

Climate change and Biodiversity: challenges for European policy

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Introduction

There's little doubt that greenhouse gases released by burning of fossil fuels are a key factor in changing Earth's climate. The atmosphere's level of carbon dioxide now is higher than it has been for hundreds of thousands of years. Since 1950 global temperatures are shooting up faster than at any other time in the past thousand years. Runoff from melting glaciers and polar ice caps, and the expanding volume of warmer oceans play the major role in raising global sea level.

Climate change is progressing so quickly that plant and animal species will not have the time to adapt and avoid extinction. Striking signs from all over the world are recently summarized by the National Geographic Society (ref. 1). Unlike in past millennia, flora and fauna must survive in a world that is also home to 6.3 billion people; species' escape routes are more or less blocked by man-made fragmentation of their habitats.

Shifting ecosystems and species

Besides changes in phenology, such as observed trends in earlier migration, hatching or flowering etc., climate warming leads to a polewards (or upwards) shift in many ecosystems. The composition of those ecosystems is likely to change, as species will not shift together. Dispersal rates are fast for grasses and much slower for trees. Ecosystem and climate models suggest that, on a broad scale, the climatic zones suitable for temperate and boreal plant species may be displaced by 200-1200 km northward by the year 2100; the maximum dispersal rates of common tree species are less than 100 km per century (ref. 2 & 3).

In terms of potential risks to biodiversity, the impact of climate change in Europe can be classified under two headings: rise in average temperature, and an increased fluctuation of weather conditions leading to increased perturbations in ecosystems. While temperature rise is affecting all ecosystem types, weather fluctuations (extreme rainfall, dry and hot summers) may be particularly important in wet ecosystems, in the lower parts of catchment areas and in river deltas, but also in dry ecosystems (ref. 4).

The risk of extinction will increase for many species, especially those that are already at risk due to factors such as low population numbers, restricted or patchy habitats, limited climate ranges, or occurrence on islands or near the top of mountains. Thus, biological diversity even in European nature reserves is under threat from rapid climate change. Networks of habitats linked by corridors will be required to facilitate dispersal and migration for plants and animals.

Ecological networks

The concept of ecological networks was officially recognised in Europe as an important approach for biodiversity conservation in the Pan-European Biological and Landscape Diversity Strategy (PEBLDS). It was endorsed in 1995 by 54 States in Europe and calls for the development of the Pan-European Ecological Network (PEEN). The Habitat Directive of the European Union acknowledges (in Article 10) the importance of landscape elements that enhance connectivity. Whilst building the EU ecological network Natura 2000, the Directive encourages member states to include corridors in their land-use planning and development policies.

Other global and European policies, such as the Bonn and Bern Conventions, oblige contracting parties to take effective measures in conservation and management of the listed species and habitats. Finally, during the Seventh Conference of Parties of the Convention on Biological Diversity, in 2004, ecological networks were incorporated in the work program on protected areas as a key conservation strategy.

As mentioned before, corridors strengthen the spatial cohesion of the network of habitat patches, which is crucial for the survival of many species. Related to the movement capacity of the species, corridors have to be tailor-made and/or species-specific in order to function effectively (ref. 5). Moreover these connections need

measures against fragmentation of habitats by highways and other infrastructure by means of the construction of road crossings or underpasses.

Problems in the field of habitat fragmentation have to be solved by integrating them in the process of spatial planning. Therefore the application depends on decisions of planners and politicians, water authorities, farmers and other land use sectors. Practical solutions should be part of action oriented strategies, such as PEBLDS, and for the allocation of European funding sources, such as the EU Life Program, the Rural pillar of the Common Agricultural Policy, and EU Structural Funds. In view of the impact of climate change on habitats and species, counteracting habitat fragmentation should receive much more priority in these EU policies.

Conclusion

We must realise ourselves that nature is now intensively responding to climate change. The response is more dynamic, divers and unpredictable than we wish. Our responsibility for nature remains unchanged. This urges us to a shift in conservation focus from the local level towards the regional and international level; a shift from isolated protected areas towards landscape networks, including large nature areas as well as rural areas with a high density of nature coverage; and a shift from a defensive conservation strategy towards a dynamic landscape development strategy, based on coalitions with other functions.

References

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