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CONSERVING EUROPEAN BIODIVERSITY IN A CHANGING CLIMATE: THE BERN CONVENTION, THE EU BIRDS AND HABITATS DIRECTIVES AND THE ADAPTATION OF NATURE TO CLIMATE CHANGE

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This article reviews the Bern Convention on the Conservation of European Wildlife and Natural Habitats and the European Union's Wild Birds and Habitats Directives from the perspective of the need to help nature adapt to climate change in order to attain biodiversity conservation goals. It concludes that, even though none of the three instruments explicitly state this, both the Bern Convention and the EU directives currently subject States to legal obligations to take the measures necessary to facilitate the adaptation of biodiversity in Europe to climate change. These measures include the restoration and protection of robust populations and habitats, as well as the establishment of adequate connectivity, in order to enable recovery of populations following climate-related impacts and to enable climate-induced range shifts.

INTRODUCTION

The growing need to help species and ecosystems adapt to climate change poses an unprecedented challenge to international nature conservation law. A suite of proactive measures appears to be required to warrant the necessary adaptation.[1] These include protecting and restoring large, robust natural areas; ensuring adequate connectivity between such areas – thus creating protected area networks; taking management measures to boost the resilience of species and ecosystems to changing conditions and extreme climatic events; and, in some cases, undertaking the active translocation of populations to more suitable areas (also known as 'assisted migration' or 'assisted colonization'). All of this, in turn, clearly augments the need for international cooperation in nature conservation. Against this backdrop, a mounting segment of scientific literature is devoted to assessing the current capacity of international nature conservation regimes to facilitate the adaptation of species and ecosystems to climate change, and to exploring ways of enhancing that capacity.[2] It should be noted that, naturally, comparable issues arise and are discussed within *national* contexts.[3]

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[1] For attempts to summarize the scientific literature on the effects of climate change on biodiversity and on recommended adaptation measures, see A. Trouwborst, 'International Nature Conservation Law and the Adaptation of Biodiversity to Climate Change: A Mismatch?', 21(3) *Journal of Environmental Law* (2009), 419, at 419-421 and 426-429.

[2] Besides Trouwborst, ibid., this includes M. Bowman, 'Global Warming and the International Legal Protection of Wildlife', in R.R. Churchill and D. Freestone, *International Law and Global Climate Change* (Kluwer, 1991), 129; G.C. Boere and D. Taylor, 'Global and Regional Governmental Policy and Treaties as Tools Towards the Mitigation of the Effect of Climate Change on Waterbirds', 146 *Ibis* (2004), 111; R. Sutherland, O. Watts and G. Williams, 'Climate Change and the Birds and Habitats Directives: Can They Work Together?', 26(3/4) *Ecos* (2005), 86-94; K. Wheeler, 'Bird Protection & Climate Changes: A Challenge for Natura 2000?', 13(3) *Tilburg Foreign Law Review* (2006), 283; H.E. Woldendorp, 'Integratiedebat in het Natuurbeschermingsbeleid', 45/46 *Nederlands Juristenblad* (2007), 2881; D. Hodas, 'Biodiversity and Climate Change Laws: A Failure to Communicate?', in M.I. Jeffery *et al.*, *Biodiversity, Conservation, Law and Livelihoods: Bridging the North-South Divide* (Cambridge University Press, 2008), 383; A. Cliquet, C. Backes, J. Harris and P. Howsam, 'Adaptation to Climate Change: Legal Challenges for Protected Areas', 5(1) *Utrecht Law Review* (2009), 158; W.C.G. Burns, 'Belt and Suspenders? The World Heritage Convention's Role in Confronting Climate Change', 18(2) *Review of European Community and International Environmental Law* (2009), 148; T. Marauhn, 'The Potential of the Convention on Biological Diversity to Address the Effects of Climate Change in the Arctic', in T. Koivurova *et al.*, *Climate Governance in the Arctic* (Springer, 2009); S. Erens, J. Verschuuren and K. Bastmeijer, 'Adaptation to Climate Change to Save Biodiversity: Lessons Learned from African and European Experiences', in B.J. Richardson *et al.* (eds), *Climate Law and Developing Countries: Legal and Policy*

States are well aware of the necessity of, as the G8 Environment Ministers put it in 2009, proactively putting in place actions for climate change adaptation of natural and managed ecosystems,' as 'spontaneous adaptation is not expected to be sufficient.'[4] The Conference of the Parties (COP) to the Biodiversity Convention (CBD),[5] which means virtually all states (except the US), have similarly recognized the need to 'enhance the integration of climate-change considerations related to biodiversity in their implementation of the Convention,' *inter alia* by incorporating such considerations in national biodiversity strategies and by taking 'appropriate actions to address' the impacts of climate change on biodiversity.[6] Furthermore, the CBD COP has resolved 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'[7] and to 'integrate climate change adaptation measures in protected area planning, management strategies, and in the design of protected area systems.'[8] As part of more comprehensive guidance, the decision on biodiversity and climate change adopted at the latest COP in Nagoya in October 2010, invites parties – subject to the qualification 'according to national circumstances and priorities' – to take the following actions:

> *Reduce the negative impacts from climate change as far as ecologically feasible, through conservation and sustainable management strategies that maintain and restore biodiversity;*
>
> *Implement activities to increase the adaptive capacity of species and the resilience of ecosystems in the face of climate change, including, inter alia:*
>
> *(i) Reducing non-climate stresses, such as pollution, over-exploitation, habitat loss and fragmentation and invasive alien species;*
>
> *(ii) Reducing climate related stresses, where possible, such as through enhanced adaptive and integrated water resource and marine and coastal management;*

Challenges for the World Economy (Edward Elgar, 2009), 206; C.J. Bastmeijer and K. Willems, 'Robuust, Verbonden en… Beschermd. Past een Klimaatbestendig Natuurbeleid met Aandacht voor "Wilde Natuur"-beleving in het Juridische Natura 2000-Jasje?', in C.W. Backes *et al.*, *Natuur(lijk) met Recht Beschermd: Bouwstenen voor een Effectieve en Hanteerbare Natuurbescherming* (Boom Juridische Uitgevers, 2010), 85; A. Dodd, A. Hardiman, K. Jennings and G. Williams, 'Commentary: Protected Areas and Climate Change – Reflections from a Practitioner's Perspective', 6(1) *Utrecht Law Review* (2010), 141; A. Cliquet, J. Harris, P. Howsam and C. Backes, 'Response to "Protected Areas and Climate Change – Reflections from a Practitioner's Perspective"', 6(1) *Utrecht Law Review* (2010), 149; D. Schramm and A. Fishman, 'Legal Frameworks for Adaptive Natural Resource Management in a Changing Climate', 22 *Georgetown International Environmental Law Review* (2010), 491; J. Verschuuren, 'Rethinking Restoration in the European Union's Birds and Habitats Directives', 28(4) *Ecological Restoration* (2010), 431; and A. Kühl and E. Maruma Mrema, 'Impacts of Climate Change on Biodiversity, with a Focus on Migratory Species', in T. Honkonen and E. Couzens (eds), *International Environmental Law-Making and Diplomacy Review* (University of Eastern Finland, forthcoming 2011). See also the following presentations at the 8th IUCN Academy of Environmental Law Colloquium, which focused on 'Linkages Between Biodiversity and Climate Change' (Ghent, 14-17 September 2010): A. Cliquet, 'Connectivity Between Protected Areas as an Adaptation Strategy for Biodiversity Conservation'; A. Trouwborst, 'Climate Change Adaptation and the Bonn Convention on Migratory Species and its Daughter Agreements'; H. Unnerstall, 'Natura 2000 and Climate Change: Options and Imperatives for Adapting the Interpretation of the Habitats Directive'; and R. Uylenburg, 'Climate Change and the (In)flexibility of Natura 2000' (see <http://www.iucnael.org/index.php?option=com_content&view=article&id=141%3Aghent-colloquium-2010-full-program-and-presentations&catid=98&Itemid=91&lang=en >, accessed 28 January 2011).

[3] See, e.g., J.E. Hossell, N.E. Ellis, M.J. Harley and I.R. Hepburn, 'Climate Change and Nature Conservation: Implications for Policy and Practice in Britain and Ireland', 11(1) *Journal for Nature Conservation* (2003), 67; (for the Netherlands) B. van Leeuwen and P. Opdam, 'Klimaatsverandering Vergt Aanpassing van het Natuurbeleid', 104(3) *De Levende Natuur* (2003), 122; (for Australia) H. Clarke, 'Conserving Biodiversity in the Face of Climate Change', 14(2) *Agenda* (2007), 157; and B. Griffith *et al.*, 'Climate Change Adaptation for the US National Wildlife Refuge System' 44(6) *Environmental Management* (2009), 1043.

[4] 'Carta di Siracusa' on Biodiversity (Siracusa, 24 April 2009), para. 2.

[5] Convention on Biological Diversity (Rio de Janeiro, 5 June 1992).

[6] COP Decision IX/16 on Biodiversity and Climate Change (30 May 2008), para. A(4)(b) and (i).

[7] COP Decision VII/15 on Biodiversity and Climate Change (20 February 2004), para. 12.

[8] COP Decision VII/28 on Protected Areas (20 February 2004), para. 1(4)(5).

> *(iii) Strengthening protected area networks including through the use of connectivity measures such as the development of ecological networks and ecological corridors and the restoration of degraded habitats and landscapes […];*
>
> *(iv) Integrating biodiversity into wider seascape and landscape management;*
>
> *(v) Restoring degraded ecosystems and ecosystem functions; and*
>
> *(vi) Facilitating adaptive management by strengthening monitoring and evaluation systems;*
>
> *Bearing in mind that under climate change, natural adaptation will be difficult and recognizing that in situ conservation actions are more effective, also consider ex situ measures, such as relocation, assisted migration and captive breeding, among others, that could contribute to maintaining the adaptive capacity and securing the survival of species at risk, taking into account the precautionary approach in order to avoid unintended ecological consequences […].*[9]

Also in the 2010 COP Decision on protected areas, climate change was identified as one of the 'issues that need greater attention.'[10] Parties are requested in this regard to 'integrate protected areas into wider landscapes and seascapes and sectors,' including through 'connectivity measures such as the development of ecological networks and ecological corridors, and the restoration of degraded habitats and landscapes in order to address climate change impacts and increase resilience to climate change.'[11] Decisions recommending climate adaptation measures have also been adopted under other global nature conservation treaties, including the Ramsar Wetlands Convention[12] and the Bonn Convention on Migratory Species.[13] It is well understood that much of the required adaptation action will need to be undertaken at a regional rather than a global scale. For instance, the CBD COP has called upon States to 'cooperate regionally in activities aimed at enhancing habitat connectivity across ecological gradients, with the aim of enhancing ecosystem resilience and to facilitate the migration and dispersal of species with limited tolerance to altered climatic conditions.'[14]

The challenge of regional cooperation to enhance nature's ability to adapt to climate change is particularly momentous in Europe, where biodiversity is already struggling to cope with severe human pressures in heavily fragmented landscapes which extend across a large number of relatively small States. As a recent study conducted for the European Commission observes: 'In most parts of Europe, protected areas are too small to accommodate changes, and the matrix around them is too modified and intensively used.'[15] Furthermore, a major recent assessment report reveals that only a small proportion of the numerous habitat types and species covered by the European Union (EU) Habitats Directive[16] currently has a conservation status that is deemed 'favourable',[17] and that an increasing

[9] COP Decision X/33 on Biodiversity and Climate Change (29 October 2010), para. 8(c)-(e).
[10] See COP Decision X/31 on Protected Areas (29 October 2010), section B(2), para. 14.
[11] Ibid.
[12] Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar, 2 February 1971). See, for example, COP Resolution VIII.3 on Climate Change and Wetlands (26 November 2002) and COP Resolution X.24 on Climate Change and Wetlands (4 November 2008).
[13] Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 23 June 1979). See COP Resolution 8.13 on Climate Change and Migratory Species (25 November 2005) and COP Resolution 9.7 on Climate Change Impacts on Migratory Species (5 December 2008). See also A. Kühl and E. Maruma Mrema, n. 2 above. An in-depth review of the role of the Bonn Convention and its daughter instruments in respect of climate adaptation is currently being conducted by the present author, based on the presentation mentioned in n. 2 above.
[14] COP Decision VIII/30 on Biodiversity and Climate Change (31 March 2006), para. 4.
[15] G. Tucker and Y. de Soye, *Impacts of Climate Change and Selected Renewable Energy Infrastructures on EU Biodiversity and the Natura 2000 Network – Tasks 2b & 3b: Impacts of Climate Change on EU Biodiversity Policy, and Recommendations for Policies and Measures to Maintain and Restore Biodiversity in the EU in the Face of Climate Change* (IEEP/IUCN, August 2009, updated November 2009), 81.
[16] Council Directive 92/43/EC on the Conservation of Natural Habitats and of Wild Fauna and Flora (21 May 1992), [1992] OJ L206/7.
[17] This term will be explained below.

number of them is already identified as under threat from climate change.[18] These circumstances warrant the below review of the principal intergovernmental regimes for nature conservation in Europe, namely the Council of Europe's 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats[19] and the EU's Wild Birds[20] and Habitats Directives. The central question addressed is to what extent these instruments, all of which were adopted well before the adaptation of species and habitats to climate change appeared on international agendas, are capable of accommodating such adaptation. Special attention is paid to assessing the scope of existing provisions in this context when interpreted in light of their overarching purpose and subsequent decisions and policies on climate change. For reasons of space and to avoid duplication, no elaborate introductions of the legal regimes involved will be provided,[21] enabling the analyses below to focus entirely on the research question just outlined. Incidentally, although space limitations inhibit the examination of any instruments besides the Bern Convention and the two EU directives, it is convenient to bear in mind that the latter three do not operate in a vacuum. Other instruments of relevance to the conservation of European biodiversity in the face of climate change include several treaties covering particular migratory species, sea areas and mountain regions.[22] Similar considerations apply to various regulations and policies with a focus different from or broader than environmental protection, such as agriculture, infrastructure or water management.[23]

BERN CONVENTION

Of the selected instruments, the Bern Convention has the broadest scope, both in terms of participation and objectives. Its parties presently number 50, comprising all 27 EU Member States, the EU itself, 18 other European States and four African States. The aims of the Convention are 'to conserve wild flora and fauna and their natural habitats, especially those species and habitats whose

[18] Report from the European Commission to the Council and the European Parliament on the Conservation Status of Habitat Types and Species as Required under Article 17 of the Habitats Directive, Communication COM(2009) 358 (13 July 2009).

[19] Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 19 September 1979).

[20] Directive 2009/147/EC of the European Parliament and of the Council on the Conservation of Wild Birds (30 November 2009), [2010] OJ L20/7; this is the codified version of Council Directive 79/409/EEC (2 April 1979) as subsequently modified.

[21] Studies discussing the Birds and Habitats Directives are particularly plentiful. As for the Bern Convention, two comprehensive and recent introductions are C. Lasén Díaz, 'The Bern Convention: 30 Years of Nature Conservation in Europe', 19(2) *Review of European Community and International Environmental Law* (2010), 185; and M. Bowman, P. Davies and C. Redgwell, *Lyster's International Wildlife Law* (2nd ed., Cambridge University Press, 2010), 297-345. Other scientific literature addressing the Bern Convention includes S. Jen, 'The Convention on the Conservation of European Wildlife and Natural Habitats (Bern 1979): Procedures of Application in Practice', 2(2) *Journal of International Wildlife Law and Policy* (1999), 224; S. Erens *et al.*, n. 2 above, 212-213; and A. Trouwborst, 'Managing the Carnivore Comeback: International and EU Species Protection Law and the Return of Lynx, Wolf and Bear to Western Europe' 22(3) *Journal of Environmental Law* (2010), 347. A representative impression of the Bern Convention regime can, furthermore, be obtained from the 101st issue of *Naturopa* (2004). The website of the Convention is <http://www.coe.int/t/dg4/cultureheritage/nature/Bern/default_en.asp>.

[22] Selected examples are the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (The Hague, 16 June 1995); the OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic (Paris, 22 September 1992); the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona, 16 February 1976, revised 10 June 1995) and its Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (Barcelona, 10 June 1995); the Protocol on the Implementation of the Alpine Convention of 1991 Relating to the Conservation of Nature and the Countryside (Chambéry, 20 December 1994); and the Framework Convention on the Protection and Sustainable Development of the Carpathians (Kiev, 22 May 2003) and its Protocol on Conservation and Sustainable Use of Biological and Landscape Diversity (Bucharest, 19 June 2008).

[23] Examples include the EU Common Agricultural Policy (CAP); Directive 2000/60/EC of the European Parliament and of the Council Establishing a Framework for Community Action in the Field of Water Policy (EU Water Framework Directive) (23 October 2000), [2000] OJ L327/19; and Directive 2008/56/EC of the European Parliament and of the Council Establishing a Framework for Community Action in the Field of Marine Environmental Policy (EU Marine Strategy Framework Directive) (17 June 2008), [2008] OJ L164/19.

conservation requires the co-operation of several States, and to promote such co-operation,' giving particular emphasis to endangered and vulnerable species, including migratory ones.[24]

CLIMATE ADAPTATION AND THE BERN CONVENTION IN BRIEF

The importance attached in the stated aims just cited to species and habitats whose conservation requires international cooperation, in combination with the growing need for such cooperation on account of climate change signalled earlier, will ostensibly augment the significance of the Bern Convention as climate change advances. Although, as will be discussed below, a number of provisions in the Convention are of relevance, none of them explicitly address climate adaptation – which, given the treaty's birth year, is not surprising. This is not to say that the problem has escaped the attention of the parties to the Bern Convention, quite the contrary. Adaptation of species and habitats to climate change is addressed in a sequence of (non-legally binding) decisions adopted by the main treaty body, the Standing Committee, in which all parties are represented: Recommendations No. 122 (2006),[25] No. 135 (2008),[26] Nos. 142 and 143 (2009)[27] and Nos. 145, 146 and 147 (2010).[28] Most of these Recommendations contain specific and – certainly when compared to other nature conservation treaties – detailed guidance developed by and under auspices of a Group of Experts on Biodiversity and Climate Change appointed for this purpose in 2006.[29] In this connection, many significant studies on climate impacts and adaptation measures have been commissioned and/or specifically recommended to parties in order to inform the implementation of the Convention.[30] Attention to the issue within the Council of Europe has not remained limited to the Bern Convention, as witnessed for instance by a Recommendation on Biodiversity and Climate Change adopted recently by the Council's Parliamentary Assembly.[31]

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[24] See Bern Convention, n. 19 above, Article 1.

[25] Recommendation No. 122 (2006) of the Standing Committee on the Conservation of Biological Diversity in the Context of Climate Change (30 November 2006).

[26] Recommendation No. 135 (2008) of the Standing Committee on Addressing the Impacts of Climate Change on Biodiversity (27 November 2008).

[27] Recommendation No. 142 (2009) of the Standing Committee Interpreting the CBD Definition of Invasive Alien Species to Take Into Account Climate Change (26 November 2009); Recommendation No. 143 (2009) of the Standing Committee on Further Guidance for Parties on Biodiversity and Climate Change (26 November 2009).

[28] Recommendation No. 145 (2010) of the Standing Committee on Guidance for Parties on Biodiversity and Climate Change in Mountain Regions (9 December 2010); Recommendation No. 146 (2010) of the Standing Committee on Guidance for Parties on Biodiversity and Climate Change in European Islands (9 December 2010); Recommendation No. 147 (2010) of the Standing Committee on Guidance for Parties on Wildland Fires, Biodiversity and Climate Change (9 December 2010).

[29] The work of the Group of Experts can be viewed at <http://www.coe.int/t/dg4/cultureheritage/nature/bern/climatechange>.

[30] These include J.M. Moreno, *Climate Change, Wildland Fires and Biodiversity in Europe*, T-PVS/Inf (2010) 10; C. Epple and Y. de Soye, *Climate Change and the Biodiversity of European Islands*, T-PVS/Inf (2010) 9; E. Spehn and K. Rudmann-Maurer, *Impacts of Climate Change on Mountain Biodiversity in Europe*, T-PVS/Inf (2010) 8; M.B. Araújo, *Protected Areas and Climate Change in Europe*, T-PVS/Inf (2009) 10; V. Heywood, *The Impacts of Climate Change on Plant Species in Europe*, T-PVS/Inf (2009) 9; R. Wilson, *Impacts of Climate Change on European Invertebrates*, T-PVS/Inf (2009) 8; M. Harley and N. Hodgson, *Review of Existing International and National Guidance on Adaptation to Climate Change with a Focus on Biodiversity Issues*, T-PVS/Inf (2008) 12; K. Henle *et al*., *Climate Change Impacts on European Amphibians and Reptiles*, T-PVS/Inf (2008) 11; B. Huntley, *Climate Change and the Vulnerability of Bern Convention Species and Habitats*, T-PVS/Inf (2008) 6; L. Capdevila-Argüelles and B. Zilletti, *A Perspective on Climate Change and Invasive Alien Species*, T-PVS/Inf (2008) 5; M. Ferrer, I. Newton and K. Bildstein, *Climate Change and the Conservation of Migratory Birds in Europe: Identifying Effects and Conservation Priorities*, T-PVS/Inf (2008) 1; B. Huntley, *Climatic Change and the Conservation of European Biodiversity: Towards the Development of Adaptation Strategies*, T-PVS/Inf (2007) 3; and M.B. Usher, *Conserving European Biodiversity in the Context of Climate Change*, T-PVS (2005) 21.

[31] Parliamentary Assembly Recommendation 1918 (2010) on Biodiversity and Climate Change (30 April 2010); see also the reply adopted by the Committee of Ministers at the 1101st meeting of the Ministers' Deputies (8 December 2010).

Since crucial elements of the necessary biodiversity adaptation action set out in the introduction above are not expressly incorporated in the Bern Convention's provisions, the question may arise whether the Convention should not be amended to remedy this. It appears logical, however, and – especially given the onerous requirements for the adoption and entry into force of amendments to the Convention[32] – prudent as well, to first procure an answer to the question of how big the mismatch actually is between what is needed to help European nature adapt to climate change and the obligations currently provided for in the Bern Convention. In order to obtain that answer, the rules and role of treaty interpretation are concisely explored, followed by an examination of pertinent provisions in the Bern Convention and of relevant Standing Committee Recommendations.

TREATY INTERPRETATION

Article 31 of the Vienna Convention on the Law of Treaties contains generally accepted rules of treaty interpretation.[33] It states that a treaty 'shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose.'[34] Furthermore, account shall be taken, *inter alia*, of 'any subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions;' 'any subsequent practice in the application of the treaty which establishes the agreement of the parties regarding its interpretation;' and 'any relevant rules of international law applicable in the relations between the parties.'[35] Of particular interest for present purposes is the potential influence on the interpretation of treaty provisions of stated treaty objectives ('object and purpose'),[36] of subsequent decisions adopted by treaty bodies,[37] and to some extent of 'other relevant rules,' for instance from the CBD.

An interesting case illustrating the first two is the interpretation of Article 3 of the Ramsar Convention employed in a 2007 appeal ruling by the Netherlands Crown.[38] This case did not involve the adaptation of nature to climate change, but it is not hard to draw a parallel with the interpretation of 'outdated' provisions in conservation treaties in light of the need for adaptation action. Concretely, the Crown ruled that the permission for construction of a resort in the proximity of a wetland occurring on the List of Wetlands of International Importance had been rightfully annulled on account of infringement of the Ramsar Convention, because an environmental impact assessment (EIA) had not been performed. Yet, the rather open-ended language of Article 3 of the Convention does not as such appear to require an EIA:

> *1. The Contracting Parties shall formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory.*

[32] See Bern Convention, n. 19 above, Article 16.
[33] Convention on the Law of Treaties (Vienna, 23 May 1969). For a comprehensive analysis of the rules of treaty interpretation, see R. Gardiner, *Treaty Interpretation* (Oxford University Press, 2008).
[34] Ibid., Article 31(1).
[35] Ibid., Article 31(3).
[36] As the well-known clarification by the International Law Commission states: 'When a treaty is open to two interpretations one of which does and the other does not enable the treaty to have appropriate effects, good faith and the objects and purposes of the treaty demand that the former interpretation should be adopted.' *Yearbook of the International Law Commission* (1966, Vol. II), 219.
[37] On the possibility of such decisions serving as 'subsequent agreement' or 'subsequent practice' in the context of treaty interpretation see, *inter alia*, R. Churchill and G. Ulfstein, 'Autonomous Institutional Arrangements in Multilateral Environmental Agreements: A Little-Noticed Phenomenon in International Law', 94(4) *American Journal of International Law* (2000), 623, 641; and A. Wiersema, 'The New International Law-Makers? Conferences of the Parties to Multilateral Environmental Agreements', 31(1) *Michigan Journal of International Law* (2009), 231.
[38] Netherlands Crown Decision (in Dutch) in the case lodged by the Competent Authority for the Island of Bonaire on the annulment of two of its decisions on the Lac wetland by the Governor of the Netherlands Antilles, 11 September 2007, *Staatsblad* 2007, 347. For an English summary and commentary, see J. Verschuuren, 'Ramsar Soft Law is Not Soft at All: Discussion of the 2007 Decision by the Netherlands Crown on the Lac Ramsar Site on the Island of Bonaire' (2008), found at <http://www.ramsar.org/pdf/wurc/wurc_verschuuren_bonaire.pdf>

> *2. Each Contracting Party shall arrange to be informed at the earliest possible time if the ecological character of any wetland in its territory and included in the List has changed, is changing or is likely to change as the result of technological developments, pollution or other human interference.*

Several decisions adopted by the Ramsar COP in connection with Article 3 *do* call for EIAs, but these are not by themselves legally binding. After recalling these decisions and citing Article 31 of the Vienna Convention, the Crown reasoned as follows:

> *Although Article 3 of the Ramsar Convention does leave the state parties considerable discretionary powers as to the exact procedure, the authorities cannot agree on activities in or nearby a Ramsar site without an EIA. [...] The Ramsar Convention has to be faithfully interpreted and implemented by the state parties so that its aims are achieved. [...] Article 3 of the Ramsar Convention [...] has to be carried out in the light of the aim of conservation and preservation of the special ecological character of wetlands. In addition, [...] when interpreting the provisions of the convention, later resolutions, recommendations and guidelines that were adopted by the parties to the convention, have to be taken into account. [...] Such resolutions, recommendations and guidelines are especially important because Article 3 itself does not offer much to hold on to. In addition, [...] it is important that the resolutions and recommendations have been adopted unanimously by the Conference of the Parties, in which all state parties, including the Kingdom of the Netherlands, are represented.*[39]

'Soft law' was thus, as it were, turned into hard law. Of course, the effect of interpretation will vary from case to case, *inter alia* depending on the wording employed in relevant COP decisions and in the treaty text itself, and there are limits to what it can achieve. Provisions can only be stretched so far, and *contra legem* interpretation (resulting in actual contradiction of the language employed in a treaty) is to be avoided. Besides, notwithstanding the clear demonstration which the Dutch case provides of the potential influence of treaty aims and COP decisions on the interpretation of treaty obligations, it should be noted that not every court in every case will necessarily take as generous an approach. Particularly the extent to which, and conditions under which, non-binding decisions by treaty parties can pose as 'subsequent agreement' or 'subsequent practice' remain open to debate.

RELEVANT BERN CONVENTION PROVISIONS

Bearing in mind the above, a number of Bern Convention provisions may be of significance regarding the adaptation of species and habitats to climate change in spite of their 'pre-climate change' origin. This concerns, in particular, Articles 2 through 7, 10 and 11. Some of the most prominent are signalled here. To achieve the aims of the Convention cited above, Article 2 stipulates with respect to *all* wildlife that parties 'shall take requisite measures to maintain the population of wild flora and fauna at, or adapt it to, a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements and the sub-species, varieties or forms at risk locally.' What this level amounts to will depend on the circumstances and the positions taken by States parties concerned in each case, but it is probably safe to assume that species should at a minimum be kept clear of a threatened status on the IUCN Red List.[40] In addition, Article 3 commits parties to 'undertake' to 'have regard to the conservation of wild flora and fauna' in their 'planning and development policies' and when taking 'measures against pollution.'[41]

These general obligations are flanked by specific duties with regard to habitat and species protection, respectively in Articles 4 and 5-9. For *all* 'wild flora and fauna species' each party 'shall take appropriate and necessary legislative and administrative measures to ensure the conservation' of their habitats, and 'especially those specified in Appendices I and II, and the conservation of endangered natural habitats.'[42] Parties 'undertake' to give 'special attention to the protection of areas that are of importance for the migratory species specified in Appendices II and III,'[43] and 'to co-

[39] Translation by J. Verschuuren, ibid. (emphasis added).
[40] See also M. Bowman *et al.*, n. 21 above, 300.
[41] See Bern Convention, n. 19 above, Article 3(2).
[42] Ibid., Article 4(1).
[43] Ibid., Article 4(3).

ordinate as appropriate' their efforts to protect habitats 'when these are situated in frontier areas.'[44] Regarding species protection, each party 'shall take appropriate and necessary legislative and administrative measures to ensure the special protection of the wild flora species specified in Appendix I'[45] and 'the wild fauna species specified in Appendix II,'[46] and similar measures to 'ensure the protection' (without the adjective 'special') of species mentioned in Appendix III.[47] For each of these three groups of species specific prescriptions are added, for example to prohibit capturing or killing specimens, but it follows from the formulation of the provisions in question that these do not necessarily exhaust the generic obligation to take appropriate and necessary measures just cited. Generally speaking, parties are to 'co-operate whenever appropriate and in particular where this would enhance the effectiveness of measures taken under other articles of this Convention.'[48] Finally, each party is to 'strictly control the introduction of non-native species.'[49]

RELEVANT STANDING COMMITTEE RECOMMENDATIONS

As they are of evident significance in the present context, the aforementioned Standing Committee Recommendations on biodiversity and climate change should be examined next. Their preambles specifically recall 'the aims of the Convention to conserve wild flora and fauna and its natural habitats' and the obligations from Articles 2, 3 and 4 cited above. Likewise, they recite a number of relevant commitments from decisions adopted by the Conferences of the Parties to the Ramsar Convention, the Bonn Convention on Migratory Species and the CBD, recalling for example 'CBD COP Decision IX/16, which urges Parties to enhance the integration of climate change considerations related to biodiversity in their implementation of the Convention' and 'CBD COP Decision IX/18 on the role that protected areas and their connectivity play in addressing climate change.'[50] Six Recommendations stress 'the need to adapt conservation work to the challenges of climate change so as to minimise its impact on the species and natural habitats protected under the Convention.'[51] Precaution is advocated in the repeated statement that 'uncertainties surrounding the precise nature of future climate change and its impacts on biodiversity should not delay practical conservation action.'[52] The operational parts of Recommendations No. 135 (2008) and No. 143 (2009) urge parties to develop 'climate change adaptation activities for biodiversity,' building on specific guidance contained in appendices. The language employed from one year to the next appears to reflect a growing sense of urgency. Whereas the 2008 decision calls on parties to 'encourage the elaboration' of said adaptation activities while 'taking account' of the appended guidance, the 2009 decision calls on parties to 'develop' such activities while 'taking *due* account' of the appended guidance.[53] The latter wording is retained in Recommendations Nos. 145 and 146 (2010). These recommend parties to 'develop specific climate change adaptation policies and action' for, respectively, mountain biodiversity and European islands, 'taking due account of the proposed guidance' in the appendices.[54] The three 2010 Recommendations, thus including No. 147, contain an additional request to '[w]here appropriate, implement the proposed actions' from the appended guidance.[55] The appendices to all five Recommendations concerned contain the following, identically phrased, clarification:

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[44] Ibid., Article 4(4).
[45] Ibid., Article 5.
[46] Ibid., Article 6.
[47] Ibid., Article 7.
[48] Ibid., Article 11(1)(a).
[49] Ibid., Article 11(2)(b).
[50] Quoted from the preambles to Recommendation No. 135 (2008), n. 26 above, and No. 143 (2009), n. 27 above.
[51] Ibid., and also the preambles to Recommendation No. 122 (2006), n. 25 above, and Recommendations Nos. 145, 146 and 147 (2010), n. 28 above.
[52] Ibid.
[53] Recommendation No. 135 (2008), ibid., para. 3; and Recommendation No. 143 (2009), ibid., para. 4 (emphasis added).
[54] Recommendation No. 145 (2010), n. 28 above, para. 3; Recommendation No. 146 (2010), n. 28 above, para. 4. A corresponding provision is lacking in Recommendation No. 147 (2010), n. 28 above.
[55] Recommendation No. 145 (2010), ibid., para. 4; Recommendation No. 146 (2010), ibid., para. 5; Recommendation No. 147 (2010), n. 28 above, para. 4.

> *Measures that may be considered as appropriate for addressing the impacts of climate change on biodiversity, for the purposes of the application of the Convention, are listed for consideration by Contracting Parties. These measures are offered as examples of action that may be taken by authorities at all levels of governance to address this issue. Other complementary measures may be identified by governments as equally appropriate to their particular circumstances and concerns.*

The actual guidance is far too extensive to reproduce or even summarize here. The importance of large and representative protected areas and the establishment and preservation of sufficient connectivity for different species groups, however, is stressed throughout. It is useful to have a closer look at some representative samples drawn from the numerous actions proposed. The guidance appended to Recommendation No. 135 (2008) calls on States parties to establish 'networks of interconnected protected areas (terrestrial, freshwater and marine) and intervening habitat mosaics to increase permeability and aid gene flow;'[56] to 'plan future conservation areas to ensure that vulnerable species groups and habitats types are protected;'[57] to allow for the 'changing configuration of coasts and rivers by avoiding development in these areas;'[58] and to ensure that 'conservation objectives reflect the challenges presented by climate change.'[59] The plight is highlighted of ecosystems in areas deemed especially vulnerable to climate change, including coastal zones, salt marshes, mountains, Mediterranean-type ecosystems, boreal forests and tundra.[60] It is noted that restoration is crucial for threatened and rare species in order to boost their resilience to climate change. Parties are urged in this respect to 'take measures to build up population numbers'[61] and to 'address with urgency other non-climate threats to vulnerable species to enhance their adaptive capacity.'[62] Several species listed under the Bern Convention are identified as likely to be more vulnerable to climate change than others, for example European sturgeon (*Acipenser sturio*), midwife toad (*Alytes obstetricans*), aquatic warbler (*Acrocephalus paludicola*), Dupont's lark (*Chersophilus duponti*), pond bat (*Myotis dasycneme*), Mediterranean monk seal (*Monachus monachus*) and Iberian lynx (*Lynx pardina*).[63] Species groups receiving special attention in the 2008 guidance are migratory birds, reptiles and amphibians. The latter two are deemed to possess 'a too low dispersal capacity to follow the expected rapid changes, especially in the highly fragmented European landscapes,' and it is observed that their *in-situ* adaptation will require 'large populations – beyond the size of most amphibian and reptile populations in modern landscapes.'[64] For island endemics, amphibians from dry Mediterranean regions, amphibians requiring cool environments and other species expected to be particularly affected, the guidance proposes 'early action', including through 'species-specific climate change mitigation plans.'[65] States are called upon to 'facilitate in-situ adaptation and natural range shifts by redoubling efforts to maintain or restore large intact habitats and large-scale connectivity.'[66]

Recommendation No. 142 (2009) contains an interesting clarification meant to avoid the European Strategy on Invasive Alien Species[67] from posing an obstacle to the adaptation of species to shifting climate space. 'Worried that native species moving to neighbouring areas may be considered as alien due to the fact that climate change is the result of human action and that such species may be unnecessarily controlled,' the Standing Committee recommends parties to 'interpret the term "alien species" for the purpose of the implementation of the European Strategy on Invasive Alien Species as not including native species naturally extending their range in response to climate change.'[68]

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[56] Recommendation No. 135 (2008), n. 26 above, Appendix, para. II(3)(c).
[57] Ibid., para. II(3)(d).
[58] Ibid., para. II(3)(e).
[59] Ibid., para. II(1)(d).
[60] Ibid., para. I(1).
[61] Ibid., para. I(2).
[62] Ibid., para. I(7).
[63] Ibid., para. I(6).
[64] Ibid., chapeau of para. I(11).
[65] Ibid., para. I(11).
[66] Ibid., para. I(13).
[67] See Recommendation No. 99 (2003) of the Standing Committee on the European Strategy on Invasive Alien Species (4 December 2003).
[68] Recommendation No. 142 (2009), n. 27 above, preamble and para. 1.

Recommendation No. 143 (2009) contributes guidance on, among other things, the adaptation of invertebrates and plants. Regarding invertebrates, parties are recommended, *inter alia*, to '[m]aintain and, where possible and ecologically appropriate, add large areas and networks of heterogeneous habitat;'[69] to establish or maintain 'landscape-scale networks of natural and semi-natural habitat in order to increase the chances that species can shift their distribution naturally;'[70] to consider 'assisted colonisation' for 'species whose current distributions are unlikely to support them in the long term, and which are unlikely to reach identifiably suitable habitat and climatic conditions outside their current ranges,' while 'taking due account of potential impacts of translocation activities on species and habitats in the target area;'[71] and to minimize non-climate pressures on invertebrate biodiversity.[72] In addition, Recommendation No. 143 proposes the following action on protected areas and connectivity generally:

> *1. Ensure that existing protected areas are adequately managed and monitored so that they are in as healthy a state as possible before climatic and other change intensifies.*
>
> *2. Implement protected areas management to increase their resilience to climate change. This may include both on-site actions and management of the wider landscape to maintain ecosystem processes and functions.*
>
> *3. Take a long-term view in protected-areas management plans, and include actions for climate change adaptation (for periods up to 20 to 50 years, depending on the speed with which ecosystem changes are expected). Use adaptive management strategies and prevent the maintenance of ill-adapted habitats.*
>
> *4. Ensure the development of a sufficiently representative and connected network of protected areas so as to allow for species dispersal and settlement in new suitable sites as a consequence of climate change. In a context of great uncertainty, such a network would constitute an insurance policy to provide protection for most endangered species and habitats. [...]*
>
> *5. Connect protected areas into functional ecological networks to allow the movement of species between them. Techniques include, as appropriate, buffer zones, stepping stones, corridors, and measures to reduce habitat fragmentation.*
>
> *6. Carry out integrated management of the wider countryside to alleviate the overall pressure on biodiversity and facilitate movement of species between conservation areas, as species dispersal is likely to be the most important mechanism of species adaptation to climate change.*[73]

The three 2010 decisions set out specific climate adaptation guidance regarding, respectively, mountain areas, islands, and the role of fire. Due to space limitations, only Recommendation No. 145 (2010) on mountain regions is considered here.[74] In the preamble and appended guidance, the Standing Committee points to the particular vulnerability of European mountain ecosystems, which are exposed to a relatively 'high degree of habitat fragmentation'[75] and 'host a very high proportion of endemic species that are at great risk of extinction because of the unprecedented speed of present climate change and the West-East orientation of Europe's mountain ranges, which hinders North-bound migration possible in other mountain ecosystems of the world.'[76] Parties are recommended, *inter alia*, to enlarge protected areas; establish buffer zones; create new protected areas; protect 'altitudinal gradients avoiding further fragmentation;' re-evaluate protected area objectives; protect key ecosystem

[69] See Recommendation No. 143 (2009), n. 27 above, Appendix, para. I(1), which adds that this should be done in order to '(i) protect large invertebrate populations with low risk of local extinction; (ii) be prepared for changes to the habitat associations of species in a changing climate; and (iii) provide buffering capacity against the impacts of extreme climatic or climate-related events (e.g. fire).'
[70] Ibid., para. I(4), which adds that 'many invertebrates will need to expand their distributions to higher latitudes or elevations in order to survive climate change.'
[71] Ibid., para. I(6).
[72] Ibid., para. I(3).
[73] Ibid., paras. III(1)-(6).
[74] Recommendation No. 145 (2010), n. 28 above.
[75] Ibid., preamble.
[76] Ibid., Appendix.

features; 'maximise populations of rare and threatened species;' 'relocate where appropriate and necessary organisms from one location to another in order to bypass a barrier (e.g. urban area);' and to reduce anthropogenic stresses generally.[77] Interestingly, in order to 'restore ecosystems that have been lost or degraded' and thus boost resilience to climate change, the guidance specifically recommends the 'recovery of missing keystone species (e.g., wolf, beaver).'[78] Equally noteworthy is the proposed use of 'refugia', meaning areas less affected by climate change than others, 'as sources for recovery or as destinations for climate sensitive migrants.'[79] If anything, the current review plainly suggests that the Bern Convention is a front runner when it comes to translating scientific knowledge concerning the adaptation of biodiversity to climate change into detailed operational guidance for its parties.

INTERPRETING THE BERN CONVENTION IN LIGHT OF CLIMATE CHANGE

As regards the 'object and purpose' of the Bern Convention, it is increasingly obvious that the achievement in the long term of the stated aim 'to conserve wild flora and fauna and their natural habitats' is unlikely without the implementation of comprehensive climate adaptation measures. Similarly, such action appears imperative in order to comply with the duty to 'ensure the conservation of the habitats' of wild flora and fauna,[80] and arguably also the duties to 'ensure the protection' or 'special protection' of species from the Convention's appendices.[81] The view that without adequate adaptation action the aims of the Bern Convention cannot be achieved and its main obligations not be fulfilled, is strongly reinforced by the guidance elaborated in Standing Committee Recommendations in connection with those aims and obligations. To all intents and purposes, therefore, an interpretation in accordance with Article 31 of the Vienna Convention appears to warrant the conclusion that the 'requisite measures' required by Article 2 of the Bern Convention and the 'appropriate and necessary' measures prescribed in Article 4, and arguably also Articles 5-7, include adequate climate adaptation measures. In brief, the Bern Convention obliges contracting parties to take action to facilitate the adaptation of biodiversity to climate change.[82]

It is, nevertheless, easier said than done to pinpoint the level of specificity of the obligation(s) involved. Certainly not every measure proposed in the Standing Committee Recommendations can be assumed to represent compulsory action. This is apparent if only from the clarification in those Recommendations, reproduced above, that the proposed measures are 'listed for consideration' and 'offered as examples of action that may be taken,', and that 'complementary measures may be identified by governments as equally appropriate.' It thus looks as if parties have a fair amount of discretion in determining the details. Even so, the above analysis indicates that the prescribed adaptation action at a minimum encompasses protecting and/or restoring robustly sized areas and populations, ensuring adequate connectivity for different species groups, and generally incorporating climate adaptation measures into nature protection and management. Among other things, this appears to affirm that for Bern Convention parties, action to establish and manage the Emerald Network[83] of protected areas and the Pan-European Ecological Network (PEEN)[84] is not nearly as voluntary as it tends to be presented. Moreover, even though many of the numerous detailed action proposals in the Recommendations may not represent hard obligations, they are not devoid of legal significance. To

[77] Ibid.
[78] Ibid.
[79] Ibid.
[80] See Bern Convention, n. 19 above, Article 4(1).
[81] Ibid., Articles 5-7.
[82] Incidentally, insofar as 'measures against pollution' can be understood as including measures to reduce greenhouse gas concentrations in the atmosphere, a role would seem to be reserved for Article 3(2) of the Convention as regards the impacts on European biodiversity of climate change *mitigation* measures.
[83] The Emerald Network of Areas of Special Conservation Interest is an ecological network representing the *de facto* extension of the Natura 2000 network, established under the Habitats Directive, to non-EU countries; see Recommendation No. 16 (1989) of the Standing Committee on Areas of Special Conservation Interest (9 June 1989); Resolution No. 3 (1996) of the Standing Committee Concerning the Setting Up of a Pan-European Ecological Network (26 January 1996); and Resolution No. 5 (1998) of the Standing Committee Concerning the Rules for the Network of Areas of Special Conservation Interest (Emerald Network) (4 December 1998).
[84] The PEEN, which is an important element of the Pan-European Biological and Landscape Diversity Strategy (Sofia, 25 October 1995), is an overarching network incorporating the Emerald Network, the Natura 2000 network, Ramsar wetlands and a number of other site categories.

illustrate, in case a Bern Convention party does not develop, to pick one instance mentioned above, species-specific climate adaptation plans for vulnerable amphibians, then at the very least it would appear that this party owes an explanation as to what other means it is employing on this count to implement its obligations under the Convention in good faith.

BIRDS AND HABITATS DIRECTIVES

The EU and its 27 Member States implement the Bern Convention primarily by means of the 1992 Habitats Directive and the 1979 Wild Birds Directive. The directives, which are generally regarded as some of the most advanced and effective regional conservation instruments,[85] aim for a 'favourable conservation status' for the animal and plant species and habitat types covered by them.[86]

CLIMATE ADAPTATION AND THE BIRDS AND HABITATS DIRECTIVES IN BRIEF

As with the Bern Convention, the influence of climate change on biodiversity was not considered when the Birds and Habitats Directives were drawn up. Nevertheless, the directives contain various obligations of relevance to the issue. The extent to which the provisions involved can facilitate or perhaps even hamper the adaptation of nature to climate change has received increasing attention in the scholarly literature in recent years, including by the present author.[87] Obviously, the following analysis is intended to build on rather than duplicate this existing literature. Whether outdated or not, the legal provisions of the Birds and Habitats Directives exist in a context made up, *inter alia*, of non-binding statements on biodiversity adaptation to climate change. These occur, for instance, in the 2006 EU Biodiversity Action Plan[88] and the 2009 White Paper on climate adaptation generally.[89] The scientific literature just referred to contains several proposals for minor or major amendments to the Birds and/or Habitats Directives,[90] or for replacing or complementing them with new EU legislation attuned to nature conservation in the face of climate change.[91] Given an apparent lack of political will, *inter alia* on the part of the European Commission, to undertake any such legal reform in the foreseeable future, the analysis below focuses on the scope of current directive provisions, similar to the exercise performed above with respect to the Bern Convention.

A prominent role in this regard is reserved for the European Court of Justice (ECJ), whose jurisprudence ultimately determines the proper interpretation of the directives. This jurisprudence reveals a distinct tendency of the Court to accord substantial weight to the aims of EU legislation that it is called on to interpret, and a closely related preference for the interpretational rule of *effet utile*, or useful effect. The latter, which is linked to the so-called principle of loyal cooperation,[92] favours those interpretations which grant provisions of EU law their fullest effect and maximum practical impact.

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[85] See, e.g., P.F. Donald *et al.*, 'International Conservation Policy Delivers Benefits for Birds in Europe', 307(5839) *Science* (2007), 810.

[86] See Habitats Directive, n. 16 above, Article 2; Birds Directive, n. 20 above, Articles 1 and 2. The latter do not contain the words 'favourable conservation status' but are generally understood to imply this purpose for wild birds.

[87] See R. Sutherland *et al.*, n. 2 above; K. Wheeler, n. 2 above; H.E. Woldendorp, n. 2 above; A. Cliquet *et al.* (2009), n. 2 above; A. Trouwborst, n. 1 above; S. Erens *et al.*, n. 2 above; K. Bastmeijer and K. Willems, n. 2 above; A. Dodd *et al.*, n. 2 above; A. Cliquet *et al.* (2010), n. 2 above; and J. Verschuuren, n. 2 above. See also the presentations by A. Cliquet, H. Unnerstall and R. Uylenburg mentioned in n. 2 above.

[88] Halting the Loss of Biodiversity by 2010 – and Beyond, Communication COM(2006) 216 (22 May 2006), endorsed by the EU Council on 18 December 2006.

[89] Adapting to Climate Change: Towards a European Framework for Action, Communication COM(2009) 147 (1 April 2009).

[90] An example is the suggestion to make the wording of Article 10 of the Habitats Directive on connectivity more compulsory by J. Verschuuren, n. 2 above, at 437.

[91] E.g., the possibility of an 'Ecosystem Framework Directive' explored in the two articles by A. Cliquet *et al.*, n. 2 above.

[92] Treaty on European Union (Maastricht, 7 February 1992), Article 4(3).

For the purpose of illustrating this goal-oriented approach favouring the effectiveness of EU law, one need only consider the ample case law of the Court concerning the concept of 'direct effect.'[93]

RELEVANT DIRECTIVE PROVISIONS

The following provisions are of evident significance when read with climate change in mind. Article 2 of the Habitats Directive proclaims in general terms that all measures taken by Member States pursuant to the directive 'shall be designed to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest.' Such a status is to be achieved at least at the national level, and perhaps even also at the level of individual protected areas.[94] According to the Directive, the status of a habitat qualifies as 'favourable' when, among other things, its range is 'stable or increasing' and the 'structure and functions which are necessary for its *long-term* maintenance exist and are likely to continue to exist for the *foreseeable future*.'[95] The conservation status of a species is deemed favourable when, *inter alia*, the species 'is maintaining itself on a *long-term* basis as a viable component of its natural habitats' and 'there is, *and will probably continue to be*, a sufficiently large habitat to maintain its populations on a *long-term* basis.'[96]

Bird species listed in Annex I of the Birds Directive and (other) migratory bird species, insofar as these occur regularly in areas within Member States' jurisdiction, 'shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution.'[97] Specifically, 'the most suitable territories in number and size' for all of these species are to be classified as Special Protection Areas (SPAs).[98] Under the Habitats Directive, comparable action is to be undertaken regarding species listed in Annex II and habitat types listed in Annex I of the directive.[99] Following a multiple-step procedure, sites important to these species and habitats are to be designated as Special Areas of Conservation (SAC). Only ecological criteria, not socio-economic ones, may determine the selection and delimitation of sites.[100] The SPAs and SACs combined are to constitute a 'coherent European ecological network' of protected areas called Natura 2000.[101] With regard to SACs, Article 6 of the Habitats Directive requires States to take 'the *necessary* conservation measures' which 'correspond to the ecological requirements' of the habitats and species involved.[102] Additionally, States 'shall take appropriate steps to avoid, in the special areas of conservation [and SPAs], the deterioration of natural habitats.'[103] Connectivity is addressed specifically in Articles 3(3) and 10 of the Habitats Directive:

> *Where they consider it necessary, Member States shall endeavour to improve the ecological coherence of Natura 2000 by maintaining, and where appropriate developing, features of the landscape which are of major importance for wild fauna and flora.*[104]
>
> *Such features are those which, by virtue of their linear and continuous structure (such as rivers with their banks or the traditional systems for marking field boundaries) or their*

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[93] See, *inter alia*, A. Trouwborst, 'Modern Approaches to Enforcing Community Environmental Law: A Special Focus on Direct Effect and Criminal Sanctions', in H.H.G. Post, *The Protection of Ambient Air in International and European Law* (Eleven International, 2009), 89, at 99-113.

[94] For a discussion of this and other questions concerning the level at which a favourable conservation status ought to be achieved, see A. Trouwborst, n. 21 above, at 355-357.

[95] Habitats Directive, n. 16 above, Article 1(e) (emphasis added).

[96] Ibid., Article 1(i) (emphasis added).

[97] See Birds Directive, n. 20 above, Article 4(1)-(2).

[98] Ibid.

[99] See Habitats Directive, n. 16 above, Article 4.

[100] Article 4 of both directives, as explained by the ECJ in, *inter alia*, Case C-355/90, *Commission v Spain* (2 August 1993), [1993] ECR I-4221, paras. 26-27; Case C-44/95, *Regina v Secretary of State for the Environment ex parte Royal Society for the Protection of Birds* (11 July 1996), [1996] ECR I-3805, para. 26; Case C-67/99, *Commission v Ireland* (11 September 2001), [2001] ECR I-5757; Case C-71/99, *Commission v Germany* (11 September 2001), [2001] ECR I-5811; and Case C-220/99, *Commission v France* (11 September 2001), [2001] ECR I-5831.

[101] See Habitats Directive, n. 16 above, Article 3.

[102] Ibid., Article 6(1) (emphasis added).

[103] Ibid., Article 6(2); according to Article 7, this provision also applies to Birds Directive SPAs.

[104] Ibid., Article 3(3); see also Article 10(1).

> *function as stepping stones (such as ponds or small woods), are essential for the migration, dispersal and genetic exchange of wild species.*[105]

Article 3 of the Birds Directive stipulates a general, supplementary duty to 'take the requisite measures to preserve, maintain or re-establish a sufficient diversity and area of habitats' for all wild bird species, whether in or outside SPAs, including through 'upkeep and management in accordance with the ecological needs of habitats inside and outside the protected zones,' the 're-establishment of destroyed biotopes' and the 'creation of biotopes.' Finally, mention should be made of Articles 12 and 13 of the Habitats Directive, which require Member States to 'take the requisite measures to establish a system of strict protection' for the animal and plant species listed in Appendix IV of the directive.[106]

RELEVANT EU POLICY

Supporting the adaptation of biodiversity to climate change is one of the ten objectives set forth in the EU Biodiversity Action Plan of 2006.[107] The Plan contains a target for 2010 to 'substantially strengthen coherence, connectivity and resilience of the protected areas network' in order to attain 'favourable conservation status of species and habitats in the face of climate change' through the application of 'tools which may include flyways, buffer zones, corridors and stepping stones (including as appropriate to neighbouring and third countries),' as well as 'actions in support of biodiversity in the wider environment.'[108] Similarly, the aforementioned White Paper on climate adaptation states that the impact of climate change on natural habitats must be 'factored into the management of Natura 2000 to ensure the diversity of and connectivity between natural areas and to allow for species migration and survival when climate conditions change.'[109] Besides, it observes that '[i]n future it may be necessary to consider establishing a permeable landscape in order to enhance the interconnectivity of natural areas,'[110] and announces the elaboration of guidance on 'dealing with the impact of climate change on the management of Natura 2000 sites.'[111] Both the European Commission and the EU Council of Environment Ministers have recently called for the development of 'green infrastructure' in the 83 percent of EU territory which is located outside Natura 2000 areas.[112] In 2010 the Council emphasized the importance of such infrastructure 'to climate adaptation and mitigation objectives, to prevent habitat fragmentation, to increase connectivity and to maintain species evolution processes,' and appealed to the Commission to 'further develop this concept.'[113] Lastly, mention should be made of the establishment of an EU Ad Hoc Expert Working Group on Biodiversity and Climate Change,[114] and of a 2007 guidance document commissioned by the European Commission on the role of connectivity in the Birds and Habitats Directives.[115] The latter aims to 'help develop and implement integrated ecological connectivity related measures' in order to meet, *inter alia*, 'the need for biodiversity adaptation measures in response to climate change.'[116] The document expressly states,

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[105] Ibid., Article 10(2).
[106] Ibid., Articles 12(1) and 13(1).
[107] Action Plan, n. 88 above, Objective 9.
[108] Ibid, para. A9.4.2.
[109] See Communication COM(2009) 147, n. 89 above, para. 3.2.3.
[110] Ibid.
[111] Ibid.
[112] This is defined as 'an interconnected network of natural areas, including agricultural land, greenways, wetlands, parks, forest reserves, native plant communities and marine areas that naturally regulate storm flows, temperatures, flood risk and water, air and ecosystem quality.' See Options for an EU Vision and Target for Biodiversity Beyond 2010, Communication COM(2010) 4 (19 January 2010), at 6; and Council Conclusions on Biodiversity Post-2010 (15 March 2010), para. 6.
[113] Council Conclusions, ibid.
[114] The principal output of the Working Group has been the discussion paper *Towards a Strategy on Climate Change, Ecosystem Services and Biodiversity* (EU Ad Hoc Expert Working Group on Biodiversity and Climate Change, 2009); this and other work of the group can be viewed at <http://circa.europa.eu/public/irc/env/biodiversity_climate/home>.
[115] M. Kettunen *et al.*, *Guidance on the Maintenance of Landscape Connectivity Features of Major Importance for Wild Flora and Fauna: Guidance on the Implementation of Article 3 of the Birds Directive (79/409/EEC) and Article 10 of the Habitats Directive (92/43/EEC)* (Institute for European Environmental Policy, 2007).
[116] Ibid., 10.

however, that the opinions expressed in it 'do not necessarily represent those of the European Commission.'[117]

INTERPRETING THE DIRECTIVES IN LIGHT OF CLIMATE CHANGE

It appears that without taking adequate action to facilitate the adaptation of species and habitats to climate change, the aims of the Birds and Habitats Directives cannot be achieved and EU Member States cannot meet their obligations. Such action is also fully in keeping with recent Council and Commission policy as appraised above. Moreover, significant weight must in the present context be assigned to the outcomes of the preceding examination of the Bern Convention, given that the directives are considered as the principal vehicle for the implementation of the Convention by those parties which are also EU Member States. Finally, said adaptation action is in conformity with obligations of EU Member States under global conventions like the CBD, the Ramsar Convention and the Bonn Convention, as informed by relevant COP decisions. Hence, in parallel to – and in light of – the conclusions drawn in respect of the Bern Convention, altogether the above review seems to indicate that to a rather large extent, climate adaptation measures must already be deemed mandatory under the Birds and Habitats Directives. To be sure, this interpretation – combining current climate adaptation needs with the directives' central goal of maintaining or restoring a favourable conservation status for species and habitats, and underpinned by the wider legal and policy context on the issue – seems to fit the aforementioned tradition of the European Court of Justice like a glove.

For present purposes, this preliminary general conclusion ought to be complemented with a few more specific considerations concerning some of the directive provisions reviewed above. First, species protection – as opposed to area protection – is hardly ever mentioned in discussions of the Birds and Habitats Directives and climate adaptation, but may well have a role to play. For instance, Article 12(1) of the Habitats Directive requires more than the imposition and enforcement of a number of prohibitions. As explained by the ECJ, this provision 'requires the Member States not only to adopt a comprehensive legislative framework but also to implement concrete and specific protection measures.'[118] Furthermore, the prescribed 'system of strict protection' of Annex IV species presupposes the 'adoption of coherent and coordinated measures of a preventive nature.'[119] Both Court and Commission recommend species action plans, 'on condition that they are correctly established and applied,' as effective means of implementing the requirements of Article 12.[120] In the absence of such plans or similarly comprehensive and species-specific measures, 'the system of strict protection contains gaps' amounting to a violation of the Habitats Directive.[121] These active species protection requirements must be assumed to become applicable as soon as a new (or old) Appendix IV species sets foot or puts down roots in a Member State, whether on account of climate change or otherwise.[122] This conforms to the view of the European Commission that when a species 'spreads on its own to a new area,' this area 'has to be considered part of the natural range.'[123]

Second, regarding area protection, the use of detailed and static conservation objectives for Natura 2000 sites has been viewed as a potential obstacle to the dynamic approach needed in light of climate change.[124] The height of this alleged hurdle has been reduced somewhat in recent case law in which the ECJ held that for SPAs there is no need for conservation objectives 'to be specified for each species considered separately,' let alone an obligation to lay these down in legally binding form in the instrument of designation.[125] Besides, the potential problem may be eased by opting for qualitative

[117] Ibid., see front matter under 'Citation and disclaimer'.
[118] Case C-183/05, *Commission v Ireland* (11 January 2007), [2007] ECR I-137, para. 29.
[119] Ibid., para. 30.
[120] Ibid., para. 14.
[121] Ibid., paras. 14 and 18. Additional clarity on the implications of Article 12 can be expected when the Court delivers its judgment in the proceedings concerning the protection of the common hamster (*Cricetus cricetus*) in France, instigated on 25 September 2009: Case C-383/09, *Commission v France*, [2009] OJ C312/16; see the Opinion of Advocate-General Kokott (20 January 2011), n.y.r.
[122] See also A. Trouwborst, n. 21 above, at 368-369.
[123] European Commission, *Guidance Document on the Strict Protection of Animal Species of Community Interest under the Habitats Directive 92/43/EEC* (European Commission, February 2007), at 11.
[124] See, for example, J. Verschuuren, n. 2 above, 435.
[125] Case C-535/07, *Commission v Austria* (14 October 2010), n.y.r., para. 65.

rather than quantitative objectives.[126] For example, if the *capability* of a Natura 2000 site to serve as habitat for a given species is the conservation objective, rather than the actual presence of a specific number of individuals, then it could be argued that the objective is still met 'even when the species concerned has left the area because of the effects of climate change.'[127] Third, it should be noted that the designation itself of SACs and SPAs is, in the words of Cliquet *et al.*, 'not a one-time operation.'[128] Instead, Member States are under a continuous obligation to designate or nominate sites which (newly) qualify for inclusion in Natura 2000, arguably including cases where this is the result of climate-induced range shifts.[129] In addition, the criteria in the directives concerning site selection imply that climate adaptation is to be factored into area designation, meaning in particular that 'sites should be designated that are large enough to face the effects of climate change.'[130]

Fourth – and related to the previous observation – a closer look at the Birds and Habitats Directives is merited from the perspective of the need to maintain and, in many cases, restore robust habitats and populations of species in order to bolster their resilience to climate change. A 'demerit' of the directives detected by Verschuuren is 'the lack of specificity regarding restoration, an essential tool for biodiversity conservation in an era of climate change.'[131] Be that as it may, in general terms the conservation *and*, if need be, restoration of climate-change-resilient habitats and populations must already be considered compulsory under both directives. Especially significant in this connection are the (pro)active species protection requirements just discussed and the obligations of Member States under Articles 3 and 4 of the Birds Directive and 6(1) and 6(2) of the Habitats Directive. The prescription in the latter to take the 'appropriate steps to avoid [...] the deterioration' of habitats in SACs or SPAs, has repeatedly been interpreted by the ECJ as an obligation to 'do what it takes.' What the 'appropriate steps' are will depend on the problem at hand, but what ultimately counts is the result.[132] The anticipatory nature of the obligation should also be stressed, in the sense that effective measures are to be taken before adverse effects occur.[133] Moreover, to meet the requirements of Article 6(2), damage which already *has* occurred must be undone. For instance, a 2002 judgment in a case involving harm through overgrazing by sheep in an Irish SAC confirmed in this regard that 'it is necessary for the Irish authorities not only to take measures to stabilise the problem of overgrazing, but also to ensure that damaged habitats are allowed to recover.'[134] This appears to substantiate the view of Wheeler that 'Article 6(2) provides a direct obligation for Member States to take conservation measures to avoid and stop deterioration due to climate changes.'[135] That this provision must indeed be deemed to require conservation and/or restoration measures aimed at securing resilience of species and habitats to climate change impacts is evident, furthermore, from the Court's assertion that 'in implementing Article 6(2) of the Habitats Directive, 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.'[136] Similarly, the Court recently affirmed that 'the protection of SPAs is not to be limited to measures intended to avoid external anthropogenic impairment and disturbance but must also, according to the

[126] See A. Cliquet *et al.* (2009), n. 2 above, 166-167.
[127] Ibid., 167. The use of this type of qualitative conservation objectives for Natura 2000 sites was approved by the highest administrative court in the Netherlands, the Council of State, in Case 200802545/1, *Faunabescherming e.a. v Minister van Landbouw, Natuur en Voedselkwaliteit* (6 November 2008).
[128] See A. Cliquet *et al.*, ibid., 164.
[129] ECJ Case C-3/96, *Commission v Netherlands* (19 May 1998), [1998] ECR I-3031; Case C-209/04, *Commission v Austria* (23 March 2006), [2006] ECR I-2755; and Case C-418/04, *Commission v Ireland* (13 December 2007), [2007] ECR I-10947. Also see H.E. Woldendorp, n. 2 above, 2886; A. Cliquet *et al.*, ibid.; A. Trouwborst, n. 1 above, 439; A. Dodd *et al.*, n. 2 above, 146.
[130] See A. Cliquet *et al.*, ibid., 166.
[131] See J. Verschuuren, n. 2 above, 436.
[132] For a particularly clear example, see Case C-117/00, *Commission v Ireland* (13 June 2002), [2002] ECR I-5335, paras. 26-33.
[133] This is apparent if only from the use of the term 'avoid' in Article 6(2). See also European Commission, *Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats' Directive 92/43/EEC* (European Commission, 2000), 24.
[134] Case C-117/00, n. 132 above, para. 31.
[135] K. Wheeler, n. 2 above, 290; a similar position is taken by R. Sutherland *et al.*, n. 2 above, 89.
[136] Case C-6/04, *Commission v United Kingdom* (20 October 2005), [2005] ECR I-9017, para. 34.

situation that presents itself, include positive measures to preserve or improve the state of the site.'[137] All of this clearly supports the view of Verschuuren that, albeit perhaps in a fairly couched manner, a duty to restore and maintain robust populations and habitats 'is, in fact, already in the law.'[138]

Fifth, it has been asserted especially often that the Habitats Directive is frail when it comes to connectivity.[139] The language of Articles 3(3) and 10 cited above seems to lack 'legal teeth'[140] and to leave this critical issue largely to the discretion of individual Member States. Undeniably, in reality, the greater part of Natura 2000 is 'not a network but a collection of isolated sites.'[141] Moreover, the proposition in the European Commission's 2009 White Paper that 'in *future* it may be necessary to consider establishing a permeable landscape in order to enhance the interconnectivity of natural areas,'[142] could be taken as an acknowledgment that the current Natura 2000 regime fails to provide for adequate connectivity.[143] There is every reason to believe, nevertheless, that Articles 3 and 10 do not exhaust the legal relevance of the directive in respect of connectivity. It is important in this regard to realize that adequate connectivity is not only essential to enable the dispersal of organisms in response to changing climate space, but also to enable populations to survive and recover from adverse impacts from extreme weather events and other agents associated with climate change – such as storms, droughts, floods, temperature extremes, fires and disease. Fragmented populations have a significantly higher extinction risk in such situations than interconnected ones, and the latter recover much faster than the former.

Crucially, this second function of connectivity triggers the applicability of directive provisions aimed exclusively at the conservation and/or restoration of habitats and species *within* Natura 2000 sites, including Articles 6(1) and 6(2) of the Habitats Directive. For example, in view of this function and of the aim of securing favourable conservation status as defined in Article 1, establishing adequate connectivity *between* sites must in many cases be deemed obligatory as a result of the duty in Article 6(1) to take 'the necessary conservation measures involving, if need be, [...] appropriate statutory, administrative or contractual measures which correspond to the ecological requirements of the natural habitat types in Annex I and the species in Annex II present on the sites.'[144] Similar considerations apply to Article 6(2), discussed above. After all, although the scope of the 'appropriate steps' envisaged in this provision is limited to the species and habitats 'in the special areas of conservation,' it is common ground that they 'may need to be implemented **outside** the SAC,' as Article 6(2) 'does not specify that measures have to be **taken** in the SAC' but instead that measures are to avoid impacts in the areas in question.[145] In respect of Annex IV species, Article 12 appears to prescribe connectivity measures as well.[146] This reading of Habitats Directive provisions seems to square with the observation in the connectivity guidance document composed for the Commission in 2007 that, in principle, connectivity measures 'should be implemented whenever they are necessary to maintain or restore FCS [favourable conservation status] of habitats or species of Community interest.'[147] It is convenient to note in this context that the mere fact that Articles 3(3) and 10 of the Habitats Directive contain the most specific language on connectivity does not entail that they possess a monopoly on the

[137] Case C-535/07, n. 125 above, para. 59; see also Case C-418/04, n. 129 above, para. 154.
[138] See J. Verschuuren, n. 2 above, 437.
[139] See, *inter alia,* A. Cliquet *et al.* (2009), n. 2 above, 171; A. Trouwborst, n. 1 above, 439-440; S. Erens *et al.*, n. 2 above, 217-218; J. Verschuuren, n. 2 above, 436.
[140] See J. Verschuuren, ibid.
[141] Ibid.
[142] See Communication COM(2009) 147, n. 89 above, para. 3.2.3 (emphasis added).
[143] J. Verschuuren, n. 2 above, 436.
[144] The nature of Article 6(1) as an obligation of result interlinked with Article 2, is emphasized in European Commission, n. 133 above, 17.
[145] European Commission, ibid., 24 (emphasis as in original).
[146] As a study commissioned by the Netherlands Ministry of Agriculture, Nature and Food Quality concludes: 'In a world where most annex IV species find their habitat fragmented, long-term persistence of populations can not be ensured in local habitat sites, but requires that these sites can interact in a habitat network. Therefore, an effective implementation of the EU-Habitats Directive requires a landscape level approach: habitat networks.' P. Opdam *et al., Effective Protection of the Annex IV Species of the EU-Habitats Directive: The Landscape Approach* (Alterra, 2002) 23.
[147] See M. Kettunen *et al.*, n. 115 above, 7.

issue, and that by consequence their rather voluntary nature should overrule the mandatory requirements just distilled from a combination of Articles 1, 2 and 6 of the directive.[148]

As in the preceding discussion on resilient habitats and species, Articles 3 and 4 of the Birds Directive appear of relevance for connectivity as well – especially bearing in mind that despite their ability to fly, various bird species are demanding, short-distance travellers vulnerable to fragmentation, an example being black grouse (*Tetrao tetrix*). As it also applies outside SPAs, the obligation in Article 3 to 'take the requisite measures to preserve, maintain or re-establish a sufficient diversity and area of habitats' for all wild bird species would require connectivity measures even if connectivity only served the purpose of climate-induced latitudinal and altitudinal dispersal. Significantly, Article 3 reads like a proactive obligation of result and, like Article 6(2) of the Habitats Directive, also appears to be understood that way by the ECJ.[149] The conclusion that, depending on the circumstances, ensuring connectivity can be compulsory under Article 3 of the Birds Directive, once more substantiates what is suggested in this connection in the 2007 connectivity guidance document.[150]

Sixth, the Birds and Habitats Directives lack an express duty for Member States to coordinate their implementation of the directives internationally. Still, sincere efforts to cooperate with neighbouring States must be deemed obligatory wherever transboundary coordination appears to be a prerequisite for achieving effective climate adaptation action. This duty flows forth from core directive provisions as interpreted in light of the goal of achieving favourable conservation status – similar to preceding analyses – and in light of the particular emphasis placed on transboundary cooperation in the Bern Convention.[151]

Seventh, assisted colonization deserves discussion in the present context. Also from a legal perspective, this adaptation measure is a relatively complex one. In principle, given the proper circumstances, a duty to carry out active translocation of populations could arguably be distilled from the familiar directive provisions – again in a way similar to previous exercises. However, given that such translocation can have repercussions for species and habitats in the area of destination it may, depending on the circumstances, run counter to the directives' protection duties in respect of those. Also, due account must be taken of provisions in the Birds and Habitats Directives specifically addressing the introduction of non-native species. The Habitats Directive requires Member States in this regard to 'ensure that the deliberate introduction into the wild of any species which is not native to their territory is regulated so as not to prejudice natural habitats within their natural range or the wild native fauna and flora and, if they consider it necessary, prohibit such introduction.[152] The Birds Directive contains a roughly comparable provision.[153] Although these provisions obviously do not by definition stand in the way of adaptation-driven translocation activities, they do seem to require that the potential consequences of such activities are carefully assessed in advance on a case-by-case basis. Eighth, the scope of the Habitats Directive in terms of species and habitat types presently covered, poses a significant limitation from the point of view of climate adaptation. In contrast with the fairly comprehensive species coverage of the Birds Directive, numerous vulnerable species and habitats

[148] To illustrate, a parallel can be drawn with Articles 12(1) and 12(4) of the directive. The fact that Article 12(4) appears to have been drafted specifically with, *inter alia*, incidental mortality of marine turtles or cetaceans in fishing gear in mind, does not cancel the applicability to such bycatch of the generic prohibition to kill Annex IV species from Article 12(1). See, e.g., the answer of EU Commissioner Dimas to parliamentary question E-5890/2007 on harbour porpoise (*Phocoena phocoena*) bycatch in recreational gillnet fisheries (11 February 2008), see [2008] OJ C191/150 and <http://www.europarl.europa.eu/qp-web/home.jsp>.

[149] Case C-117/00, n. 132 above, paras. 15 and 21; also Case C-355/90, n. 100 above.

[150] Kettunen *et al.*, n. 115 above, 7: 'connectivity measures should be implemented whenever they are required to maintain populations in accordance with Article 2 of the [Birds] directive.'

[151] Bern Convention, n. 19 above, Articles 1, 4(4) and 11(1)(a). It is also in line with the transboundary action proposed in the EU Biodiversity Action Plan, n. 88 above, para. A9.4.2 (cited in text accompanying n. 108 above).

[152] Habitats Directive, n. 16 above, Article 22(b).

[153] Birds Directive, n. 20 above, Article 11: 'Member States shall see that any introduction of species of bird which do not occur naturally in the wild state in the European territory of the Member State does not prejudice the local flora and fauna. In this connection they shall consult the Commission.'

remain outside the scope of the Habitats Directive, *inter alia* in the marine environment.[154] This is an issue which can obviously not be resolved through interpretation, but will instead require amendment of the annexes to the directive.[155]

Questions remain regarding the where, when and other details of the various adaptation duties outlined above. As these are not only context-specific, but also subject to considerable uncertainty concerning the impacts of climate change on species and habitats, the precautionary principle comes into play. Precaution is one of the pillars of EU environmental policy,[156] and a principle 'by reference of which the Habitats Directive must be interpreted,'[157] and presumably the Birds Directive as well. The essence of the ECJ's understanding of the principle in the context of EU nature conservation law can be captured as *in dubio pro natura*.[158] The importance of taking a precautionary approach in respect of the adaptation of biodiversity to climate change is emphasized in the Bern Convention Standing Committee Recommendations reviewed above and in pertinent decisions by the Conferences of the Parties to the CBD[159] and the Bonn Convention.[160] It is instructive to consider the example of connectivity. Generally speaking, it can evidently be expected that for numerous European species and habitat types connectivity measures will be required to warrant a favourable conservation status in the long run. It is, however, inherently difficult to predict precisely for what populations, locations and points in time this will be the case, and in what measure. In these circumstances, interpreting the directive provisions of relevance to connectivity discussed above in accordance with the precautionary principle would seem to indicate an obligation for EU Member States to proactively create comprehensive ecological infrastructure ensuring mobility for all species groups, rather than reserving connectivity measures for cases in which scientific studies have conclusively established that species X in site Y is in dire straits due to climate change.

All in all, the analysis just carried out lends support to the conclusion drawn recently by Dodd *et al.* 'that climate change adaptation will require the interpretation and implementation of the [Birds and Habitats] Directives to be further developed, but that their fundamental construction is as sound today as it was when they were adopted,'[161] and that the directives 'can already facilitate the positive, dynamic approach needed to address climate change.'[162] Clearly, the realization of such an approach would benefit from authoritative endorsement of the above interpretations. The ECJ's case law on the Birds and Habitats Directives so far shapes legitimate expectations in this regard. It does not appear unlikely, as the consequences of climate change for European biodiversity become increasingly tangible, that in the foreseeable future the Court will employ interpretations along the lines explored above. In the short term, opportunities exist for clarification by the European Commission, in particular in the guidelines on climate change and Natura 2000 which were announced in the climate adaptation White Paper and are currently being prepared.[163]

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[154] See for one discussion H.M. Dotinga and A. Trouwborst, 'The Netherlands and the Designation of Marine Protected Areas in the North Sea: Implementing International and European Law', 5(1) *Utrecht Law Review* (2009), 21.
[155] See in this regard Article 19 of the Habitats Directive, n. 16 above.
[156] See Treaty on the Functioning of the European Union (Rome, 25 March 1957), Article 191(2).
[157] ECJ, Case C-127/00, *Waddenvereniging and Vogelbeschermingsvereniging* (7 September 2004), [2004] ECR I-7405, para. 44.
[158] Ibid.
[159] COP Decision IX/16, n. 6 above, para. A(1)(h).
[160] Parties are urged not to delay adaptation action 'despite the remaining uncertainty surrounding the full scale of the impacts of climate change on migratory species' in COP Resolution 9.7, n. 13 above, para. 1.
[161] See A. Dodd *et al.*, n. 2 above, 148.
[162] Ibid., 142; in her review focusing on birds, K. Wheeler, n. 2 above, at 299, likewise concludes that if the provisions of the Birds and Habitats Directives 'are applied to their full potential, it is reasonable to say that Natura 2000 can adequately protect birds in light of climate changes.'
[163] Personal communication K. Zaunberger, European Commission, DG Environment (5 January 2011).

CONCLUSION

Even though none of the three instruments state this in so many words, the analyses performed above warrant the conclusion that under the Bern Convention as well as under the Birds and Habitats Directives, States are presently subject to legal obligations to take the measures needed to facilitate the adaptation of biodiversity in Europe to climate change. This general conclusion constitutes the principal outcome of this article. Much has been said above regarding the origin, content and scope of the obligations concerned. By way of illustration it will do to consider one example. Establishing corridors and stepping stones between core protected areas has often been viewed as optional, extra action to be freely decided upon by States. The present study, however, yields the conclusion that ensuring adequate connectivity between core protected areas is mandatory under the Bern Convention and the EU directives alike.

Overall, the mismatch between what is desirable from a conservation perspective and what is presently provided for under the Bern Convention and Birds and Habitats Directives does not appear to be such as to warrant major revisions of either regime – and, in the case of the EU directives, turns out to be less substantial than previously assumed.[164] It seems appropriate to highlight here that climate adaptation represents an area where the added value of the Bern Convention is clearly perceptible for EU Member States as well. All the same, much stands to be gained from the further clarification of current duties of Bern Convention parties and EU Member States in the climate adaptation context. In respect of the latter, an apparent role is reserved for European Commission guidance on the topic and, ultimately, for the jurisprudence of the European Court of Justice. In any event, the significance of the obligations reviewed in this article can be expected to keep pace with the intensifying influence of climate change on species and ecosystems in Europe.

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[164] Compare, for example, A. Trouwborst, n. 1 above, 439-442.