POLICY PERSPECTIVE

# Europe needs a new vision for a Natura 2020 network

Axel Hochkirch[1], Thomas Schmitt[1], Joscha Beninde[1], Marietta Hiery[1], Tim Kinitz[2], Jenny Kirschey[3], Daniela Matenaar[1], Katja Rohde[1], Aleke Stoefen[3], Norman Wagner[1], Andreas Zink[3], Stefan Lötters[1], Michael Veith[1], & Alexander Proelss[3]

[1] Department of Biogeography, Trier University, D-54286 Trier, Germany
[2] Department of Environmental Toxicology, Trier University, D-54286 Trier, Germany
[3] Institute for Environmental and Technology Law, Trier University, D-54286 Trier, Germany

**Keywords**
Biodiversity loss; Habitats Directive; Natura 2000; reserve planning; species conservation.

**Correspondence**
Axel Hochkirch, Department of Biogeography, Trier University, D-54286 Trier, Germany.
Tel: 49-651-201-4692; fax: 49-651-201-3851.
E-mail: hochkirch@uni-trier.de

**Received**
26 September 2012
**Accepted**
30 November 2012

**Editor**
Atte Moilanen

doi: 10.1111/conl.12006

## Abstract

Twenty years after the world's nations agreed upon the Convention on Biodiversity, there is still a global decline in biodiversity. At present it seems unlikely that the Aichi Targets of halting biodiversity loss by 2020 will be met. Although the European Union is often seen as a pioneer in this regard, as its "Habitats Directive" represents one of the strongest legal tools in nature conservation, biodiversity continues to decline even in Europe. We outline four major problems in the current implementation of the directive. First, prioritization needs to be based upon comprehensive scientific knowledge. This requires a maximized number of red list assessments of European species and a regular adaptation of the annexes in order to focus on those sites with the highest conservation value. Second, strategic conservation plans need to be compiled for highly threatened species and adaptive management plans need to be implemented in each reserve. Third, an improved "on-ground" monitoring system is necessary, focusing on population trends of priority species and feeding back to management plans and red list assessments. Fourth, substantial financial resources have to be invested in the implementation as well as education in order to reach a societal consensus on the necessity for conservation.

## Introduction

Halting biodiversity loss is one of the greatest challenges of mankind. The Aichi Biodiversity Targets, which have been adopted at the 10th Conference of the Parties (COP) of the Convention on Biological Diversity (CBD), represent the strongest commitment of the world's nations to stop the ongoing decline of biodiversity. Aichi Targets 11 and 12 are particularly noteworthy, as they require that "by 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas [...] are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas..." and that "by 2020 the extinction of known threatened species has been prevented and their conservation status [...] has been improved and sustained" (CBD 2011). Although the Aichi Targets have been adopted as an annex to Decision X/2 (CBD 2010), which is not legally binding, they play a decisive role in the implementation of the convention at the national level and serve as a trigger for the future development of the international conservation legislation.

Recently, the European Union celebrated the 20th anniversary of the Habitats Directive (EU 1992), which constitutes the legal basis of a major part of the Natura 2000 network of protected areas Natura 2000 is often considered one of the most important and largest conservation networks worldwide (Lockwood 2006), but it has suffered from a multitude of setbacks, resulting from, inter alia, Member States' unwillingness to implement the requirements of the directive into their domestic legal systems, problems in adhering to the schedule in designating the Special Areas of Conservation (SAC), controversies on the species listed on the annexes, ambiguities concerning the scope of the procedural and substantial duties contained in Articles 6 and 12, insufficient consideration

  

of optimal site designation, and lack of observational infrastructure to monitor the status of biodiversity (Weber and Christophersen 2002; Gaston *et al*. 2008).

The EU Member States already had agreed in 2001 "to halt the decline of biodiversity [in the EU] by 2010" (European Council 2001). Despite all efforts, the European Commission recently acknowledged that this target has been missed (EEA 2010). Consequently, the Commission has proposed a new strategy to comply with both its own biodiversity objectives and its global commitments (European Commission 2011). This new strategy aims at "halting the loss of biodiversity [. . . ] in the EU by 2020 . . . ."

We here argue that, to ensure success of this mission, fundamental changes in the implementation of the directive are necessary. Particularly, the Natura 2000 network needs to be transformed into a more strategic, more adaptive, more focused, and more efficiently monitored network to cope with newly emerging threats from climate change (Araújo *et al*. 2011) and massive land use changes (Fargione *et al*. 2010). Furthermore, updated information on threats and population trends of species needs to be acquired and incorporated more regularly. We consider four aspects as particularly important for a revision of Natura 2000: (1) greater flexibility of the species and habitats lists in the annexes, (2) implementation of adaptive management plans for each SAC and strategic conservation plans for priority species, (3) establishment of an improved standardized "on-ground" monitoring system, and (4) increased educational and financial efforts to reach the necessary social consensus on the need to preserve biodiversity.

## Adaptive annexes rather than fixed species lists

To ensure the Natura 2000 network's function of preserving biodiversity through the establishment of a coherent network of reserves, it is crucial to (1) maximize knowledge on the existing biodiversity and its spatial distribution (inventory), (2) assess the threat status of these species using objective criteria (red list assessments) in order to identify the species with the highest extinction risks, the regions with highest conservation value as well as the major threats, (3) use this information to prioritize on the conservation of the species with the highest extinction risk and their habitats, and (4) regularly renew this prioritization process to revise the annexes. An enhanced "Natura 2020" network thus will close gaps in the current reserve network, especially the insufficient representation of highly threatened species on the annexes, namely among invertebrates (Cardoso 2012). Many invertebrates have small ranges, which often are not covered by Natura 2000 and may thus get lost accidentally. In contrast, some species listed on the annexes are not threatened according to the IUCN Red List (e.g., *Triturus cristatus*, *Podarcis muralis*, *Myotis myotis*). This is largely a result of the historical origin of the directive, which is the European implementation of the Bern Convention. Many species were simply "inherited" from the annex of the latter. Additionally, expert groups were consulted, leading to bias due to the unevenly distributed taxonomic expertise. Although the annexes have been updated with the 2004 and 2007 EU enlargements, this did not remove the bias (Cardoso 2012).

Recently, the EU started to reassess the red list status of some taxa (van Swaay *et al*. 2011). This process needs to be accelerated to cover many more taxa and obtain the information necessary for strategic planning (Gaston *et al*. 2008). Officially, the Habitats Directive aims at protecting species, for which the EU "has particular responsibility in view of the proportion of their natural range which falls within [its] territory" (EU 1992). Although European endemics perfectly fulfill this requirement, most of them (even if highly threatened) are not listed on its annexes. For non-endemics, using "global assessments" will help to detect species for which the EU has the highest responsibility. While the Aichi Target of protecting 17% of the terrestrial area is formally reached by the current extent of the Natura 2000 network (EEA 2010), a delimited coverage of protected area through a fixed threshold will not stop biodiversity loss as long as not all species with high extinction risk are covered (Noss *et al*. 2012). Apart from their spatial extent, the choice of protected areas needs to focus on high quality sites (in terms of occurrence of highly threatened species) and their connectivity.

As outlined above, a major drawback of the current implementation of the Habitats Directive is the lack of regular updates of its annexes II and IV (which list the species of "community interest"), although Article 19 of the directive provides the legal framework for such updates based upon "technical and scientific progress." Such updates should follow objective criteria, such as the IUCN Red List Criteria (Stuart *et al*. 2010). As the current annexes are not adequate, the baseline document which has been developed based upon these species and habitats (EEA 2010) may evoke misleading conclusions since it relies partly on nonthreatened species.

We suggest that the European Commission (assisted by the Habitats Committee established under Article 20 of the Habitats Directive) adapts all annexes at least yearly on the basis of the IUCN Red List. This will automatically result in a better coverage of highly threatened species. Such flexible annexes will increase effectiveness of conservation efforts by avoiding a long-term focus on

 

non-threatened species. Degazetting some protected areas may be unavoidable (Fuller *et al*. 2010) and needs to be based on scientific information rather than on social pressures (Mascia & Pailler 2010). This is possible under Article 9 of the directive. To prevent misuse we suggest a minimum time span of 10 years with mandatory management and monitoring before degazetting SACs. An external evaluation process should further prevent detrimental effects or a net loss of protected area.

## Implementing adaptive management plans

A second shortcoming in the Natura 2000 network is the insufficiently regulated management of SACs (Ostermann 1998; Wätzold *et al*. 2010; Zaimes *et al*. 2012). In theory, management should target a "favorable conservation status" of protected species and habitats, but even among species currently covered by the Habitats Directive merely 17% have recently been assessed as "favorable" (EEA 2010). Despite this, adaptive management plans are currently not mandatory. We suggest that such plans need to be compiled, implemented and surveilled at the local scale (either by local governmental institutions or NGOs), which demands adequate funding of such organizations. Respective management decisions should prioritize restoring populations of those species, which have the highest extinction risk and must integrate real-time information from monitoring.

Most problems in conservation management arise from land use (and sea use) conflicts (Jetz *et al*. 2007). The Common Agricultural Policy (CAP) of the EU often causes rapid and large-scale land use changes, which cannot be tracked by biota (Eggers *et al*. 2009). In this context, one has to acknowledge that many ecologically valuable habitats in Europe have a long-lasting history of human land use, or even result from land use traditions. Therefore, it will often be necessary to implement sustainable land use practices in SACs. The new initiative of "greening measures" under the CAP is a promising approach to compensate local stakeholders for implementing low intensity land use systems (Orbicon *et al*. 2009). Hopefully, such approaches will be implemented in an efficient way in the new CAP regulations, which will be agreed upon this year. Regarding the management of marine protected areas, the conflict with the EU Common Fisheries Policy (CFP) imposes the main obstacle for the implementation of effective measures (Proelss *et al*. 2010). Remarkably, this obstacle has recently been addressed in comparatively clear terms by the Council on a revised regulation of the CFP (European Council 2012). Integrating budget from CAP and CFP to the SAC management will help to feed the underfinanced conservation budget (Gantioler *et al*. 2010). In line with Aichi Target 1, we propose a mandatory involvement of local stakeholders to provide stronger support for conservation efforts (see also Young *et al*. 2005), which is urgently needed to reach the "favorable conservation status" of species and habitats by 2020 (Hiedanpää 2002).

## Improving on-ground monitoring schemes

The EU member states have to report the status of species and habitats listed on the annexes of the Habitats Directive (European Commission 2011). However, the existing monitoring lacks (1) standardization across countries, (2) taxon-specific standards, (3) coherent training of monitoring staff, and (4) sufficient budget for intensive on-ground monitoring. Yet, these are essential elements to obtain feedback on the suitability of the current management and to timely adapt management plans. Furthermore, the implementation and adherence to management plans should be controlled regularly in order to guarantee long-term success. Data from monitoring are not only crucial for adapting management plans, but also for reassessments of the red list status and will thus help improving the database for the next prioritization step, required to revise the annexes (Figure 1). It will certainly take years until adequate monitoring schemes will be available for all priority species, and a political and societal consensus about allocation of resources to monitoring has to be reached (McDonald-Madden *et al*. 2010). However, without monitoring no evaluation and prioritization is possible, and there is little hope that the 2020 target can be met.

## Reaching social consensus to implement the new strategy

Ambitious conservation strategies developed by scientists are rarely translated into conservation action—the "knowing-doing gap" (Knight *et al*. 2008). We are aware that the implementation of our suggested strategy requires substantial societal and political consensus and the willingness to consequently implement it at all administrative levels, including not only the EU Commission, but also national authorities, regional administrations, and local stakeholders. The EU has obliged itself to reach the Aichi Targets and has agreed upon its own 2020 biodiversity target. However, national and regional interests often compromise an EU wide consensus. This is illustrated by the fact that the efforts to implement the Habitats Directive varied strongly among countries

  

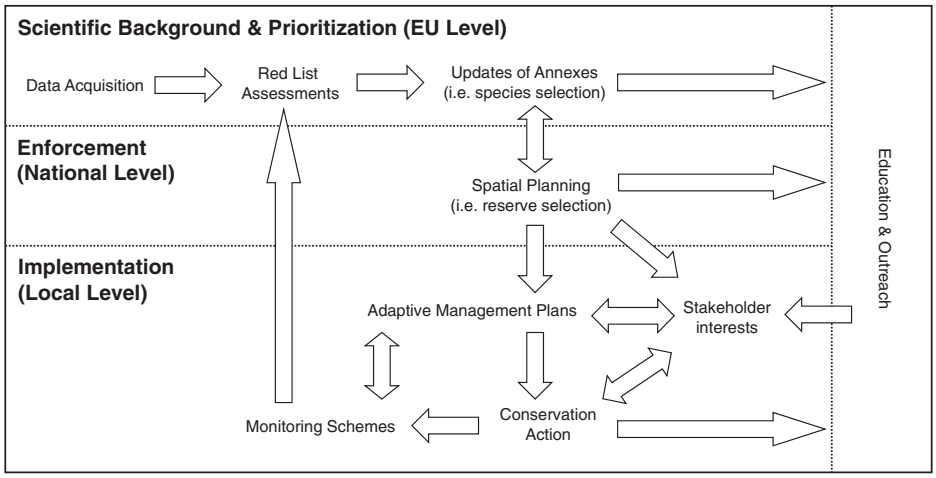


**Figure 1** Suggested prioritization strategy for a Natura 2020 network and its practical implementation. Implementation at the local level requires co-financing from the EU budget (as outlined in Article 8 of the directive). This could be achieved by harmonizing existing programs (e.g., CAP, CFP, RDP, EMFF, LIFE+) with objectives of the Habitats Directive.

(Grodzinska-Jurczak & Cent 2011), and the intended time table has been more or less ignored by many countries. This even caused legal proceedings against some countries, which then accelerated the designation of SACs (Paavola 2004; Evans 2012), underlining the strength of European legislation.

In order to be successful, implementing our revised strategy will require substantial financial resources for both obtaining the necessary information (i.e., data acquisition for prioritizing) and practical implementation of conservation action. While the necessary legislation amendments are relatively minor (mandatory yearly updates of the annexes and adaptive management plans), the practical implementation will remain a major challenge considering the ongoing European financial crisis and massive land use conflicts caused by the political and social consensus to expand renewable energies (Cho 2010).

Like other applied sciences, conservation planning suffers from the complex interplay of societal problems, compartmentalization of knowledge, and even limited collaboration between scientists and decision makers (Reyers *et al*. 2010). Therefore, implementation of a revised Natura 2020 network will demand considerable transdisciplinary efforts to reach societal consensus. This can only be achieved by increasing conservation education and outreach. In this context, ethical arguments may play a more important role than economic ones (e.g., ecosystem services, Costanza *et al*. 1997) as ethical aspects are the foundations of nature conservation and even the CBD values biodiversity *per se*. Instead of promoting potential economic benefits due to the reserve network (which finally may not hold true), it will be important to take concerns of local stakeholders seriously and provide an adequate system to minimize and compensate for economic costs (e.g., Grodzinska-Jurczak & Cent 2011).

## Conclusion

Halting and reverting biodiversity loss in the EU by 2020 will not be possible without a fundamental reform of the current reserve network. Conceptually, the Habitats Directive meets all requirements to become a successful conservation act. However, consistent implementation of all facets of Natura 2000 as well as adaptation strategies to a changing world are urgently needed to avert a recurrent postponement of the targets. In addition, more efforts have to be put into educational and financial aspects to significantly move the Natura 2000 concept beyond the blueprint. By implementing a strategic approach, the European Union has the opportunity to become a real pioneer in nature conservation.

## Acknowledgments

The authors are members of the interdisciplinary graduate school "Cooperation of Science and Jurisprudence in Improving Development and Use of Standards for Environmental Protection – Strategies for Risk Assessment and Management," funded by the German Science Foundation (DFG, GRK 1319).

 

## References


Araújo, M.B., Alagador, D.,Cabeza, M., Nogues-Bravo, D. & Thuiller, W. (2011). Climate change threatens European conservation areas. *Ecol. Lett.*, **14**, 484-492.

Cardoso, P. (2012). Habitats Directive species lists: urgent need of revision. *Insect Conserv. Divers.*, **5**, 169-174.

CBD. (2010). COP 10 Decision X/2. Strategic Plan for Biodiversity 2011–2020. http://www.cbd.int/decision/cop/?id=12268. (visited Sept. 6, 2012).

CBD. (2011). Aichi Biodiversity Targets. http://www.cbd.int/sp/targets/. (visited Sept. 6, 2012).

Cho, A. (2010). Energy's tricky tradeoffs. *Science*, **329**, 786-787.

Costanza, R., dArge, R., deGroot, R. *et al.* (1997). The value of the world's ecosystem services and natural capital. *Nature*, **387**, 253-260.

EEA. (2010). EEA Technical Report 12/2010, EU 2010 Biodiversity Baseline. http://www.eea.europa.eu/publications/eu-2010-biodiversity-baseline/. (visited Sept. 6, 2012).

Eggers, J., Troltzsch, K., Falcucci, A. *et al.* (2009). Is biofuel policy harming biodiversity in Europe? *Glob. Change Biol. Bioenergy*, **1**, 18-34.

EU. (1992). Council directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. *Official J.*, **L206**(July), 7-50.

European Commission. (2011). Our life insurance, our natural capital: an EU biodiversity strategy to 2020. http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1_EN_ACT_part1_v7%5B1%5D.pdf. (visited Sept. 6, 2012).

European Council. (2001). Göteborg European Council, 15–16 June 2001, Presidency Conclusions, SN 200/1/01 REV 1. http://ec.europa.eu/governance/impact/background/docs/goteborg_concl_en.pdf. (visited Sept. 6, 2012).

European Council. (2012). General Approach Concerning the Proposal of the Commission for a Regulation of the European Parliament and of the Council on the Common Fisheries Policy. 2011/0195 (COD).

Evans, D. (2012). Building the European Union's Natura 2000 network. *Nat. Conserv.*, **1**, 11-26.

Fargione, J.E., Plevin, R.J. & Hill, J.D. (2010). The ecological impact of biofuels. *Annu. Rev. Ecol. Evol. Syst.*, **41**, 351-377.

Fuller, R.A., McDonald-Madden, E., Wilson, K.A. *et al.* (2010). Replacing underperforming protected areas achieves better conservation outcomes. *Nature*, **466**, 365-367.

Gantioler, S., Rayment, M., Bassi, S. *et al.* (2010). Costs and socio-economic benefits associated with the Natura 2000 Network. *Final report to the European Commission*. Institute for European Environmental Policy Brussels.

Gaston, K.J., Jackson, S.E., Nagy, A., Cantu-Salazar, L. & Johnson, M. (2008). Protected areas in Europe – principle and practice. *Ann. N.Y. Acad. Sci.*, **1134**, 97-119.

Grodzinska-Jurczak, M. & Cent, J. (2011). Expansion of nature conservation areas: problems with Natura 2000 implementation in Poland? *Environ. Manage.*, **47**, 11-27.

Hiedanpää, J. (2002). European-wide conservation versus local well-being: the reception of the Natura 2000 Reserve Network in Karvia, SW-Finland. *Landscape Urban Plan*, **61**, 113-123.

Jetz, W., Wilcove, D.S. & Dobson, A.P. (2007). Projected impacts of climate and land-use change on the global diversity of birds. *PLoS Biol.*, **5**, 1211-1219.

Knight, A.T., Cowling, R.M., Rouget, M., Balmford, A., Lombard, A.T. & Campbell, B.M. (2008). Knowing but not doing: selecting priority conservation areas and the research-implementation gap. *Conserv. Biol.*, **22**, 610-617.

Lockwood, M. (2006). Global protected area framework. Pages 73–100 in M. Lockwood, V. Graeme, A. Kothari, editors. *Managing protected areas: a global guide*. Cromwell Press, Trowbridge, UK.

Mascia, M.B. & Pailler, S. (2010). Protected area downgrading, downsizing, and degazettement (PADDD) and its conservation implications. *Conserv. Lett.*, **4**, 9-20.

McDonald-Madden, E., Baxter, P.W.J., Fuller, R.A. *et al.* (2010). Monitoring does not always count. *Trends Ecol. Evol.*, **25**, 547-550.

Noss, R.F., Dobson, A.P., Baldwin, R. *et al.* (2012). Bolder thinking for conservation. *Conserv. Biol.*, **26**, 1-4.

Orbicon, Écosphère, ATECMA, & LTD E. (2009) How species conservation can be supported through rural development programmes. Pages 1–139. *Report for the European Commission Directorate General for Environment, Unit B3 Natura 2000*.

Ostermann, O.P. (1998). The need for management of nature conservation sites designated under Natura 2000. *J. Appl. Ecol.*, **35**, 968-973.

Paavola, J. (2004). Protected areas governance and justice: theory and the European Unions Habitats Directive. *Environ. Sci.*, **1**, 59-77.

Proelss, A., Krivickaite, M., Gilles, A., Herr, H. & Siebert, U. (2010). Protection of cetaceans in European waters – a case study on bottom-set gillnet fisheries within marine protected areas. *Int. J. Mar. Coastal Law*, **26**, 5-45.

Reyers, B., Roux, D.J., Cowling, R.M., Ginsburg, A.E., Nel, J.L. & Farrell, P.O. (2010). Conservation planning as a transdisciplinary process. *Conserv. Biol.*, **24**, 957-965.

Stuart, S.N., Wilson, E.O., McNeely, J.A., Mittermeier, R.A. & Rodriguez, J.P. (2010). The barometer of life. *Science*, **328**, 177-177.

van Swaay, C., Maes, D., Collins, S. *et al.* (2011). Applying IUCN criteria to invertebrates: how red is the Red List of European butterflies? *Biol. Conserv.*, **144**, 470-478.

Wätzold, F., Mewes, M., van Apeldoorn, R. *et al.* (2010). Cost-effectiveness of managing Natura 2000 sites: an exploratory study for Finland, Germany, the Netherlands and Poland. *Biodivers. Conserv.*, **19**, 2053-2069.


  

Weber, N. & Christophersen, T. (2002). The influence of non-governmental organizations on the creation of Natura 2000 during European Policy process. *Forest Policy Econ.*, **4**, 1-12.

Young, J., Watt, A., Nowicki, P. *et al.* (2005). Towards sustainable land use: identifying and managing the conflicts between human activities and biodiversity conservation in Europe. *Biodivers. Conserv.*, **14**, 1641-1661.

Zaimes, G.N., Emmanouloudis, D. & Iakovoglou, V. (2012). Estimating soil erosion in Natura 2000 areas located on three semi-arid Mediterranean islands. *J. Environ. Biol.*, **33**, 277-282.

 