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Adaptation to climate change
Legal challenges for protected areas

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1. Problem-setting and the scope of this article

Climate change will not only have negative effects on human beings, but will also put additional pressure on biodiversity. Measures taken to reduce the causes of climate change are taken on a global level within the United Nations Framework Convention on Climate Change[1] and the concrete schemes put forward in the Kyoto Protocol.[2] New agreements are to be expected as the parties attending the climate change conference in Poznań[3] (at the end of 2008) ended with a clear commitment to start full negotiations in order to agree on an ambitious and effective international response to climate change, to be agreed in Copenhagen at the end of 2009. At the EU level actions are taken within the climate change policy.[4] However, these measures will not be able to prevent certain effects of climate change.[5] We are already facing changes, such as changes in temperature, the increased frequency of extreme weather such as floods, coastal erosion, changes in the occurrence of species, migrating species in search of their optimum 'climate space', etc.

In order to face the increased pressure on biodiversity, we need *adaptation measures* for the conservation of biodiversity. This is important not only for the intrinsic value of biodiversity, but also for the significance of biodiversity for human beings. Protection of biodiversity can help limit atmospheric greenhouse gas concentrations because forests, peat lands and other habitats store carbon. Ecosystem services provided by biodiversity can serve as a buffer for human beings against the negative impacts of climate change. For instance, coastal wetlands can help to protect against rising sea level. Evidence suggests that working with nature's capacity to absorb or control impact in urban and rural areas can be a more efficient way of adapting to climate change

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1 1992 United Nations Framework Convention on climate change, <http://unfccc.int/>.

2 1997 Kyoto Protocol to the United Nations Framework Convention on climate change.

3 The United Nations Climate Change Conference, Poznań, – COP 14, 1-12 December 2008.

4 *E.g.* European Climate Change Programme, II (2005-); Green Paper from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions – *Adapting to climate change in Europe – options for EU action*, COM(2007) 0354, 29 June 2007; EU climate change and energy package, 2008; European Commission, *White Paper, Adapting to climate change: Towards a European framework for action*, COM(2009) 147 final, 1 April 2009.

5 *Cf.* Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: The Physical Science Basis, IPCC Fourth Assessment Report*, 2007.

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than simply focusing on physical infrastructure.[6] Protected areas can contribute to a great extent to facilitate biodiversity, but only when linked to ecosystem functions – London Zoo is extremely biodiverse, but could hardly claim to provide the full range of ecosystem functions!

The need for adaptation is recognised on the international level.[7] The Parties to the UN Framework Convention on Climate Change have adopted a five-year programme of work on adaptation.[8] Within the framework of the Convention on Biodiversity,[9] the Conference of the Parties (COP), at its seventh meeting, encouraged Parties to take measures to manage ecosystems so as to maintain their resilience to extreme climate events and to help mitigate and adapt to climate change.[10] At COP 8 the importance was highlighted of integrating biodiversity considerations into all relevant national policies, programmes and plans in response to climate change, and to rapidly develop tools for the implementation of biodiversity conservation activities that contribute to climate change adaptation.[11] An *ad hoc* technical experts group (AHTEG) on Biodiversity and climate change prepared guidance documents.[12] At the level of the European Union, the European Commission elaborated a Green Paper and a White Paper on adaptation[13] (see further).

The question is whether existing nature conservation legislation is sufficiently adapted to face the challenges of climate change. Will the current legal regime on protected areas suffice? This article will conduct a preliminary research into EU nature conservation law on protected areas in order to answer this question. We will limit the analysis to EU nature conservation law. Other policies and legislation such as on energy, health, water, agriculture, forests, marine and coastal environments, which may contribute to resilient ecosystems, are not discussed as they are outside the scope of this contribution. The article is written from an interdisciplinary perspective. It is not intended as an in-depth legal technical analysis. We will start by discussing the scientific challenges we are facing (Section 2). We will look into EU nature conservation law on protected areas (Birds and Habitats Directives[14]) and see what possible bottlenecks exist in the legislation itself or in the implementation thereof (Section 3). In the future, a new way of thinking about nature conservation might be necessary. This is examined in Section 4 in which we briefly

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6 European Commission, *White Paper, Adapting to climate change: Towards a European framework for action*, COM(2009) 147 final, 1 April 2009, p. 5.

7 For an overview of the international legal framework on adaptation, we can refer to R. Verheyen, 'Adaptation to the Impacts of Anthropogenic Climate Change – The International Legal Framework', 2002 *RECIEL*, no. 2, pp. 129-143.

8 SBSTA, *Decision 2/CP.11. Five-year programme of work of the Subsidiary Body for Scientific and Technological Advice on impacts, vulnerability and adaptation to climate change*, FCCC/CP/2005/5/Add. 1.

9 1992 Convention on Biological Diversity, <http://www.cbd.int>; for the relationship between the regime of the Convention on Biodiversity and the Framework Convention on Climate Change, we can refer to J. Kim, 'Regime interplay: the case of biodiversity and climate change', 2004 *Global Environmental Change*, no. 14, pp. 315-324.

10 COP 7 Decision VII/15, *Biodiversity and Climate Change*, Kuala Lumpur, 9-20 February 2004.

11 COP 8 Decision VIII/30, *Biodiversity and climate change: guidance to promote synergy among activities for biodiversity conservation, mitigating or adapting to climate change and combating land degradation*, Curitiba, 20-31 March 2006.

12 Secretariat of the Convention on Biological Diversity, *Interlinkages between biological diversity and climate change. Advice on the integration of biodiversity conservation into the implementation of the United Nations Framework Convention on Climate Change and its Kyoto Protocol*, Montreal, SCBD, 2003 (CBD Technical Series no. 10); Secretariat of the Convention on Biological Diversity, *Guidance for Promoting Synergy Among Activities Addressing Biological Diversity, Desertification, Land Degradation and Climate Change*, Montreal, 2006 (CBD Technical Series no. 25).

13 Green Paper from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, *Adapting to climate change in Europe – options for EU action*, COM(2007) 0354, 29 June 2007; European Commission, *White Paper, Adapting to climate change: Towards a European framework for action*, COM(2009) 147 final, 1 April 2009.

14 Directive 79/409/EEC of 2 April 1979 on the Conservation of Wild Birds, *OJ* L 103, 25.4.1979 (hereafter: Birds Directive); for the text of the Directive, with later amendments, see <http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm>; Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora, *OJ* L 206, 22.7.1992 (hereafter: Habitats Directive); for the text of the Directive, with later amendments, see <http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm>.

explore the idea of an 'Ecosystem Framework Directive'. This idea may justify and need more investigation in the future.

2. Scientific challenges for adaptation to climate change

There are several major pressures on biodiversity which have been identified by Sala *et al.*[15] (listed in order of decreasing impact):

– land-use change;
– climate change;
– nitrogen deposition;
– biotic exchange;
– increasing atmospheric CO_2.

Global climate change will lead, coupled with the already extensive conversion of land to intensive production uses (food and fibre, particularly in the EU), to severe consequences for the structure and function of ecosystems, and their contributions to global ecosystem functions and feedbacks,[16] and have implications for conservation and restoration targets and programmes.[17] Although climate has changed many times in the past and with amplitudes as great as or greater than we are seeing at present, the rate of this present change is unprecedented outside of those cataclysmic transitions engendered by asteroid impacts.[18] There is already evidence that large-scale impacts, on forest tree assemblages in the Western United States for example,[19] are already occurring.

To face this challenge, adaptive measures are required that make ecosystems more resilient and robust, accepting that there will be changes in the viable populations of species in a given geographical location – some will leave, some will arrive. Nature conservation measures should not try to ensure a certain amount of hectares of a certain habitat type or to protect the status quo and keep the species at the areas they use as their habitat right now, but should instead strengthen the adaptability of ecosystems to natural changes and facilitate species migrating to other areas as a consequence of gradually changing climatic basic conditions much more than is now possible.

A review of scientific recommendations on biodiversity management and adaptation in the face of climate change is given in Heller and Zavaleta.[20] Recommendations can be situated on three levels: 1. regional policy and planning (including reserve planning and landscape connectivity); 2. site-scale action (including both resilience and resistance strategies,[21] with a preference for resilience); 3. adapting existing conservation plans.

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15 O.E. Sala *et al.*, 'Biodiversity – Global biodiversity scenarios for the year 2100', 2000 *Science* 287, pp. 1770-1774.

16 Intergovernmental Panel on Climate Change, *Climate Change 2007: Impacts, adaptation, and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the IPCC*, 2007; *Millennium Ecosystem Assessment*, 2005.

17 J.A. Harris *et al.*, 'Ecological restoration and climate change', 2006 *Restoration Ecology* 14, no. 2, pp. 170-176.

18 P.J. Mayhew *et al.*, 'A long term association between global temperature and biodiversity origination and extinction in the fossil record', 2008 *Proceedings of the Royal Society B.* 275, no. 1630, pp. 47- 53.

19 P.J. Van Mantgem *et al.*, 'Widespread Increase of Tree Mortality rates in the Western United States', 2009 *Science* 323, pp. 521-524.

20 N. Heller & E. Zavaleta, 'Biodiversity management in the face of climate change: A review of 22 years of recommendations', 2009 *Biological Conservation* 142, pp. 14-32.

21 Resistant strategies attempt to bolster a system's defences to rapid environmental change (*e.g.* resist biotic change such as adding irrigation if precipitation declines). Resilience strategies attempt to bolster a system's ability to absorb rapid environmental change. Managing for resilience focuses on increasing the flexibility and ability of systems to adapt and self-organize in response to change (Heller & Zavaleta, *supra* note 20, pp. 25-26).

In view of the scientific recommendations that have so far been made, policy and legislation should therefore be based on the following concepts:

– the need for resilience and resistance in ecosystems;
– coherent ecological networks (including habitat restoration and creation);
– large reserve areas;
– connectivity (corridor areas);
– ecological models to predict shifting ranges of species.

In the next section we will examine whether EU policy and law already incorporate these scientific recommendations.

3. Policy and legal challenges for adaptation to climate change

3.1. General adaptive strategies

At the level of the EU the relationship between climate change and biodiversity has been acknowledged in several policy documents. The European Commission's Communication on Biodiversity – halting the decline of biodiversity in the EU by 2010,[22] including the EU Action Plan to 2010 and Beyond, contains a specific objective to support biodiversity adaptation to climate change. The Commission stresses both the need for *mitigation* (cuts in global greenhouse gas emissions) and *adaptation*. Adaptation requires, in particular, securing the coherence of the network of protected areas: by 2010 the coherence, connectivity and resilience of Natura 2000 and non-Natura 2000 protected areas must be strengthened, in order to maintain favourable conservation status of species and habitats in the face of climate change, by applying tools which may include flyways, buffer zones, corridors and stepping stones, as well as actions in support of biodiversity in the wider environment (Action A.9.4.2., Technical annex to the Communication).[23] Care must also be taken to prevent, minimise and offset any potential damage to biodiversity arising from climate change adaptation and mitigation measures (Target A.9.3., Technical annex to the Communication).

In the Green Paper on adaptation to climate change (2007)[24] focus is put on healthy ecosystems, as they are more resilient to climate change and therefore more able to maintain the supply of ecosystem services on which our prosperity and well-being depend. They form the centre of any adaptation policy. Conventional pressures that cause the fragmentation, degradation, over-exploitation and pollution of ecosystems must be reduced ('ecosystem climate-proofing'). Climate change will have an effect on water, soil, air and biodiversity. Existing legislation on these components need to be implemented on schedule to allow early action to strengthen ecosystem resilience. However, it will be a major challenge to maintain healthy, functioning ecosystems, as a changing climate could undermine past and present efforts. Thus policies may need further adjustments. The effective implementation of the 2006 Biodiversity Communication and its 'EU action plan to 2010 and beyond' will make an important contribution to safeguarding and restoring biodiversity and ecosystems.

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22 Communication from the Commission, *Halting the loss of biodiversity by 2010 – and beyond – Sustaining ecosystem services for human well-being*, COM(2006) 0216, 22 May 2006.

23 Annex 1, EU Action Plan to 2010 and beyond, Annex to the Communication from the Commission, *Halting the loss of biodiversity by 2010 – and beyond – Sustaining ecosystem services for human well-being*, COM(2006) 0216, 22 May 2006.

24 Green Paper from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, *Adapting to climate change in Europe – options for EU action*, COM(2007) 0354, 29 June 2007, pp. 17-18.

In the 2009 White Paper on adapting to climate change,[25] the Commission stresses that the impact of climate change must be factored into the management of Natura 2000 to ensure the diversity and connectivity between natural areas and to allow for species migration and survival when climate conditions change. The Commission suggests that in future it may be necessary to consider engineering 'permeability' in the landscape in order to enhance the movement of wild species, both plant and animal, between natural areas. The action that is foreseen in the White Paper is to establish draft guidelines by 2010 on dealing with the impact of climate change on the management of Natura 2000 sites.

The key elements (coherence, connectivity and resilience), that have been identified in the scientific literature for adaptation to climate change (see above), can thus generally be found in the EU policy documents. In the next section we will examine whether the existing nature conservation legislation supports this policy.

3.2. EU nature conservation legislation

The question is whether the existing EU nature conservation legislation, the Birds Directive[26] and the Habitats Directive,[27] supply the legal equipment to realize the policy goals, as mentioned above.

The definition of 'conservation' in the Habitats Directive includes the element of restoration of habitats and species (Article 1(a)). Article 2(2) explicitly requires that measures are taken to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest. Habitat restoration will be important as a way to secure the coherence and connectivity of a network. In general, both Directives include the potential to increase ecosystem resilience by designating and managing special protection areas and special areas of conservation. The Habitats Directive contains the explicit obligation to create a coherent ecological network, Natura 2000 (Article 3(a)). Article 6(4) refers to the overall coherence of Natura 2000 in taking compensatory measures. The requirements for connectivity are provided in Article 3(3) and Article 10 of the Habitats Directive. The Natura 2000 network can thus, in principle, help to mitigate climate change as it can help to conserve carbon sinks such as forests, peatlands and wetlands. The network has a key role in halting biodiversity loss because of climate change. By maintaining species and habitats at a favourable conservation status, the network should increase their resilience. As seen before, the policy of the EU stresses the need to reinforce the implementation of the network and to strengthen significantly its connectivity and cohesion.[28]

However, several general problems can be identified concerning the EU legislation. When we look at the implementation of EU policy and law so far, we see that it concentrates more on the conservation of certain habitats and species at certain places. Much more effort, (legal) discussion and money have been expended on the conservation of certain areas and their function as habitats for certain species, than on the coherence of Natura 2000 as a whole and on the connectivity of the ecosystems. Nature conservation legislation has a rather static character. For example, Article 4 of the Habitats Directive requires the designation of Special Areas of

25 European Commission, *White Paper, Adapting to climate change: Towards a European framework for action*, COM(2009) 147 final, 1 April 2009, p. 11.

26 Directive 79/409/EEC of 2 April 1979 on the Conservation of Wild Birds, *OJ* L 103, 25.4.1979, see note 14, *supra*.

27 Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora, *OJ* L 206, 22.7.1992, see note 14, *supra*.

28 European Commission, *Natura 2000 Newsletter. Biodiversity and climate change. The role of the Natura 2000 network*, no. 22, June 2007, pp. 11-12.

Conservation (SACs) to protect certain habitats and species. The criteria on which areas have to be protected for what purposes as laid down in Annex III of the Directive are mainly linked to the existing values (habitats and species) at the moment of designation. When designated, no 'deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated' may occur (Article 6(2) Habitats Directive). At least at first sight, this is a rather static approach.

Scientific literature however points out the need for changing nature conservation policy in order to adapt to climate change.[29] Adaptation to climate change requires a more flexible approach.[30] This need for more flexibility should not be abused as an excuse to undermine or weaken nature conservation policy. Additional areas must be protected as species migrate, and include their 'climate space' in the ecological network and additional management measures should be taken to face the pressure caused by climate change and other causes of disturbance and deterioration. The legal process of designating additional areas and taking additional conservation measures are usually time-consuming, which might be a constraint for the flexibility that is needed. In taking adaptive measures (such as the creation of flooding areas) we come across legal rights such as ownership rights and user rights. So a balance must be found between private rights and the common interest. The issue of the likely conflict between private rights and common interest will not be further discussed in this article, but may have to be dealt with by further legislation – property ownership should bring responsibilities as well as rights. According to Woldendorp, the need for legal certainties leads to the 'juridification' of nature conservation policy. This can be in conflict with ecological dynamics.[31] A balance must be found between the need for ecological dynamics and the need for legal certainties.

The legal challenges of increasing ecosystem resilience and coherence and providing connectivity will now be discussed in more detail.

3.3. Increase of ecosystem resilience and coherence

First, ecosystems need to become more resilient in order to face up to the additional pressure on biodiversity. Resilience of ecosystems may be secured by creating ecological networks, which should consist of more robust nature areas where ecological processes can take place – depletion of 'overall' biodiversity would certainly weaken resistance and resilience.[32] Thus, the first important thing to do is to strengthen the core areas of Natura 2000. Legal challenges occur in all the different steps to implement the Natura 2000 network: designation of sites, setting conservation objectives, taking conservation measures and making an assessment of human activities.

3.3.1. Designation of protected areas under the Birds and Habitats Directives

Both the Birds Directive of 1979 and the Habitats Directive of 1992 provide for the establishment of specific protected areas. The procedure for this designation is different for each Directive. Both types of areas will however be included in the same ecological network, the 'Natura 2000 network'.[33]

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29 See for example B. van Leeuwen & P. Opdam, 'Klimaatsverandering vergt aanpassing van het natuurbeleid', 2003 *De Levende Natuur* 104, pp. 122-124.

30 J. Verschuuren, 'Adaptatie aan klimaatverandering vraagt om adaptatie van de wet', 2007 *Nederlands Juristenblad*, no. 45/46, p. 2880; H.E. Woldendorp, 'Dynamische natuur in een statische rechtsorde', 2009 *Milieu & Recht*, no. 3, pp. 134-143.

31 See Woldendorp, *supra* note 30, p. 143.

32 C. Folke *et al.*, 'Regime shifts, resilience, and biodiversity in ecosystem management', 2004 *Annual Review of Ecology, Evolution, and Systematics* 35, pp. 557-581.

33 Art. 3(1) Habitats Directive.

On the basis of Article 4 of the Birds Directive, Member States have to take special conservation measures for the species mentioned in Annex I of the Directive, as well as for regularly occurring migratory species that are not mentioned in Annex I, to ensure their survival and reproduction in their area of distribution. For this purpose the Member States shall classify the territories that in number and size are most suitable for the conservation of those species as Special Protection Areas (SPAs), taking into account their protection requirements in the geographical land and sea areas to which this directive applies. The Court of Justice has produced extensive jurisdiction relating to the designation of SPAs.[34] Decisive for the duty to designate areas are the number of specimens of certain bird species and their relative importance within the Member State in certain areas at the moment of designation. In essence it results in Member States having very little policy margin for designating areas and only being allowed to invoke ecological (ornithological) criteria for the designation of areas; social or economic criteria must not play a role in the designation or non-designation of an area. Looking at the requirements of the Birds Directive and the jurisprudence of the Court, one has to acknowledge that they are rather static. Areas have to be designated because of the presence of a certain number of individuals of a species at a certain time at a certain place. Consequently, the areas have to be protected in order to serve as a habitat just for these species. If species move due to the effects of climate change, protecting an area just for the species which has been there at the moment of designation does not seem to make much sense. However, this is exactly what Article 4 of the Birds Directive seems to require. According to Article 4(1) of the Birds Directive, the bird species (and the specimens of the species) have to be protected where they occur at the moment when an SPA is designated. Thus, the existing criteria for the designation of SPAs and the protection regime do not match the needs of a climate-proof protection policy. On the other hand, the process of designating sites is not a one-time operation, but is a continuous process, as was confirmed by the Court of Justice.[35] If new bird species occur, because their habitats shift due to climate change, then Member States will have to designate new and additional areas.

The Habitats Directive aims to designate areas for the natural habitats and habitats of species of Community importance described in Annexes I and II, in order to reach a favourable conservation status and if necessary to restore them. Member States contribute to the establishment of Natura 2000 by designating areas as Special Areas of Conservation (SACs). The procedure for the establishment of the SACs is described in Article 4 and consists of various stages. First of all, each Member State shall propose a list of sites indicating which natural habitat types in Annex I and which species in Annex II that are native to its territory the site currently hosts. The designation must take place on the basis of the criteria in Annex III (Stage 1) and relevant scientific data. Annex III includes the ecological criteria on which the designation should be based. Just as for the designation of SPAs under the Birds Directive, Member States should not take into account economic and social criteria in the designation of SACs.[36] A second stage in the establishment of the Natura 2000 network consists of the Commission establishing a list of Sites of Community Importance (SCIs), drawn from the Member States' lists identifying those which host one or more priority natural habitat types or priority species and based on the criteria in Annex III (Stage 2). The decisions of the Commission for the establishment of the list are

34 See for instance: Case C-335/90, *Commission* v *Spain (Marismas de Santoña)*; Case C-44/95, *Regina* v *Secretary of State for the Environment (Lappel Bank)*; Case C-166/97, *Commission* v *France (Seine estuary)*; Case C-96/98, *Commission* v *France (Poitevin Marshes)*; Case C-3/96, *Commission* v *the Netherlands*; see on this case law B. Beijen, 'The implementation of area protection provisions from European environmental directives in the Member States' in this issue of the *Utrecht Law Review*.

35 Case C-209/04, *Commission* v *Austria (Lauterachter Ried)*.

36 Confirmed in Case C-371/98, *Severn estuary*.

divided up according to biogeographical regions. For most of these regions Community lists have been established.[37] Once an area has been declared to be an Site of Community Importance according to the procedure described above, the Member State involved designates that area as soon as possible (and within six years at the most) as an SAC.

According to the EU Biological Diversity Plan[38] (European Commission 2006) the network of SPAs should be completed by 2006 for the terrestrial environment and by 2008 for the marine environment. The lists of SCIs have to be adopted by 2006 (terrestrial) and 2008 (marine). The final designations of SACs have to be made by 2010 (terrestrial) and 2012 (marine). The necessary management and conservation measures should be taken by 2010 (terrestrial) and 2012 (marine) for both the SPAs designated under the Birds Directive and the SACs under the Habitats Directive.

In most EU countries the process of designating Natura 2000 sites is well underway (as can be seen on the EU barometer[39]). So far, those areas have been designated on the basis of the presence of certain habitat types and species. The criteria for selecting the SACs, set forth in Annex III of the Habitats Directive, depart from a rather classical conservation approach. The selection of sites for habitat types in Annex I should be based on:

> '(a) The degree of representativity of the natural habitat type on the site.
> (b) The area of the site covered by the natural habitat type in relation to the total area covered by that natural habitat type within national territory.
> (c) The degree of conservation of the structure and functions of the natural habitat type concerned and restoration possibilities.
> (d) A global assessment of the value of the site for conservation of the natural habitat type concerned.'

For the habitats of species mentioned in Annex II, the criteria for selection are:

> '(a) The size and density of the population of the species present on the site in relation to the populations present within national territory.
> (b) The degree of conservation of the features of the habitat which are important for the species concerned and restoration possibilities.
> (c) The degree of isolation of the population present on the site in relation to the natural range of the species.
> (d) A global assessment of the value of the site for conservation of the species concerned.'

Thus, in the Habitats Directive, too, the size of habitats and the number of species at a certain moment are the most critical factors for the duty to designate conservation sites. However, the fact that the potential for ecological restoration can also be taken into account leaves some room for selecting sites that can fulfil a role in adaptation measures. This aspect should be strengthened and accentuated as far as the designation of new areas is at stake.

In the second phase of the designation of SACs, a Community list is established. The criteria for the selection of these sites include:

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37 <http://ec.europa.eu/environment/nature/natura2000/sites_hab/biogeog_regions/index_en.htm>.
38 See note 22, *supra*.
39 <http://ec.europa.eu/environment/nature/natura2000/barometer/index_en.htm>.

> '(a) The relative value of the site at national level;
> (b) The geographical situation of the site in relation to migration routes of species in Annex II and whether it belongs to a continuous ecosystem situated on both sides of one or more internal Community frontiers;
> (c) The total area of the site;
> (d) The number of natural habitat types in Annex I and species in Annex II present on the site;
> (e) The global ecological value of the site for the biogeographical regions concerned and/or for the whole of the [European] territory (…) [of Member States], as regards both the characteristic of unique aspect of its features and the way they are combined.'

Although most criteria in the second phase are also mostly aimed at selecting sites based on the actual presence of habitats and sites, the criteria leave some room for flexibility (*e.g.* the mentioning of migration routes).

Adaption to climate change should be taken into account when designating sites. This holds true for both SACs and SPAs. This means that sites should be designated that are large enough to face the effects of climate change. Specific attention should be paid to the site selection of those habitats that play a role as carbon sinks. Designated sites should also have a potential as a future refuge for species that will migrate because of climate change. Protected sites may have an important role in providing locations where the full range of potential species' association within each habitat type can develop. The transitional stages of habitats should be recognised, as changing climate results in changing Community compositions.[40] All of this should be explicitly taken into account when evaluating the designation of sites. Ideally, the criteria in Annex III of the Habitats Directive should be expanded and include specifically criteria that allow for adaptation.

3.3.2. Conservation objectives

According to the Preamble to the Habitats Directive, the necessary measures have to be implemented in each area, having regard to the conservation objectives pursued. Conservation objectives are also important when assessing the impact of plans and projects on the site. Article 6(3) states that any plan or project likely to have a significant effect thereon shall be subject to an appropriate assessment of its implications for the site in view of its conservation objectives. In the Court of Justice's case on the *cockle fisheries in the Wadden Sea*,[41] the importance of conservation objectives was confirmed: where a plan or project is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on that site.

Most EU Member States are still in the process of defining those objectives. Conservation objectives can be defined in quantitative parameters (*e.g.* for the conservation of a certain habitat type we need x hectares; y breeding pairs of birds; z number of reproducing female otters; the number of typical species of a habitat type present). However, it is not necessary to define the conservation objectives with quantitative criteria. Qualitative criteria can serve as objectives, too.

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40 J. Hossell *et al.*, 'Climate change and nature conservation: Implications for policy and practice in Britain and Ireland', 2003 *Journal for Nature Conservation* 11, p. 70.

41 Case C-127/02, concerning a request for a prejudicial decision under Art. 234 EC, submitted by the Council of State (Netherlands) by decision of 27 March 2002, recorded on 8 April 2002, in the procedure *Landelijke Vereniging tot Behoud van de Waddenzee* (National Association for the Protection of the Wadden Sea), *Nederlandse Vereniging tot Bescherming van Vogels* (Dutch Association for the Protection of Birds) against the Secretary of State for Agriculture, Nature Management and Fisheries, in the presence of the *Coöperatieve Producentenorganisatie van de Nederlandse Kokkelvisserij* (Cooperative Producers' Organisation of the Dutch Cockle Fisheries) UA.

If, for example, the capability of an area to serve as a habitat for a certain species is the conservation objective, this objective is still met even when the species concerned has left the area because of the effects of climate change.[42]

Objectives are defined on a national/regional and site level. This is necessary in order to make an appropriate assessment of the conservation status of the habitats and species, and on the impact of human activities on the site. However, at site level, the loss of a species as a result of climate change may have significant implications for achieving the conservation objectives, especially if the species concerned is the prime reason for the site's designation. The loss of such species could have serious implications with respect to judging whether the Member State is meeting its obligations under the Habitats Directive.[43] In some cases a change in conservation objectives or an adjustment to the boundaries of an area may be justified (see below). However, we face a possible conflict between the need for legal certainty and the reality of scientific uncertainties: stakeholders want conservation objectives to be set for the long term and to be permanent. This is difficult, if not impossible, in view of climate change: species will disappear; other species will appear, for which new conservation objectives will have to be set. Ecological models predict that migration will be needed and will have to be included in the conservation objectives. In view of the expected shifting ranges of habitats and species we also seem to need transboundary conservation objectives (bilateral, multilateral or EU level).

Thus, to some extent the dynamics of nature and especially the dynamics caused by climate change can be taken into account by formulating more qualitative rather than quantitative conservation objectives and by allowing these objectives to be changed after a certain time. However, both these solutions face the disadvantage of a loss of legal certainty when applying the legal regime.

3.3.3. Conservation measures and the management of the sites

According to Article 4(1) and (2) of the Birds Directive, Member States must take special protection measures to ensure the survival and reproduction of the species listed in Annex I and of regularly occurring migratory birds. According to the case law of the Court of Justice Member States must take adequate protection measures (see *Commission* v *France* with regard to the *Seine estuary*).[44]

For the sites protected under the Habitats Directive, Member States must also take necessary conservation measures (Article 6(1) Habitats Directive). According to the Habitats Directive 'conservation' means a series of measures required to maintain or restore natural habitats and the populations of species of wild fauna and flora at a favourable status (Article 1(a)). The conservative status of a natural habitat will be taken as favourable when:

> '– its natural range and areas it covers within that range are stable or increasing,
> – the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
> – the conservation status of its typical species is favourable as defined [further] in [the] Habitats Directive (…).' (Article 1(e))

42 The Dutch Council of State (*Raad van State*), acting as an administrative court, has determined that such qualitative criteria are sufficient, Council of State November 6th 2008, 200802545/1, 2009 *Tijdschrift voor Milieu en Recht*, no. 29.

43 Hossell *et al.*, *supra* note 40, p. 69.

44 Case C-166/97, *Commission* v *France (Seine estuary)*.

The conservation status for species will be taken as favourable when:

> '– population dynamics data of the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats,
> – the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
> – there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.' (Article 1(i))

Besides the positive conservation measures Member States must also take action to prevent negative effects on the SPAs. The measures were originally included in Article 4(4), 1st clause of the Birds Directive. As a consequence of the strict interpretation of this provision by the Court of Justice this regime was replaced by Article 6(2)-(4) of the Habitats Directive (see below). Finally, Member States must also strive to prevent pollution and any deterioration of habitats outside the protection areas (Article 4(4), 2nd clause of the Birds Directive). According to the Habitats Directive, Member States must take appropriate action for both the SPAs and SACs to avoid the deterioration of natural habitats and of habitats of species and to avoid any disturbance of the species for which the areas have been designated (Article 6(2) Habitats Directive).

In the light of the effects of climate change, this raises a couple of questions. The definitions of a favourable conservation status, as mentioned above, might cause problems for certain habitats and species, because these requirements are again formulated in a very static way. The population data of the existing species present at a certain moment may not diminish. However, as a consequence of climate change, the predictability of the occurrence of the protected species becomes more difficult.

Thus, if there is a deterioration, the question rises whether this is the consequence of insufficient measures against human activities, which Member States have to avoid, or whether this is an impact of climate change (the species will migrate in as well as out). If climate change, which is at least to a great extent human induced, is the cause of an alteration, can that be qualified as a 'natural reason' and can it be attributed to one Member State? If habitats deteriorate to such an extent that they no longer qualify as a habitat for the species for which they were designated, can the site be reduced in size, or even removed from the Natura 2000 network?

The Birds Directive does not provide any explicit provisions on the declassification of sites. The Habitats Directive only provides a possibility in Article 9: an SAC may be considered for declassification where this is warranted by natural developments noted as a result of the surveillance provided for in Article 11 of the Habitats Directive. Even if Article 9 may not be applied to SPAs as well (but only for SACs), which is uncertain, the same possibility seems to be recognized by the Advocate General for SPAs, too. In a case from 2006 against Portugal[45] the Court did not accept an adjustment of an SPA, but in her opinion in that case the Advocate General concluded that '(…) if the Member State can show that a deterioration in quality in the meantime is due to objective circumstances over which it has no influence, for example volcanic eruptions, may it justify the reduction in the extent of an SPA.'[46] Although she did not explicitly state this, we assume that the Advocate General could have relied on Article 9 of the Habitats Directive to underpin this conclusion. The Court confirmed in that case that a Member State may not reduce the surface area of an SPA or alter its boundaries unless the areas are no longer the

45 Case C-191/05, *Commission of the European Communities* v *Portuguese Republic*.
46 AG Kokott, C-191/05, Para. 14.

'most suitable territories'. Since Portugal did not deliver any proof of the existence of such a situation, the Court held that Portugal had failed to fulfil its obligations under Article 4(1) of the Birds Directive. Thus there seems to be some room at least in the reasoning of the Advocate General that habitat loss due to 'natural' reasons and a change of the boundaries or conservation objectives for those reasons may be justified.

However, in a case against the UK on the transposition of Article 6(2) Habitats Directive in Gibraltar, the Court seems to be very restrictive. In that case the United Kingdom raised the argument that only non-natural deterioration is to be avoided. The Advocate General on the contrary held that the examples brought forward by the UK, changes in sea level and climate change, relate less to nature in general than to structural environmental changes that jeopardise the conditions for the continued existence of the protected habitats and species in the Natura 2000 sites concerned. The Court did decide that at least to some extent the Member States are obliged to take measures to react to natural changes to avoid any deterioration of the habitats and species for which the areas have been designated. 'It may be necessary to adopt both measures intended to avoid external man-caused impairment and disturbance and measures to prevent natural developments that may cause the conservation status of species and habitats in SACs to deteriorate.'[47]

It has to be seen whether and how the Court itself will accept 'natural changes' as a reason for a decline in a certain habitat type or species in a protected area. Even if it does, the question is whether and to what extent the effects of climate change can be qualified as 'objective circumstances over which a Member State has no influence'. Guidance by the EU is needed on how to assess the conservation status of each species and habitat type with respect to climate change.[48] Even if one could consider climate change as a situation over which one has no influence (as an individual state),[49] then still, the burden of proof is for the Member State to show that the deterioration is the direct consequence of climate change. According to the Advocate General only if a Member State can show that a deterioration in quality is due to objective circumstances over which it has no influence, may it justify the reduction in the extent of an SPA. It might be very difficult for Member States to provide the required necessary proof.[50]

Furthermore, the deterioration of a habitat will often be caused by more than just climate change, but will already have been influenced by other human-induced reasons as well.[51] For those factors Member States should take appropriate steps to avoid deterioration and they cannot rely on the exception of natural developments or objective circumstances.

3.3.4. Assessment of plans and projects

An assessment framework for the implementation of (new) activities is determined in Article 6(3)-(4) of the Habitats Directive: any plan or project that is not directly connected with or necessary to the management of an SPA or SAC, but is likely to have a significant effect thereon, shall be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives. The national authorities can only agree to the plan or project after having ascertained that it will not adversely affect the natural features of the site concerned and after having provided opportunities for participation if necessary (Article 6(3) Habitats Directive). A possible exception is provided in Article 6(4) of the Habitats Directive: a plan or project may

47 Case C-6/04, *Commission* v *United Kingdom*, Para. 34.
48 Hossell *et al.*, *supra* note 40, p. 70.
49 See in this sense: H.E. Woldendorp, 'Integratiedebat in het natuurbeschermingsbeleid', 2007 *Nederlands Juristenblad*, no. 45/46, p. 2884.
50 Woldendorp, *supra* note 49, p. 2884.
51 *Ibid.*, p. 2885.

nevertheless be carried out, in spite of a negative assessment of the implications for the site, if certain conditions are met. No alternative solutions should be available; it should concern imperative reasons of overriding public importance, including reasons of a social or economic nature; and the Member State should take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. The Commission should be informed of the compensatory measures adopted.

Given the importance of Article 6(3)-(4) a further concretization of concepts such as *significant consequence* and *appropriate assessment* is very important. The Court of Justice has made some conclusions concerning those concepts in a preliminary ruling on the *cockle fisheries in the Wadden Sea*.[52] In this case, the Court stated the importance of the conservation objectives (see above). As it will be more complex to define conservation objectives in light of climate change, the appropriate assessment might become more difficult, as conservation objectives might evolve (adjustment of objectives for certain species, including new objectives for migrating species). Again, there might be tension between scientific uncertainties and the need for legal certainty.

According to the text of Article 6(3) of the Habitats Directive and the guidelines of the Commission,[53] the assessment should take into account the cumulative effect of individual plans and projects. This was confirmed by the Court in the *cockle fisheries* case.[54] Both the Court and the Commission refer to the cumulative effects of the combination of a plan or project with other plans and projects. The Commission is of the opinion that on grounds of legal certainty the combination provision is restricted to other plans or projects which have actually been proposed. No statements have been made on the cumulative effects of plans and projects and the effects emanating from climate change. According to Verschuuren, autonomous developments such as the effects of climate change or invasive species should be taken into consideration as well. However, a problem is that little can be done to mitigate the effects of climate change.[55] Also on this issue guidance by the EU is needed on how to deal with the cumulative effects of plans or projects and climate change.

As an exception, plans and projects with a negative effect can be allowed for reasons of overriding public interest. Adaptive measures (such as safety measures against flooding) can certainly fall under this definition. In view of the impact of climate change on biodiversity, this creates the opportunity for win-win situations, by including elements of naturalness in the adaptive measures. In taking adaptation measures, the damage to biodiversity should be prevented and minimised (as was also put forward by the Commission in the Communication on Biodiversity (Objective 9)).

If plans and projects are allowed within Natura 2000 sites, compensation measures have to be taken. The Commission requires active compensation, meaning that compensation must be realised before the negative effects of a plan take place.[56] According to Boere and Taylor this guidance could be used by Member States proactively to adjust the Natura 2000 network in response to climate change. They admit, however, that this may be difficult to implement, because there might be little space available in Member States for any adjustment.[57] Furthermore,

52 Case C-127/02, *Cockle Fisheries.*
53 European Commission, *Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*, 2000, p. 35.
54 Case C-127/02, *Cockle Fisheries*, Para. 53.
55 J. Verschuuren, 'Shellfish for Fishermen or for Birds? Article 6 Habitats Directive and the Precautionary Principle', 2005 *Journal of Environmental Law*, no. 2, pp. 265-283.
56 European Commission, *supra* note 53, p. 46.
57 G. Boere & D. Taylor, 'Global and regional governmental policy and treaties as tools towards the mitigation of the effect of climate change on waterbirds', 2004 *Ibis* 146, p. 114.

Article 6 of the Habitats Directive only requires compensation in the case of a plan or project with negative effects on the site. The Commission also stated that taking compensatory measures from the beginning does not exempt Member States from following the procedure on Article 6 on the assessment of plans and projects.[58]

3.4. Connectivity

Next to creating coherent ecological networks, measures are needed outside these networks. The aim is to enhance connectivity and coherence. In order to enable species to migrate, ecological corridor areas are needed.

Connectivity is provided in Articles 3 and 10 of the Habitats Directive. Member States shall endeavour in their land-use planning and development policies to encourage the management of features of the landscape which are of major importance for wild fauna and flora. This must be done in particular with a view to improving the ecological coherence of the Natura 2000 network. Those features are those which, by virtue of their linear and continuous structure or their function as stepping-stones are essential for the migration, dispersal and genetic exchange of wild species.

The Habitats Directive thus provides a legal basis for connectivity. However, compared to the provisions on the Nature 2000 network, the provisions on connectivity are put rather weakly: 'shall endeavour', 'where they consider it necessary', 'to encourage'. Both the EU itself and the Member States have focused mainly on the implementation of the provisions on the designation and management of the Natura 2000 areas. Because of the urgent need for connectivity, and the transboundary character of corridor areas, this cannot be left in the hands of the Member States alone. Therefore a stronger commitment on the European level for nature conservation measures outside the core areas of Natura 2000 and for connectivity measures is necessary.

3.5. Conclusion on policy and legal challenges

As was shown above, the Directives provide to a certain extent for possibilities for ecosystem resilience and connectivity. As a result of their climate change policy, the EU and the Member States could focus more on implementing the directives in such a way that they correspond better to those needs.

The following elements are important:

- In order to enable the designation of sites that have a potential as a future refuge for species, the use of the criteria in Annex III of the Habitats Directive should take this into account.
- Transboundary conservation objectives must be set up. The EU should stimulate the use of ecological models, predicting migration.
- Qualitative rather than quantitative criteria seem to be preferable when defining the conservation objectives of an area.
- Changes to the conservation objectives should be allowed when the Member State proves that the reason for those changes is not man-made.
- Guidelines are needed on how to define conservation measures in light of occurring changes.
- In order to provide for connectivity between the core areas, there is a need for a stronger policy commitment on the European level for nature conservation measures outside the

58 European Commission, *supra* note 53, p. 45.

core areas of Natura 2000 and for connectivity measures. This can be done by a more stringent approach by the Commission in supervising the implementation of Article 10 by Member States. Compulsory purchase powers for securing ecosystem service provision may be required.

However, even if those recommendations are taken into account, both Directives still seem to be focused on the protection of certain habitat types and certain species present in a certain area at a certain moment. Until now, the jurisprudence of the Court of Justice hardly takes into account the dynamics of nature, especially as a consequence of climate change. Furthermore, if those dynamics are taken into account to a greater extent, this necessarily seems to have a loss of legal certainty as a consequence. A loss of legal certainty may carry the risk of a decline in the protection of nature, too. Therefore, it seems to be worthwhile to consider whether there could be alternatives to the Birds Directive and the Habitats Directive or complementary legal measures which serve the needs to protect biodiversity in a changing climate in a better way. In the following section, we will briefly explore the idea of an 'Ecosystem Framework Directive' which might be worth examining in the future.

4. Towards an 'Ecosystem Framework Directive'?

Even with a stronger implementation of existing legislation, an adjustment of policy and legal instruments might prove necessary in the future. In the literature suggestions have already been made in this sense. Boere and Taylor for example suggest, next to the Birds and Habitats Directives, additional arrangements, that should allow for more flexibility in the change of designated site borders. The arrangements could provide for the setting aside of reserve sites to help mitigate against the effects of climate change. Implementation should take place within and across boundaries. In some countries there may be no space left to function as reserve sites, while others still have sufficient areas. The Carbon Trading approach could be valuable in facilitating this approach by encouraging countries without space to provide incentives to those with space to provide guaranteed habitat for wildlife.[59]

The idea of additional legislation needs further research. Questions need to be answered on the content of this legislation, the relationship with the Birds and Habitats Directives and the relationship with other legislation. In this article we can only tentatively explore the idea of a new possible directive, a so-called 'Ecosystem Framework Directive'. We will not explore this as an in-depth analysis on how such a directive should look like, nor will we look in detail at whether such an approach could amend existing shortcomings in the current legislation. This in-depth research will be part of a future publication.

A legal framework, amongst other things provides a mechanism to achieve policy objectives. If it is accepted that an ecosystem services approach to development is the right way forward, then a suitable legal framework is needed to support this. If the current legal framework is not fit for the purpose due to the reasons discussed earlier, then what would be advisable? It is first necessary, therefore, to define the purpose. The main purpose would be to provide a framework that (a) raised awareness and then (b) moved operators towards an ecosystems approach, focusing on biodiversity indices, ecosystem functions, goods and services rather than individual habitats and species.

59 Boere & Taylor, *supra* note 57, p. 117.

It should support and extend rather than simply replace existing legislation. Specifically, it should provide a *safety net* to catch those sites which would no longer be protected if particular species, species' assemblages or habitat types can no longer persist under changing bioclimatic conditions. It should encourage and facilitate the use of *ecological restoration* to produce new areas capable of delivering valued ecosystem characteristics in a way which is congruent with what the area would support biophysically. This would mean a real increase in 'Natural Capital Net Worth' and would be a move away from 'nature gardening'.

So what would an 'Ecosystem Directive establishing a framework for Community action in the field of ecosystem services' look like? Some recent environmental directives with similar purposes provide some guidance on the key features which could be incorporated in such a framework directive. Other directives, because of their scope and purpose, would provide support to an Ecosystem Framework Directive.

The Water Framework Directive (WFD, 2000/60/EC)[60] was preceded by a series of separate water directives dealing with parts of the whole.[61] These existed despite the knowledge that legally designated bodies of water are in fact dynamically interconnected and therefore cannot be properly managed in isolation.

The WFD was introduced initially to provide a mechanism for dealing with ecological water quality and then evolved with a wider aim of providing a more integrated holistic approach to water management. The Directive applies to all waters and not just to those designated for particular purposes under a range of different directives. This evolution mirrors the proposal to move from specific habitat and species' designations to a more integrated holistic protection of ecosystems and the management of ecosystem services.

The Floods Directive (2007/60/EC)[62] on the assessment and management of flood risks is a response to the increase in the occurrence of high-impact flood events in Europe over the last 15-20 years, to a large extent attributed to climate change (Preamble 4). It has a number of features including those which raise awareness, knowledge and understanding (Chapter II - flood risk assessment; Chapter III - flood hazard mapping). These will in turn facilitate better management (Chapter IV - flood risk management plans).

The Soils Directive (COM(2006) 232 final – proposal for a Directive establishing a framework for the protection of soil) recognizes the importance of soil within the environment and the need to protect what is a key ecosystem component. (Preamble 1 – '(…) It is a very dynamic system which performs many functions and delivers services vital to human activities and to the survival of ecosystems.'). Preamble 6 highlights the importance of, and the need for, a more integrated and holistic approach to soil protection in the same way as is now advocated for ecosystems. It also explicitly acknowledges the need for raising awareness (Article 15(1)). Thus the proposed Soils Directive, whilst not necessarily a model to follow, does through its aim and purpose lend support to the idea and purpose of an Ecosystem Framework Directive.

An Ecosystem Framework Directive would undoubtedly impact on planning and development control. However, the main aim of the Directive would not be to deliver European rules on national planning and development control. That would not even be possible, because the EU has

60 Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy, *OJ* L 327, 22.12. 2000.

61 *I.e.* dealing with waters of different types and/or used for different purposes – such as surface waters used for drinking water supplies, 75/440/EEC; groundwaters, 80/68/EEC; waters used for bathing, 76/160/EEC; waters which support freshwater fish, 78/569/EEC and shellfish, 79/923/EEC; *etc.*

62 Directive 2007/60/EC of 23 October 2007 on the assessment and management of flood risks, *OJ* L 288, 6.11. 2007.

no jurisdiction in the field of physical planning. Like the EIA[63] and the SEA[64] Directives, an Ecosystem Framework Directive would influence Member States' planning systems only as a side-effect.

So taking lessons from some of the more recent environmental directives and addressing its proposed purpose, the key features of an Ecosystem Framework Directive would be a requirement to:

- establish common EU-wide terminology, components of and definitions for ecosystems services in order that a common approach can be adopted;[65]
- prepare a preliminary characterization and assessment of the current status of ecosystem services at appropriate scales (as per Article 5 WFD; and as in the proposed Soil Framework Directive);
- establish common EU-wide standards for good ecosystem conditions; (as per WFD Annex II Reference Conditions from which 'good status' is defined);
- monitor status (as per Article 8 WFD);
- identify and map developments and activities which adversely impact on ecosystem services (as per Article 5 WFD and as in the proposed Soil Framework Directive);
- develop programmes of measures to protect and restore ecosystem services (as per Article 11 WFD and as in the proposed Soil Framework Directive);
- modify relevant directives to incorporate an ecosystem services approach.

5. Conclusion

Even with measures taken to prevent climate change, we are already facing the effects of climate change and we can expect a further increase in the effects on both human beings and biodiversity. Protecting biodiversity against the effects of climate change is important as it can mitigate the further effects of climate change (*e.g.* the role of carbon sinks), and it can help human society to adapt to the effects of climate change through regulatory ecosystem services such as forming natural buffers against flooding. However, in order to be able to perform these ecosystem services, biodiversity must be protected. Biodiversity is already under heavy pressure from human activities, and this will be further increased by the effects of climate change. Adaptation measures will be needed in order to safeguard ecosystems and their goods and services.

Existing nature conservation policy and law has until now mainly focused on safeguarding habitats and species *in situ* against negative impacts from human activities. Because of increased pressure by climate change, the existing measures will be insufficient. Also because of climate change, certain habitats and species will migrate. Species and habitats will appear or disappear at a much faster rate. It will become increasingly difficult and will not always make sense to reach the (rather static) conservation goals.

More effort is needed through a more proactive policy, including protecting additional reserve sites, taking restoration measures and protecting migration routes through the establishment of corridor areas. Furthermore, the dynamic effects of climate change might need a

63 Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment, *OJ* L 175, 5.7.1985, as amended.

64 Directive 2001/42/EC of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment, *OJ* L 197, 21.7.2001.

65 The implementation of the Water Framework Directive has uniquely been supported by a Common Implementation Strategy CIS programme; see <http://ec.europa.eu/environment/water/water-framework/objectives/implementation_en.htm>.

fundamental shift in nature conservation policy and legislation. We need more focus on ecosystem functions. This will, however, require a more flexible approach, which might conflict with existing nature conservation policy and law, and with the need for legal certainties for stakeholders. The existing nature conservation legislation of the EU, the Birds and Habitats Directives, provide for some possibilities to enable a shift in implementation. In the long term, this might not be sufficient and a newer approach in legislation might become necessary. The idea of an 'Ecosystem Framework Directive' should be explored. The question is whether a directive aiming at protecting and developing ecosystem services could substantially amend the difficulties which we encounter with current policy and legislation.

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Adaptation to climate change: legal challenges for protected areas

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