

European Climate Change Programme

**Working Group II
Impacts and Adaptation**

**Biodiversity
Sectoral Report**



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The EU's Adaptation Programme

Adaptation is a new policy area for the European climate change policy. The Impacts and Adaptation Workgroup has been set up as part of European Climate Change Programme (ECCP II). The main objective of the workgroup is to explore options to improve Europe's resilience to Climate Change Impacts, to encourage the integration of climate change adaptation into other policy areas at the European, national and regional level and to define the role of EU-wide policies complementing action by Member States.

The aim of this initial programme of work is to identify good practice in the development of adaptation policy and foster learning from different sectoral experiences and explore a possible EU role in adaptation policies.

The Commission has led a series of 10 sectoral meetings looking at adaptation issues for different sectors. One of these meetings looked at the impacts on biodiversity in particular. This report summarises the state of play in biodiversity in relation to adaptation to climate change on the basis of the information gathered at the stakeholder meeting on May 29, 2006.

Key impacts of climate change on biodiversity

Species from a variety of groups, such as plants, birds, mammals, insects and fish are already being impacted by climate change. This can be concluded for example from observed shifts in species distributions and abundance over time and from changes to the timing of seasonal (phenology) and reproductive behaviour. Species range shifts have been observed that are as large as 400 kilometres per century, or 11 meters per day. Birds are arriving from their annual migration earlier and egg laying dates have advanced by about 9 days in 25 years for several species. Not all species will be able to respond by dispersal to such rapid changes, and some are likely to suffer reduced populations or become extinct. Fragmentation of landscape and semi-natural habitats is likely to increase the vulnerability to changes in climatic conditions of species with limited dispersal capacity.

Research, through both observation and modelling studies show that major impacts of climate change on biodiversity may include:

- changes in seasonal timings will affect species' dependencies and reproductive success of species,
- shifts in location of suitable "climate space" and the distribution of species, raising issues of suitability of habitat in new areas of climatic suitability,
- impacts of extreme weather events on species survival,
- changes in habitat composition and structure as species move northwards, including the expected increase in invasive species and diseases,
- increased extinction risk where population numbers are low, habitats are restricted or patchy, and climatic/geographic ranges are limited,
- impact of changing land use as agriculture, water, forestry and other countryside industries and interests adapt to climate change.

Biodiversity and semi-natural habitats and ecosystems are already exposed to many other pressures and environmental threats besides climate change. These pressures include pollution, habitat fragmentation and land use change. Ecosystems that are already exposed to these other environmental threats can be more vulnerable to

climate change impacts. These factors need therefore to be addressed in order to reduce the vulnerability of biodiversity and ecosystems to climate change.

The impacts of climate change mitigation measures on biodiversity, for example the development of biomass production and wind farms, also need to be assessed to ensure that inappropriate measures and developments are not taken forward. Key areas where coordination is necessary to avoid conflicts and strengthen synergies include agriculture and bio-energy production.

The seriousness of biodiversity loss in general also needs to be recognised, which the EU Heads of State already committed to halting in the June 2001 Gothenburg Environmental Council. Climate change is likely to exacerbate this loss further, so it is vital that biodiversity considerations are strongly integrated into EU climate change policy so that they support efforts to reach this existing EU target.

Existing/relevant policies at the EU level

The most important EU level policies for biodiversity and related activities are:

- Birds Directive (79/409/EEC),
- Habitats Directive (92/43/EEC),
- development of Natura 2000 designated protected areas,
- Gothenburg target (2001): halting the loss of biodiversity by 2010,
- Environmental Impacts Assessment Directive,
- Strategic Environmental Assessment Directive,
- EU Biodiversity Strategy (1998),
- EC Biodiversity Communication (COM(2006) 216 final).

Related EU level regulations that affect biodiversity are:

- Water Framework Directive (WFD),
- Common Agricultural Policy (CAP).

The position and priorities for action of the European Commission regarding climate change and biodiversity are laid out in the Biodiversity Communication 'Halting the loss of biodiversity by 2010' released in May 2006. Relevant commitments are also contained in the decisions taken under the Convention on Biological Diversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC).

EU policies related to the marine environment and marine biodiversity are treated separately in the sector reports on marine resources and coastal zones and tourism.

Examples of existing initiatives at Member State level

Some examples from Member States presented at the meeting included the following:

An assessment of climate change risks and options for adaptation for protected areas is being undertaken in Germany. The German Federal Environment Agency is organising a stakeholder dialogue and will establish a competence centre on climate change impacts in all sectors. The Federal Environment Ministry has announced the completion of a strategy paper on nature conservation and climate change by 2008.

In The Netherlands, the Natura 2000 sites are reflected in the Nature Policy Plans of 1990 and 2000. Large-scale spatial cohesion is being achieved through these ecological networks. However, these corridors may be too limited and should be linked to neighbouring EU countries to be effective for climate change adaptation.

Finland has included biodiversity in its National Strategy for Adaptation to Climate Change. Expert judgment was used for assessing the impacts on biodiversity. Some research gaps were identified, and more modelling is needed for particular species.

Gaps identified

A full overview of Member State activities is missing, as there is no consistent monitoring and reporting on biodiversity and related policy planning and implementation at the Member State level. Such an overview would however be desirable. An EU-wide programme of identifying vulnerability and monitoring the impacts of climate change needs to be developed and implemented to inform the development of climate change adaptation measures.

The most vulnerable biotopes and species are often either not known or not systematically monitored and thus cannot yet be addressed by dedicated adaptation measures.

Climate change will trigger new patterns of species dispersal, distribution and migration. The biodiversity policy and strategy need to respond to new movements and distributions of species and to the implications of community change. In the future, policy and strategy may need to address the changes in community composition and structure of biotopes and ecosystems, which may lead to previously unknown species assemblages. Therefore, the perception of the Natura 2000 network of protected areas as a static system, mainly intended to maintain the status quo of each site, needs to be altered. The focus should be on maintaining viable populations and resilient ecosystems. The Natura 2000 sites will remain as essential components of EU conservation delivery but will need to be viewed increasingly as components of a landscape scale approach to biodiversity conservation. Therefore, more focus needs to be given to the establishment of habitat networks and larger areas of semi-natural habitat within the landscape to provide connectivity.

Notwithstanding the inevitability of climate change, there are also gaps in developing management practices for natural, semi-natural and human-use land areas (e.g. agriculture) to reduce the impacts of climate change on biodiversity. Policy, strategy and action therefore need to develop along two concurrent, complementary paths: of building resilience of the existing suite of sites and species to the impacts of climate change, while also seeking to accommodate and facilitate the inevitable responses of biodiversity to climate change to retain and enhance the breadth and abundance of biodiversity of protected areas and the wider countryside.

Since habitat fragmentation restricts movement, landscape-scale connectivity and permeability need to be improved, while the protected areas have an important role to play as refugia.

Focus only on one single species is not recommended as a landscape approach is considered to be the most relevant. Nonetheless, individual species are the building blocks of biological communities; habitats and ecosystems and thus conservation must not lose the species focus, as biodiversity policies develop to encompass both protected areas and the wider countryside.

The influence of other threats needs to be reduced both within and outside of protected areas. Sectoral integration is an important tool to achieve landscape-scale conservation. Challenges remain in integration and need to be worked on continuously. At present, the CAP does not provide sufficient incentives for biodiversity-friendly practices.

Also, the framework for dealing with invasive species at EU level is still insufficient.

Opportunities for the EU level

Knowledge and information

There is a need to encourage Member States to share their experiences in addressing the impacts of climate change on biodiversity, and for the development of strategies for adaptation to increase resilience and build accommodation for biodiversity under climate change.

There are currently many policies for biodiversity conservation and adaptation to climate change can be part of those policies. Current biodiversity conservation may be seen to conserve species in a static sense and some aspects of adapting to climate change will require a more dynamic approach. This can be accommodated by addressing climate change adaptation and biodiversity policies through an integrated landscape approach, encompassing both protected areas and other sectoral countryside interests.

Vulnerable species and ecosystems need to be identified and assessed to see whether specific assisting measures can be developed to increase their resilience and natural adaptation capacity in the face of climate change. Measures that work with the grain of nature will be preferable, although some other short-term measures may be required for the longer-term sustainability of adaptive measures.

Extreme weather events play an important role in determining the impacts of climate change on biodiversity, as was observed for instance during the 2003 heat wave in Europe. Several hard-hitting impacts of extreme weather on specific species are documented, including response to heat stress, drought, and spring rains. Ecological systems can rapidly degrade because of weather extremes, while recovering only slowly. Impact assessments and modelling studies however rarely consider the impact of extreme weather events.

In addition to modelling, which is useful as a broad guidance for policy-makers, *in situ* monitoring, phenological observations, and field experiments are essential to establish actual species, habitat and ecosystem responses to climate change. For example, it is not possible to model the impacts of climate change on individual species with accuracy, without robust observational data. Modelling projections should therefore be treated with care and understanding of their caveats and limitations. Use of a wide range of scenarios should be used to explore the range of uncertainty.

Both modelling and observational research (phenological networks) are valuable for informing the media and the general public on the impacts of climate change on the natural environment and the scale of responses needed to address its causes and impacts. Approaches for the dissemination of knowledge and information which can inform biodiversity conservation practices, for example ConservationEvidence.com¹, should receive more attention.

¹ <http://www.conservationevidence.com>

Policy planning process

Climate change is a major concern for biodiversity and has to be taken into account in policy to reach the target as defined in the EU action plan to halt biodiversity loss by 2010 (Gothenburg Target).

The most important existing biodiversity policies in the EU are the Habitats and Birds Directives and the associated implementation of the Natura 2000 sites network, as well as national Member State policies for nature conservation. The need for these is even higher with increasing impacts from climate change. The essentially static approach of the Habitats and Birds Directives and the Natura 2000 network may however become insufficient to accommodate the future impacts of climate change. However, they provide an essential resource from which to develop nature conservation in the face of the impacts of climate change.

While protected areas will not be immune to climate change impacts, they will continue to act as sites of high nature value. They are also the places where conservation management takes precedence over other interests and they can therefore be managed for optimal biodiversity given the impacts of climate change. The Natura 2000 network sites and the Pan-European Ecological Network (PEEN) are the core areas for assisting or better allowing ecosystems to adapt to climate change. Consequently, the immediate and highest priority is to ensure a proper and swift implementation of the Natura 2000 network, as well as the need to increase connectivity between the sites.

A stronger focus should be placed on the dynamics of ecosystems and the function and value of ecosystems and on networks and corridors rather than single areas. Space is required to allow ecosystems to respond to climate change impacts in a natural way, by migration, shift in species composition and changing food webs, etc. This approach however should not come at the expense of abandoning species and habitat conservation targets and actions; these rather need to be seen in a wider context of the landscape.

The EU should extend conservation planning across whole landscapes, including across national borders, in order to improve the coherence of the Natura 2000 network and the biodiversity value of the surrounding matrix. This is in accordance with the Pan-European Biological and Landscape Diversity Strategy (PEBLDS); the Habitats Directive, with particular focus on Article 10 of the Natura 2000 network. The latter recognises that the coherence of protected areas needs to be improved through enhancement of the connectiveness through landscape elements. Climate change is a major concern for biodiversity conservation and should be translated into policy to reach the targets as defined in the EU action plan to halt biodiversity loss by 2010 (Gothenburg target), and also in the forthcoming evaluation of the nature Directives.

The Water Framework Directive aims to achieve a good ecological status of surface water and the protection of pristine waters within the EU by 2015. This policy will contribute to the protection of ecosystems, as well as to increased connectivity of water elements within the landscape.

Other priorities related to biodiversity are:

- halt biodiversity loss across the EU by 2010 (Gothenburg Target),
- establish a network of Marine Protected Areas (Johannesburg Commitment),

- achieve ecological connectivity within Natura 2000 network and promote cross-border ecological networks (Malahide Message),
- use of the CAP and EU budget reforms to integrate biodiversity conservation within other key sectors for planning and delivery of conservation objectives and targets,
- activities to address the issue of invasive species at the European level should be supported.

The EC Biodiversity Communication annex includes a list of actions to be taken by the EU and Member States on biodiversity and climate change. The ECCP II should be produced in reference to these existing agreed actions to ensure consistency between the two policy approaches.

Economic stimuli

For the wider countryside, the effects of CAP instruments are very important in providing permeability and connectivity to biodiversity in the landscape to assist the dispersal and re-distribution of species. Farmers must be assisted to contribute to improved landscape cohesion, for instance with support from the European Agricultural Fund for Rural Development (EAFRD).

Integrating adaptation to biodiversity conservation within and across all the key sectors represents a major opportunity for both wildlife and agriculture sector development. There is a need to seek synergies within sectoral activities and sectoral policy integration, as challenges and conflicts remain in integration and need to be worked on continuously. Policy tools for this are available, for example Strategic Environmental Assessment, Environmental Impact Assessments and spatial planning procedures, and these tools could be used more effectively to address biodiversity concerns.

Sectoral adaptation and land ownership are important when considering the establishment of ecological networks to facilitate landscape-scale connectivity, through both improvement of the quality of biodiversity for the wider countryside and through the enhancement and creation of more semi-natural habitat as stepping stone, corridors and other means to reduce fragmentation. CAP reform could offer an important mechanism that can be used to help get wildlife back into the countryside, in order to help provide ecological connectivity and integration of the Natura 2000 network.

EU policies should be further harmonized both across sectors and within the field of environment. Integration of biodiversity concerns into mitigation and adaptation activities of other sectors in accordance with the principles laid down in the Biodiversity Communication should be a key consideration throughout the ECCP II process.

Actions relevant at national/regional/local level

An overview of Member State activities is not currently available; there is therefore a need to undertake monitoring and reporting on Member State activities, in order to contribute to an overview in this respect.

Better international coordination of conservation activities is needed, including establishing cross-state boundary connections between protected areas. The latter is important as the species may disperse across national boundaries.