

## Exploring the consequences of climate change for EU nature protection policies

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Two conflicting points of view are nowadays debated about the future of protected areas. The first one emphasizes that current protected areas are important, even in a global change context, especially because they may be the place where new biodiversity patterns will emerge (Lovejoy). The second one points out that landscapes have always been dynamic and that the basic paradigm of keeping things the same is wrong. This argues in favour of a more integrated approach.

Climate change has already a huge impact on nature, in a range of different ways: species distribution changes, extinction of species, or changes in phenology for instance, which are widely documented. The greatest impact is supposed to occur mainly for specialised or rare species. However, knowledge focuses on a pretty small amount of taxa. The species envelop modelling approach allows us to project the current changes into the future, based on the climatic requirements of species. Nevertheless the caveats of this approach are large: the models are only describing areas of suitable future climates and they do not take into account dispersion abilities of the species, migration speed, connectivity between habitats nor barriers to migrations. Though maps are appealing, it is often an optimistic picture. Paleoecological data can also provide useful information on migration routes during the last glaciations. According to these data, some species seems to be very mobile, following climate changes, which could sound optimistic for the future. However we need to take into account current fragmentation of agricultural landscapes and land use changes. Paleoecological data allows identifying bottlenecks for migration and refuges which are important zones to be protected.

These approaches could be used to assess the most vulnerable areas in Europe in a context of climate change, and the suitability of a conservation network such as Natura 2000. In a first glance at Natura 2000 sites, we can see that the spatial configuration and amount of sites vary a lot between countries. Moreover, Natura 2000 sites were not designed to deal with species moving out of the sites (even if the dense network may allow some movements if the connectivity between sites is high). One solution could be to try to increase the connectivity between sites by creating habitat corridors. But considering the difficulties faced by certain countries in the sites designation, because of land use intensity and other demands competing with conservation, this option is probably extremely difficult to implement. A second solution could be to implement landscape permeability in some win-win approaches. Some importance characteristics of the landscape (such as hedgerows or field margins) can have also economical benefits (pest controls, wind protection, etc.). A third and quite extreme solution may be the translocation of endangered species with bad dispersion abilities to suitable areas.

Should nature conservation policy respond to climate change and how? Three strategies may be identified: (1) preservation, focusing on the current protected areas; (2) intervention: translocation, habitat creation, corridor building, creation of new species assemblages; (3) laissez-faire, because the magnitude of change will probably overwhelm any effort. Depending on the species to be protected, on the political context in the country, and on the landscape, the strategy may be different. A first step to define a conservation strategy is to identify the risks of the conservation targets, and the climate change scenarios, so that the sensitivity of the species and its habitats can be assessed. It is however really difficult to develop indicators to evaluate changes in the conservation status of specific targets.

Finally, recommendation for the future is probably to help biodiversity to adapt. Coming back to the two points of view described at the beginning of the talk, there are arguments in favour on conservation areas. Future diversity will indeed emerge from the diversity we have now. Therefore current protected areas are the core of the conservation policies. Even if some species are leaving from these areas, some new are coming. And they also have a role in mitigation of climate change because they are carbon sinks. However some losses will need to be accepted. Some species will disappear and new ones arise. More flexibility and adaptability is needed in conservation practices to allow these new species to arise.

In the discussion, the issue was raised of the sustainable use of nature resources. A wide range of biodiversity is indeed outside conservation areas. The European Environment Agency is also doing some sectoral integration of environmental issues.