of climate change impacts on Europe’s biodiversity.

The project will identify policy options, in particular at EU level, to prevent and minimise future negative impacts from climate change and from climate change adaptation and mitigation measures. It will develop strong links with several other EU projects and co-operate with COCONUT, the sister project of MACIS. Both of these projects will work closely with the IP ALARM, in particular with the climate change module, and will build on the results of other projects such as the completed projects BIOASSESS and BIOPRESS, under the 5th Framework Programme for Research.

For more information: <http://macis-project.net/index.html>
www.coconut-project.net
www.alarmproject.net
www.nbu.ac.uk/bioassess/
www.creaf.uab.es/biopress

of climate change on ongoing planning and development projects and the evaluation, development and monitoring of the extent of the network of protected areas

- Maintaining, restoring and managing the use of valuable natural habitats and biotopes – including forests, farmland, wetlands and mires – with changes in policy towards the management and use of protected areas, where necessary.
- Increasing co-operation and consultation between the different administrative sectors and the provision of more information and training for related professionals.
- Evaluating the possibilities for *ex situ* protection to prevent the extinction of species.
- Carrying out general habitat-level and supplementary species-level follow-up assessments.
- Controlling and preventing the spread of invasive alien species

For further information see:

http://www.mmm.fi/attachments/5enfdAPe1/5kghLfz0d/Files/Current-File/MMMjulkaisu2005_1a.pdf.

At a trans-national level the recently completed LIFE project “RESPONSE” (see page 14) examined adaptation policies for protecting biodiversity under the likely impacts of climate change in the coastal areas of the UK, France, Italy and Poland.

Climate change affecting ecosystem goods and services

The conservation and management of species and habitats is essential for protecting the goods and services on which people depend. This means, for example, that by maintaining the Favourable Conservation Status of the ecological functions of forest habitats within Natura 2000 sites, forest species and habitats’

BRANCH – adaptation through spatial planning and land-use systems

The “BRANCH” (Biodiversity Requires Adaptation in Northwest under a CHanging climate) project, funded by the INTERREG IIIB programme, advocates change to spatial planning and land-use systems to allow wildlife to adapt to climate change by:

- Reviewing existing spatial planning policies and recommending a new policy framework to provide greater resilience for biodiversity;
- Modelling how European wildlife will respond to climate change;
- Developing planning options and tools to tackle the impacts of climate change on coasts;
- Assessing the impact of climate change on inland ecosystems and ecological networks; and
- Engaging stakeholders to integrate adaptation to climate change at all planning levels.

For more information: www.branchproject.org

Photo: Thomas de Dorlodot



Managing land-use improves the connectivity of Natura 2000 sites – a key adaptation measure for biodiversity

resilience to climate change related weather extremes, such as storms and droughts, could be improved. It could also reduce the vulnerability of forests to new invasive species and pests. Such measures would improve the overall adapting capacity of forest ecosystems and benefit those who depend on forests for their livelihoods.

Looking ahead

Adapting to climate change and protecting Europe’s biodiversity will require the full and forceful implementation of the Natura 2000 network. New partnerships will need to be forged and nature conservation and management issues will have to be integrated into future EU agriculture, forestry, fisheries and economic development programmes and policies. The Commission’s Green Paper on adaptation to climate change impacts is planned for adoption by the summer 2007. This paper will also be significant in promoting this discussion and helping to define nature conservation policies and sustainable development compatible with climate change.

Europe's coast – the frontline of climate change

Coastal areas contain some of the most vulnerable ecosystems to climate change. A LIFE-Environment project, however, developed an innovative mapping technique that can inform better management of coastal regions.

Photo: LIFE03 ENV/UK/000611



The chalk cliff lines of the Côte d'Albâtre, France have been eroded by the sea to form caves, arches and stacks

Climate change has been linked to a higher rate of coastal erosion and higher sea-levels, increasing the risk of flooding and resulting in significant habitat loss. Changing sea temperatures, which affects the type and quality of fish stocks, is another important impact.

A better understanding of these impacts is essential for coastal management planning, and the LIFE "RESPONSE" project was set up by The Isle of Wight Centre for the Coastal Environment to meet this challenge. In partnership with nine

organisations from the UK, France, Italy and Poland, it collected data on coastal behaviour systems in five study areas across Europe. As part of the project, the centre developed an innovative technique for interpreting such data in order to predict coastal changes.

Taking into account historical records, the project was able to map coastal features, monitor changes over time, predict future changes and identify specific local areas of risk. This methodology can be used in any coastal region to allow local authorities and stakeholders to make informed coastal planning and shoreline management.

A key advantage of the technique is that it can be used to identify areas

most at risk to the effects of climate change. Climate change can have a significant impact on sediment transfer, affecting coastal habitats such as salt marshes and sand dunes. Management plans must account for increased sediment movement and include corrective measures to protect vulnerable habitats. For more information on the project and to access the project's dissemination tools including a Training Pack, Good Practice Guide, CD-Rom and DVD, visit the project website.



Project reference:

LIFE03 ENV/UK/000611

Website:

<http://www.coastalwight.gov.uk/response.html>

Enlargement

Bulgaria and Romania: new biogeographical regions

Bulgaria and Romania make a great contribution to the biodiversity of Europe. Nearly half of Romania constitutes areas of natural habitats and ecosystems, and the country is home to one of the largest undisturbed forests in Europe and its largest wetland, the Danube Delta. Bulgaria is also very rich in biodiversity, particularly its mountain and coastal areas.

The accession of Bulgaria and Romania brings two new biogeographic regions to the EU: Steppic and the Black Sea. Many plant and

animal species are endemic to these countries, and other species such as the brown bear (*Ursus arctos*), the lynx (*Lynx lynx*) or the wolf (*Canis lupus*), which have disappeared or are barely surviving in other European countries, have a very good conservation status. For instance, about 40% of the wolves and 60% of the bears in the European Union (EU27) live in Romania.

The next issue of the Natura 2000 Newsletter will provide further details on designation of Natura 2000 sites in these two countries.



Carpathian mountains, Romania

Photo: LIFE02 NAT/RO/008576

natura News

New EU business and biodiversity initiative

A new EU Business and Biodiversity Initiative is being developed by the Commission together with Portugal (in its role as next Presidency of the EU) in partnership with Member States, business and other stakeholders, to engage the Business community in the challenge of halting biodiversity loss by 2010.

The Initiative aims to introduce biodiversity considerations into corporate governance using voluntary mechanisms. Portugal has identified this issue as one of its environmental priorities for its Presidency and will host a major stakeholder conference on Business and Biodiversity in Lisbon in November 2007.

http://ec.europa.eu/environment/nature/nature_conservation/natura_2000_network/financing_natura_2000/guidance/index_en.htm

Countdown 2010

Countdown 2010, the network of partners working together to achieve the 2010 biodiversity target, continues to develop. Launched in 2004, and supported by the European Commission, it now assembles more than 200 local and national governments,



civil society organisations and businesses.

www.countdown2010.net

Brochures on biogeographical regions

A series of attractive brochures on Natura 2000 sites in five biogeographical regions has just been published by the European Commission. The brochures cover Natura 2000 sites in the Alpine, Atlantic, Boreal, Continental and Macaronesian regions. Highlighting the key conditions and influences on main habitat types and species groups in the five regions, they also detail up-to-date lists of Natura 2000 sites for each of the regions. Printed copies can be ordered free of charge at <http://bookshop.europa.eu/uri?target=EUB:AUTHOR:ENV:EN>.

An electronic version is also available at:

http://ec.europa.eu/environment/nature/nature_conservation/useful_info/documents_publications/index_en.htm

EU guidance on Article 12 of Habitats Directive

The Commission has just published new guidelines on the strict protection of animal species under the Habitats' Directive (92/43/EEC). The document concerns Articles 12 (and 16) of the Directive and is intended to ensure a clear understanding of the respective provisions among national and regional authorities, conservation and other organisations concerned with the implementation of the Habitats Directive. The document should assist in the setting up of pragmatic and flexible ways of implementing the directive in a legal framework.

The document is available in electronic format at:

http://ec.europa.eu/environment/nature/nature_conservation/species_protection/specific_articles/art12/index_en.htm

EU guidance on Article 6(4) of Habitats Directive

New guidelines on Article 6(4) of Habitats Directive relating to management of the Natura 2000 sites have just been published. They are intended to be read in conjunction with a booklet published by the Commission in 2000, entitled "Managing Natura 2000 sites. The provisions of



Handshake between José Manuel Barroso, (left) and Claire Papazoglou, Head of the European Office of BirdLife

Photo: European Commission

President Barroso says biodiversity conservation is a vital part of Europe's future

European Commission President José Manuel Barroso gave a strong statement about the importance of biodiversity conservation in Europe at the launch earlier this year of a new report from BirdLife International, "Wellbeing through Wildlife in the EU". The President, who wrote the brochure's foreword, emphasised that "biodiversity is integral to sustainable development, underpins competitiveness,

growth and employment and improves livelihoods". Using different case studies from across Europe, including LIFE projects, the brochure promotes awareness about the value of biodiversity for health, quality of life and prosperity of EU citizens.

More information:

http://www.birdlife.org/news/news/2007/02/barroso_meeting_EU.html

Article 6 of the 'Habitats' Directive", the new document aims to further develop and replace the section on Article 6(4) of this earlier publication. Specifically, the guidelines provide clarification of the concepts of "alternative solutions", "imperative reasons of overriding public interest", "compensatory measures", "overall coherence", and the "opinion of the Commission".

The document is available in electronic format at:

http://ec.europa.eu/environment/nature/nature_conservation/eu_nature_legislation/specific_articles/art6/index_en.htm

Publication on EU nature and biodiversity cases



A useful new publication contains a selection of nature and biodiversity European Court of Justice rulings related to the

Articles of the Birds and Habitats Directives. The first part examines statements of the Court, as they were pronounced in each particular case, while the second part provides further background to those rulings. Internet links are provided for the main cases.

Published in English, (128 pp) an electronic version is available at: http://ec.europa.eu/environment/nature/nature_conservation/useful_info/documents_publications/pdf/ecj_rulings_en.pdf

Discover Europe's Nature – nature leaflet for schools



A colourful new leaflet for schools is the latest of a series of brochures and posters on European nature and Natura 2000 that are freely available to schools throughout Europe. The leaflet includes background to nature in Europe and to the Natura 2000 network. It provides details of "Flying over Natura 2000" an interactive project <http://www.flyingover.net> tracking the migrations of black storks

and encouraging schoolchildren to follow bird movements across Natura 2000 sites.

Electronic copies can be downloaded at:

http://ec.europa.eu/environment/nature/nature_conservation/useful_info/documents_publications/pdf/leaflet.pdf

Print versions can be ordered at <http://bookshop.europa.eu/uri?target=EUB:AUTHOR:ENV:EN>

European Mammal Assessment

A European Mammal Assessment (EMA) – a comprehensive status assessment of Europe's 260 mammal species based on the IUCN (the World Conservation Union) 'Red List' categories and criteria – has been carried out by the IUCN on behalf of DG Environment. This is the first time that European mammals have been evaluated according to the Guidelines for Application of IUCN Red List criteria at regional levels, and as such is an important contribution to our understanding of the threats facing Europe's mammals, and the action required to improve their status. Over 150 scientists from more than 40 countries in Europe and adjacent regions have contributed to the project.

For further details, visit the website:

<http://ec.europa.eu/environment/nature/conservation/species/ema/>



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Alternatively, you can view this newsletter, together with other information and documents at the EU's nature and biodiversity homepage: http://ec.europa.eu/environment/nature/nature_conservation/useful_info/documents_publications/index_en.htm

For details on LIFE and LIFE-Nature projects see: <http://ec.europa.eu/life/>



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