



Wildlife and
Countryside



What would have happened to Europe's wildlife without the Nature Directives?

Extracts from the Joint LINKs submission to the Fitness Check of the Birds and Habitats Directives, and Case Studies

Introduction

The fundamental question when considering the effectiveness of a conservation intervention is what would have happened if there had been no intervention (a counterfactual).¹

Identifying a counterfactual to EU nature conservation efforts (and environmental policies more generally) is challenging, for a number of reasons; The EU is a unique legal and political entity², the EU Nature Directives apply equally to the territories of all the 28 EU Member States, conservation action under the Directives has not been implemented with such an analysis in mind but instead translated into national law in ways unique to each Member State, and, as a result of the almost universal participation of the Global Community in the Convention on Biological Diversity, there are no comparable regions where conservation action has been entirely absent. Nevertheless there is strong evidence that without the Directives, the lot of European species and habitats would have been considerably worse.

As stated in the evidence previously submitted to the European Commission by the UK Joint LINKs, biodiversity loss in the UK remains unacceptably high, with 60% of species for which we have data in decline³. However, this does not imply that the Nature Directives have been ineffective, since the rate of decline has undoubtedly slowed since the implementation of the Directives began in spite of growing pressures and several positive examples indicate the power of this legislation to deliver recovery. For example, when the Directives came into force, the red kite (a species near endemic to Europe) remained a rare bird in the UK with a population of a few dozen pairs confined to remote valleys in Wales. Following legal protection established by the Directives and a series of reintroduction projects encouraged and partly funded by EU mechanisms, the species has now been brought back to areas across the UK. Red kites are now a bird of the wider countryside in many areas, with almost 2,000 pairs (nearly 10% of the global population) spread across all four countries of the UK.

A scientific paper on the contribution made by the EU Nature Directives to meeting the Aichi targets (Beresford et al. In press) has estimated that 52% of the total area covered by the Natura 2000 network has no additional protected area status, and so would otherwise be unprotected. This is likely to underestimate the direct contribution of the Directives to protecting key sites across the EU, since Natura 2000 designation is often the trigger for further protective designations (European Environment Agency 2012b).

¹ Miteva, D. A., Pattanayak, S. K., & Ferraro, P. J. (2012). Evaluation of biodiversity policy instruments: what works and what doesn't?. *Oxford Review of Economic Policy*, 28(1), 69-92

² Van Gend en Loos v Netherlands [1963] ECJ "The Community constitutes a new legal order of international law"

³ http://www.rspb.org.uk/Images/stateofnature_tcm9-345839.pdf

The impact of the Nature Directives on Nature Conservation in the UK

In addition to and alongside consideration of conservation outcomes, it is also relevant to consider how the Nature Directives have influenced conservation policies themselves across the EU. The UK has a long history of nature conservation legislation and the UK was instrumental in the promotion of both the Birds and Habitats Directives, as they in large part reflected the expression of UK aspirations for the protection of nature at the European level. However, the Birds and Habitats Directives have led to substantial improvements in the standards of protection for habitats and species in the UK.

'The Habitats and Birds Directives have added a layer of protection for nature in the UK above and beyond that provided in previous national legislation'⁴.

For example, UK national protected areas (Sites of Special Scientific Interest (SSSIs) in England, Scotland and Wales and Areas of Special Scientific Interest (ASSIs) in Northern Ireland) were introduced in national legislation in 1949, but until 1981 were ineffective providing limited protection from development and damage caused by changes in agricultural and forestry management. As a consequence, 10–15% of SSSIs were damaged each year.⁵ In England, the total number of nationally designated sites damaged in England from 1987 to 1993 was almost a quarter of the total number of these sites in England. Changes to the Wildlife and Countryside Act 1981, driven by the requirements of the Birds Directive, have led to a marked improvement in SSSI protection. By the early 1990s, the area of SSSI being lost per year had fallen to below 0.005% and the area subject to short-term damage to around 2–3% per year. Since 2007, only 139 ha, or 0.01%, of the total SSSI network has been lost as a result of development or land-use change⁶.

The role of EU legislation in improving environmental performance is recognised by a wide range of stakeholders. The UK Government's Balance of Competences Review Environment Report⁷ found that;

"The majority of respondents believed that EU competence has increased environmental standards in the UK and across the EU and that this has led to improved performance in addressing several environmental issues."

Evidence submitted to the Balance of Competences Review by the Tyndall Centre for Climate Change Research⁸ underlines this:

"According to the peer-reviewed academic literature...the EU has had many significant and long lasting effects on UK practice [in relation to environmental policy]. For example, it has: significantly raised (and subsequently maintained) environmental standards across many areas, but especially those relating to water, air quality, waste and wildlife protection..."

"There is some discussion in the academic literature of how much policy change over the last 40 years can realistically be ascribed to EU membership... three sources of evidence

⁴ http://assets.wwf.org.uk/downloads/final_report_influence_of_eu_policies_on_the_environment.pdf

⁵ Fairbrass, J., & Jordan, A. (2001a). European Union environmental policy and the UK government: a passive observer or a strategic manager?. *Environmental Politics*, 10(2), 1-21; Fairbrass, J., & Jordan, A. (2001b). Protecting biodiversity in the European Union: national barriers and European opportunities?. *Journal of European Public Policy*, 8(4), 499-518.

⁶ http://issuu.com/wildlifetrusts/docs/nature_and_wellbeing_act_final?e=4558523/9971297#search

⁷ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/284500/environment-climate-change-documents-final-report.pdf

⁸ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/279198/environment-climate-change-evidence-all.pdf#page=782

suggest that the total EU effect has been significant. First of all, so many of the changes noted above are to be found in other comparable member states, that the EU's influence is very likely to have been a significant one.... Second, comparative policy analysis work suggests that any domestic change that would have occurred in the UK independently of the EU's influence, would almost certainly have adopted a very different form i.e. far fewer rigid timetables, binding targets and explicit standards. Third, areas where there have been infringement proceedings against the UK for non-compliance with EU rules...provide further insight into what a 'non-EU' world might have looked like."

In addition, the Nature Directives have improved monitoring and enforcement procedures at the UK level. In respect of enforcement, this is illustrated by the strengthening of protection for national protected areas (ASSIs and SSSIs) described above.

Implications of no EU nature legislation at the UK level

Improvements made to the protection of UK national protected areas (SSSIs and ASSIs) as a result of changes made to national legislation to meet the requirements of the Birds Directive are outlined above. However, the standard of protection from damaging development applied to these sites remains lower than that afforded to Natura 2000 sites under the Birds and Habitats Directives thus providing a powerful demonstration of what UK legislation might have looked like in the absence of the Directives.. This has been illustrated by a number of cases where damaging developments of management activities on (non-Natura) SSSIs have been consented under circumstances which would not have complied with the legal requirements for protection of Natura 2000. Recent examples that are the subject of ongoing NGO and public concern include housing development at Lodge Hill SSSI in Kent⁹ and Rampisham Down in Dorset¹⁰, and Canvey Wick in Essex, where not only was a road put through the SSSI, but the proposed compensation habitat was not enforced.¹¹

The reluctance of the UK Government to implement elements of the requirements of the Birds and Habitats Directives also points to the extent to which effective action to protect habitats and species at UK level has relied on the existence (and the threat of enforcement of) the Birds and Habitats Directives. For example, it took approximately 18 years after adoption of the Habitats Directive for the UK government (Defra) to start to strategically lead on protecting European marine species protected under the Habitats Directive from damaging fishing. Prior to the Habitats Directive there were only three marine nature reserves in the UK. The need to identify marine SACs and marine SPAs considerably enhanced marine conservation in UK waters and yet the designation of marine SPAs and SACs remains incomplete

In the UK, the requirements of the Birds and Habitats Directive have acted as a catalyst and driver for projects which deliver multiple benefits far in excess of their costs which would never have been undertaken without this. Key examples include the Alkborough managed realignment project¹² on

⁹ <http://www.rspb.org.uk/whatwedo/campaigningfornature/casework/details.aspx?id=tcm:9-317476>

¹⁰ <http://action.wildlifetrusts.org/ea-action/action?ea.client.id=1823&ea.campaign.id=35104>

¹¹

<http://cmis.essexcc.gov.uk/EssexCmis5/Document.ashx?czJKcaeAi5tUFL1DTL2UE4zNRBcoShgo=TDQ89SSZPPs2wlguk2iGHdl64fFDa1PNq%2BQhmETn4Y9DT9uPfdyNHw%3D%3D&mCTlbCubSFfXsDGW9lXnlq%3D%3D=hFflUdN3100%3D&kCx1AnS9%2FpWZQ40DXFvdEw%3D%3D=hFflUdN3100%3D&uJovDxwdjMPoYv%2BAJvYtyA%3D%3D=ctNJFf55vVA%3D&FgPIIEJYlotS%2BYGoBi5oIA%3D%3D=NHdURQburHA%3D&d9Qji0ag1Pd993jsyOJqFvmyB7X0CSQK=ctNJFf55vVA%3D&WGewmoAfeNR9xqBux0r1Q8Za60lavYmz=ctNJFf55vVA%3D&WGewmoAfeNQ16B2MHuCPMRKZMwaG1PaO=ctNJFf55vVA%3D>

¹² https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291631/scho0409bpvm-e-e.pdf

the Humber Estuary and the Wallasea Island habitat creation project¹³, both driven by the need to avoid deterioration and to compensate for losses of intertidal habitat to flood defence developments within SPAs and SACs.

Finally, funding associated with the EU nature legislation has been fundamental in the creation, restoration and management of habitats and the recovery of many species in the UK. Without the Directives, UK biodiversity would be much the poorer.

UK examples of what would have happened without the Nature Directives;

No protection or lower standard of protection for internationally important sites and species

- No Lewis Peatlands SPA, Breckland SPA, Dorset Heaths SPA, and many others
- Capercaillie squeezed out by housing in the Cairngorms
- Important habitats and over 300,000 wintering birds in the Thames Estuary threatened by airport development
- No protection for red-throated divers in the Outer Thames Estuary SPA which is not currently protected by UK legislation
- No protection for resident populations of bottlenose dolphins in Cardigan Bay SAC and the Moray Firth SAC.
- No protection of cetaceans from disturbance¹⁴
- No protection of harbour and grey seals from collision with tidal turbines¹⁵

No replacement for habitats likely to be lost to sea level rise or flooding

Newly created sites in the UK whose development was driven by the requirements of the Nature Directives include:

- Frampton Marsh, Lincolnshire
- Freiston Shore, Lincolnshire
- Wallasea island, Essex
- Alkborough Flats, North Lincolnshire
- Ouse Washes, Cambridgeshire
- Great Bells, Kent
- Medmerry, Kent
- Hesketh Outmarsh, Lancashire
- Snape, Suffolk
- Rye Harbour, East Sussex
- Newport Wetlands, South Wales

No improved flood defences to protect threatened sites

- Minsmere¹⁶¹⁷

¹³ <http://www.rspb.org.uk/whatwedo/campaigningfornature/casework/details.aspx?id=tcm:9-235089>

¹⁴ No cumulative impact assessment of three port developments in combination with existing vessel traffic and offshore wind proposals in the Moray Firth SAC and no subsequent advice that unless mitigation measures were put in place, adverse effects on the integrity of the site in relation to the conservation objectives for bottlenose dolphins would be imminent.

¹⁵ For example; Meygen tidal energy project off Scotland applied for 61 turbines, but only 6 turbines were consented to in the first stage with all subsequent stages needing prior approval by Scottish Minister, as the collision risk for seals would otherwise have been too high. <http://www.gov.scot/Topics/marine/Licensing/marine/scoping/MeyGen>

- Titchwell¹⁸

No binding compensation or mitigation for development schemes

- A11 road widening
- No compensation for London Gateway, Bathside Bay, Dibden Bay, Bristol Port, Felixstowe, Immingham Outer Harbour or Cardiff Bay barrage developments.
- No strategic approach to mitigating disturbance from housing developments across the Thames Basin Heaths, leading to fewer Dartford warblers, nightjars and woodlarks
- No mitigation for impacts from housing schemes at Bognor Regis or Salisbury plain
- Reduced protection from disturbance for Little terns nesting at Pagham and Langstone Harbours
- Loss of habitat at Lappel Bank in the Medway would not have resulted in compensation land at Wallasea
- No Steart Marshes managed realignment to mitigate saltmarsh loss due to coastal squeeze in the Severn Estuary.

Poorer siting of onshore and offshore wind farms

- No modifications to reduce impacts on Bewick's swans and other species from turbines on Romney Marsh, Kent.
- Less protection for breeding Hen harriers on Renfrewshire Heights SPA as new wind farms developed.

No (or reduced) scope to challenge to damaging activities

- Fen orchid on road to extinction due to damaging water abstraction
- Largest blanket peatland in the world (Flow Country in Scotland) decimated by inappropriate forestry
- Damaging giant superquarry on the island of Harris would have gone ahead
- Muirkirk and North Lowther Uplands SPA not protected from open cast mining
- Upper Solway Flats and Marshes SPA not protected from damaging unregulated cockle fishing.
- Severn Barrage development damaging multiple SPAs, SACs habitats and features might have gone ahead
- No requirement to monitor and mitigate bycatch of EPS of seabirds and marine mammals¹⁹. Such data are fundamental to informing conservation actions by Member States.
- Damaging dredging for King scallops in Cardigan Bay SAC would have gone ahead

No funding for species recovery and habitat restoration

- Bittern (LIFE96 NAT/UK/003057)
- Stone curlew (LIFE11 INF/UK/000418)
- Corncrake (LIFE94 NAT/B/001516)

¹⁶ http://www.waterprojectsonline.com/case_studies/2013-Virtual/EA_Minsmere_2013_VE.pdf

¹⁷ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289667/gean0109bpfi-e-e.pdf

¹⁸ <http://www.rspb.org.uk/whatwedo/projects/details/262957-titchwell-marsh-coastal-change-project>

¹⁹ Particularly in those fisheries not identified in Council Regulation 812/2004 of 26.4.2004 laying down measures concerning incidental catches of cetaceans in fisheries.

- Little tern (LIFE12 NAT/UK/000869)
- Black-tailed godwit²⁰
- Massive landscape scale blanket bog restoration in mid and north Wales (Berwyn and Migneint-Arenig-Dduallt SACs) would not have happened. (LIFE06 NAT/UK/000134)
- Hen harrier²¹ (LIFE13 NAT/UK/000258)
- Machair management(LIFE08 NAT/UK/000204)²²
- Freshwater pearl mussels (LIFE99 NAT/UK/006088)²³
- Eradication of invasive species (LIFE05 NAT/UK/000141, LIFE13 NAT/UK/000209)
- Slavonian grebes²⁴²⁵
- Atlantic oakwoods (LIFE97 NAT/UK/004244)
- Futurescapes programmes on the Greater Thames and South Downs, and Firth of Forth SPA. (LIFE10 INF/UK/000189)
- No funding for wide-scale population surveys of cetaceans (SCANS-I, SCANS-II)(LIFE92NAT/UK/027, LIFE04NAT/GB/000245)
- No investment by OFWAT (the UK water company regulator) in peatland restoration in the Pennines²⁶ and Bowland²⁷ to deliver SPA and SAC recover and reduce water discoloration and processing costs

Reduced benefits for citizens and local economy

- Titchwell Marsh – 132 FTE jobs supported
- Minsmere – 103 FTE jobs supported
- Bempton Cliffs SPA attracted 66,400 visitors in 2009 who spent £5.8 million
- In 2009, 85,775 visitors to RSPB Saltholme (part of the Teesmouth SPA) spent £580,000
- Medmerry project in West Sussex created new wildlife habitat and protects property at Selsey from flooding
- EU LIFE Vyrnwy – Berwyn & Migneint SACs – would not have enabled over 4,000 people (1,900 of which were school children), to develop a lasting connection with their environment
- Moray Firth SAC – supports an active seasonal commercial boat-based whale watching industry and brings in more than £4 million per year

²⁰ http://ec.europa.eu/environment/nature/conservation/wildbirds/hunting/docs/black_tailed_godwit.pdf

²¹ <http://www.rspb.org.uk/henharrierlife/>

²² <http://www.machairlife.org.uk/>

²³ <http://webarchive.nationalarchives.gov.uk/20080612154553/http://www.english-nature.org.uk/lifeinukrivers/publications/publications.html>

²⁴ <http://www.rspb.org.uk/discoverandenjoynature/seenature/reserves/guide//lochruthven/work.aspx>

²⁵ <http://www.highlandbiodiversity.com/loch-ruthven-habitat-enhancement-project-76.asp>

²⁶ <http://www.northpennines.org.uk/Pages/PeatlandProgramme.aspx>

²⁷ <http://forestofbowland.com/Lancashire-Peat-Partnership>

Case Study: Extinctions Prevented thanks to Nature Directives and LIFE

One measure of whether conservation efforts have had any success in reducing these deteriorating trends is to determine if conservation programmes have managed to prevent any extinctions. The paper “How many bird extinctions have we prevented?”²⁸ identified 16 bird species that would probably have become extinct during the period 1994 – 2004 if conservation programmes for them had not been undertaken.

One of the 16 species identified by this study is Zino’s Petrel, *Pterodroma madeira*, which is endemic to the Portuguese island of Madeira, and is listed on Annex I of the Birds Directive.

Although the species is protected under Portuguese law, its numbers had been declining since 1990, and is listed as Globally Threatened because of its extremely small world population size. The Birds and Habitats Directives underpinned the conservation action that was subsequently taken for this species.

The Maciço Montanhoso Oriental (eastern mountain massif) on the island of Madeira hosts all the known nesting sites of Zino’s or Madeiran petrel. In 1995 this area was proposed as a Natura 2000 site, as part of the Maciço Montanhoso Central pSCI, since it includes areas which display a high degree of biodiversity, with an especially wide variety of mountain flora: around 33 endemic species out of a total of 77.²⁹ The site has since been designated a Special Protection Area (SPA) under the EU’s Wild Birds Directive³⁰.

A European action plan was published in 1996 and its implementation reviewed in 2010 (Barov and Derhé 2011). Successful predator control and research has been carried out since 1986 by the Freira Conservation Project and the Parque Natural da Madeira, which has led to increases in the productivity of this species (Zino et al. 2001, Carlile et al. 2003). This programme was expanded in 2001 with additional funding provided by a multidisciplinary European Union LIFE project, which also enabled the purchase of c.300 ha of land around the main breeding site (Menezes and Oliveira 2003, Unwin 2004). A project on the identification of marine IBAs in Portugal may allow the species to be studied at sea (I. Ramirez in litt. 2005).

Breeding success has apparently improved since the 1980s, with a total of 29 chicks fledged in 2004 (Menezes 2004). The 2001 LIFE project reported that, “The population of Madeira’s Petrel [sic] has increased from 30-40 to 65-80 breeding pairs mainly through the discovery of new nests, but also due to management actions carried out by the project. It contributed to the improved conservation status of Madeira’s Petrel and its habitat.”³¹ As a result, the status of Zino’s petrel was improved from ‘critically endangered’ to ‘endangered’. The project was later selected as one of the “Best” LIFE projects in 2007-2008.

The 2006 paper assessed the probability of this species going extinct if action had ceased in 1994 as “V. high, perhaps only functionally extinct given long lifespan of species”. The authors of this paper could not have foreseen the massive forest fires that swept through the island of Madeira in 2010. The fires destroyed approximately 2,800 ha, or 80% of the SPA, Maciço Montanhoso Oriental (MMO), severely impacting Zino’s Petrel and other endemic fauna and Flora on Madeira.

²⁸ Butchart S, Stattersfield A, Collar N. 2006. How many bird extinctions have we prevented? *Oryx* 40:266–278.
http://people.ds.cam.ac.uk/cns26/njc/Papers/Extinctions_prevented.pdf

²⁹ <http://natura2000.eea.europa.eu/natura2000/SDF.aspx?site=PTMAD0002>

³⁰ <http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=PTZPE0041>

³¹ http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=1723

A LIFE project has since been initiated³² to facilitate the regeneration and conservation of the fragile natural ecosystem of the MMO, including the recovery of plant, snail and bird communities. While it is too early to determine the effects of the 2010 fires on the long-term trend of the species³³, it is very likely that Zino's petrel would have been in a much worse position prior to the fires without the conservation action that was delivered as a result of the nature directives, and, as suggested by Butchart S, Stattersfield A, Collar N, very possibly already functionally extinct.

³²

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4296&docType=pdf

³³ <http://www.birdlife.org/datazone/speciesfactsheet.php?id=3906>

Case Study: Birds Directive Delivers Demonstrable Improvements for Birds in Europe

The scientific paper, “International Conservation Policy Delivers Benefits for Birds in Europe” by Donald et al. (2007: Science 317: 810-813)³⁴ carried out a comparative analyses of population trends of bird populations in order to assess their responses to conservation measures. Donald et al. looked at trends in the populations of Annex I and non-Annex I species pre and post the introduction of the Birds Directive in original Member States (or the point at which it began to apply in accession states).

The authors found that there is strong scientific evidence to suggest that the Birds Directive makes a significant difference to the conservation of birds in the EU. These differences are multi-faceted:

a) The most threatened species are progressing better

Before being given special protection on Annex I of the Directive, this group of the EU's most threatened species were doing significantly worse than non-Annex I species. However, once these species were put on Annex I, and received the targeted conservation help associated with Annex I (e.g. they can be the focus of EU Species Action Plans, can receive specific EU LIFE funding etc.), these species did better than non-Annex I birds. Notable examples of species which have increased include avocet, marsh harrier, nightjar, woodlark, Dartford warbler, stone-curlew, osprey, bittern and red kite.

b) Birds Directive more successful than non-EU conservation measures

Outside the EU, where the Birds Directive does not apply, Annex I species did no better than birds that were not on Annex I. Following implementation of the Birds Directive, Annex I species did better inside the EU than outside the EU. The authors noted that. “There was no significant difference in trends of Annex I species within and outside the EU15 in 1970–1990. However, by 1990–2000, Annex I species in the EU15 were significantly more likely to be recorded in a higher trend band than the same group of species outside the EU15”.

c) Bird populations take time –more than ten years– to recover

It is shown that the longer a bird spends on Annex I of the Birds Directive, the more likely it is to show recovery. On average it takes over ten years of policy measures before improvements in whole populations are detectible.

d) EU protected areas are directly helping European birds

On average, the more land is designated as an EU-protected area (in particular as a ‘Special Protection Area’ identified by the Birds Directive), the more likely bird populations are to improve. Annex I species respond nearly twice as well as the average due to specialised conservation measures targeted at them.

One of the principal strategic messages from this paper is that the Birds Directive, although agreed in 1979, is still a world-leading piece of conservation legislation that produces concrete results across many countries.

The paper also notes that evaluating the impact of international policies is extremely difficult because we rarely have the information on how species respond to them. There was a large amount

³⁴ <http://www.monitoringmatters.org/publications/Science%20Donald%20paper.pdf>

of luck that the right data was available, thanks to the efforts of thousands of amateur and professional ornithologists across Europe.

The results outlined in this paper demonstrate that without the Birds Directive, the status of bird species listed on Annex I of the Directive would have been worse than is currently the case. The Birds Directive has brought demonstrable benefits to bird populations in the EU. The results of this paper have recently been replicated by similar analyses of a new dataset covering more recent, and longer, time periods (Sanderson et al. in press). This new study once again finds strong evidence for an impact of the Birds Directive on EU bird populations, even when factoring in climate change and life history strategies. Indeed, whether a species is listed on Annex I or not is one of the strongest predictors of its population trend over the last 30 or over the last 12 years.

Case Study: Conservation improves the status of Europe's vertebrates

In the paper, "The impact of conservation on the status of the world's vertebrates"³⁵ Hoffman et al. asked whether observed trends in the world's ungulate species between 1996 and 2008 would have been different if all conservation interventions entirely ceased at the start of this period.

The authors' best estimate suggested that the overall decline in the conservation status of ungulates would have been nearly 8 times worse than observed, corresponding to an average of 12 ungulate species deteriorating by one red-list category per year from 1996 to 2008 (compared with the observed average of fewer than 2 species that actually did undergo a deterioration over this time). Nearly half of all species would have deteriorated in status by one category between 1996 and 2008 and 30 would have deteriorated by 2 or more categories. The proportion of ungulates collectively categorized as threatened would have increased from the 46% of non-data deficient species observed in 2008 to 58% (owing to an additional 31 species moving from least concern or near threatened to a threatened category).

Among the ungulate species considered by Hoffman et al were several present in the EU, several of which are protected under the Habitats Directive;

Scientific Name	English Name	1996 observed RL	2008 observed RL	Habitats Directive Status
<i>Alces alces</i>	Eurasian Elk	LC	LC	
<i>Bison bonasus</i>	European Bison	EN	VU	Annex II / Annex IV
<i>Capra aegagrus</i>	Wild Goat	NT	VU	Annex II / Annex IV
<i>Capra ibex</i>	Alpine Ibex	LC	LC	Annex II / Annex IV / Annex V
<i>Capra pyrenaica</i>	Iberian Wild Goat	NT	LC	Annex II / Annex IV / Annex V
<i>Capreolus capreolus</i>	European Roe Deer	LC	LC	
<i>Cervus elaphus</i>	Red Deer	LC	LC	
<i>Dama dama</i>	Fallow Deer	LC	LC	
<i>Rangifer tarandus</i>	Reindeer	LC	LC	Annex II
<i>Rupicapra pyrenaica</i>	Pyrenean Chamois	LC	LC	Annex II / Annex IV / Annex V
<i>Rupicapra rupicapra</i>	Northern Chamois	LC	LC	Annex II / Annex IV / Annex V
<i>Sus scrofa</i>	Wild Boar	LC	LC	

In relation to all those species listed in the Annexes of the Habitats Directive, the authors note that in the absence of conservation action their red list status would not have improved, and that it is likely their status would have worsened, in the case of *Capra aegagrus* by two red-list categories. Key conservation actions identified by the authors that prevented this happening include protected areas, population management, protection from threats and hunting regulations. See Annex I below.

The authors concluded;

³⁵ Hoffmann M, et al. 2010. The impact of conservation on the status of the world's vertebrates. *Science* 330:1503–1509. <http://onlinelibrary.wiley.com/enhanced/doi/10.1111/cobi.12519/?hootPostID=2f7a88fd6e7567c4b76231ed5bfe7a57>

“Our study confirms previous reports of continued biodiversity losses. We also find evidence of notable conservation successes illustrating that targeted, strategic conservation action can reduce the rate of loss compared with that anticipated without such efforts. Nonetheless, the current level of action is outweighed by the magnitude of threat, and conservation responses will need to be substantially scaled up to combat the extinction crisis. Even with recoveries, many species remain conservation dependent, requiring sustained, long-term investment.

Halting biodiversity loss will require coordinated efforts to safeguard and effectively manage critical sites, complemented by broad-scale action to minimize further destruction, degradation and fragmentation of habitats and to promote sustainable use of productive lands and waters in a way that is supportive to biodiversity. Effective implementation and enforcement of appropriate legislation could deliver quick successes. The 2010 biodiversity target may not have been met, but conservation efforts have not been a failure. The challenge is to remedy the current shortfall in conservation action to halt attrition of global biodiversity.”

Annex I

Data on counterfactual assessments (Appendix S2): Hoffmann M, et al. 2010. The impact of conservation on the status of the world's vertebrates

Scientific Name	English Name	Notes
<i>Alces alces</i>	Eurasian Elk	Although Eurasian Elk inhabits numerous PAs and much of its population is under management, its large population and range coupled with the lack of major threats at present make it likely that it would have remained as LC in 2008 even had all conservation actions been stopped in 1986.
<i>Bison bonasus</i>	European Bison	European Bison has undergone large efforts to restore its population; however, its small current populations are still threatened by small population effects, disease and inadequate space and habitat availability. While hunting is banned/regulated it is still a threat to some extent, because enforcement is not fully effective. It is particularly vulnerable to hunting because it is not found in such remote areas as American Bison, and because it is a dangerous animal which people do not like around. Therefore, it is likely that without population management and protection from threats since 1996 this species would not have been downlisted in the 2008 Red List, because the population would not be increasing. It is most likely that this species would have remained EN, or perhaps would have become CR under D1 or A2cde, having undergone a decline of 50% or 80% over 3 generations (21 years) by 2008.
<i>Capra aegagrus</i>	Wild Goat	Wild Goat has declined sharply and disappeared from many areas through hunting, habitat degradation, and competition with livestock. The relatively large remaining population in Iran is restricted to PAs that are effectively managed. It occurs in a number of PAs elsewhere, which vary greatly in the effectiveness of their protection. It is already undergoing a significant decline (at least 30%, because of unmanaged threats) and the loss of all PAs and hunting regulations in 1996 would certainly have accelerated this decline. It is therefore likely that in 2008 this species would have reached the threshold for EN under A2cd, having declined by 50% or more over 3 generations (21-24 years).
<i>Capra ibex</i>	Alpine Ibex	Following intensive conservation actions since the late 19th century involving introductions and reintroductions, Alpine Ibex has recovered and now occurs in several PAs, in some of which it is abundant. It is legally protected in all range states. Had this protection ceased in 1996, uncontrolled hunting would have escalated and the effectiveness of PAs would have declined because they would have been subjected to invasion of livestock and increased disturbance. Therefore, it is certainly possible that this species might have declined by more than 20% over 3 generations (21-24 years), thus qualifying for NT by 2008 under criterion A2.

Capra pyrenaica	Iberian Wild Goat	Iberian Wild Goat occurs in a number of PAs, but mostly outside them. Reintroductions and a range of other conservation measures began in the early 1990s, allowing the population to recover from 7,500 to today's 50,000. It is threatened by habitat loss, poaching, disease, competition with livestock and inbreeding depression. Hunting reserves and PAs have been key to its recovery and hunting is currently strictly regulated. Therefore, depending upon when the recovery took place, it might be that if conservation had halted in 1996 this species would not have successfully recovered. Instead, without hunting regulations, population management and PAs, it would have declined, probably at a rate fitting VU (decline of 30% or more over 3 generations: 21-24 years) under criterion A2cd.
Capreolus capreolus	European Roe Deer	European Roe overlaps with a lot of conservation actions including PAs, hunting regimes and reintroductions. However, although the removal of these actions might initiate a decline, it currently has a very large population and there are no broad-scale significant threats presently being significantly contained by conservation actions that, with the latter's removal in 1996, would have caused rapid declines. Therefore, it is very likely it would have remained as LC in 2008.
Cervus elaphus	Red Deer	Red Deer is present in numerous PAs. Its hunting is highly regulated and it has undergone reintroductions and population management to reduce hybridisation. In Mongolia and China it is highly valued for its body parts. It is thought to be in slow overall decline, and it is certainly possible that had it been, since 1996, without the extensive conservation actions from which it currently benefits, it could have met the threshold for NT by 2008 (a decline exceeding 20% over 3 generations). However, its large range and large population mean this is far from certain and, therefore, on balance it seems more likely to have remained LC in 2008.
Dama dama	Fallow Deer	The treatment of Fallow Deer here differs from that on the current Red List. The only surviving original native population is restricted to Telmessos NP, Turkey, and numbers fewer than 30 individuals (with a further 10 outside). A second population on Rhodes (estimated at 400 individuals) is of the wild type, but was introduced in antiquity. All other Fallow Deer populations are believed to be descendants of domesticated animals. Feral populations derived from domestic animals do not contribute towards Red List assessments. Consequently, the true listing of this species back in 2008 is not LC, but CR (under C). Within Turkey, and to some extent Rhodes, poaching is a threat: in Rhodes this has reduced through conservation actions. This species relies heavily upon managed areas and without conservation actions in place the population in Turkey would be lost and in Rhodes it would decline greatly. Therefore, in the absence of conservation since 1996 this species would have declined greatly, possibly deteriorating even further to EX.
Rangifer tarandus	Reindeer	Reindeer hunting is strictly controlled, although poaching still occurs in some areas: this has caused the species to decline before. Hybridisation and disease might also increase without population management. However, given the remoteness of much of its distribution and its low trade value it is likely that subsistence

		hunting by a low number of people would be the main change had conservation ceased in 1996, and that this would not have been at levels sufficient to lead to categorisation as anything but LC in 2008.
Rupicapra pyrenaica	Pyrenean Chamois	Pyrenean Chamois occurs mainly in PAs and is mostly under strict hunting regulations; however, in most areas where regulations are not rigorously enforced, poaching is limited, suggesting in today's culture low motivation for added hunting of the species. The Italian subspecies, in particular, has been reintroduced into PAs and is strictly protected. Had conservation actions stopped in 1996 it might well have been close to extinction by 2008. However, this subspecies is only a small part of the total species population (about 1,100 individuals, of somewhat fewer than 50,000). The species as a whole would have declined following unregulated hunting, removal of PAs and loss of population management but (see above) increases in hunting might not have been very large. Disease would have posed a significant threat. Therefore, the species would probably have been classified as NT by 2008 under criterion A2cd, having undergone a 20-25% decline over 3 generations (21 years).
Rupicapra rupicapra	Northern Chamois	Northern Chamois are present in numerous PAs and strictly protected across their range. Most subspecies have small populations and have undergone reintroductions and active conservation measures. The bulk of the population is of the nominate subspecies, which is under some pressure from various threats including unregulated poaching and increased harvest rates. Without PAs and hunting control since 1996, the species would probably have declined, but not sufficiently (range-wide) by 2008 to have warranted listing as NT.
Sus scrofa	Wild Boar	The Wild Boar is widespread, abundant and adaptable to habitat disturbance, and persists, albeit in much reduced numbers, even in very heavily hunted parts of SE Asia. It occurs in many PAs. In heavily-hunted regions such as parts of South-east Asia, PAs perhaps play their important role in protecting the species primarily through retaining large forest landscapes within which the species is less readily hunted than in converted and fragmented areas. Aside from the general measures such as PA systems, according to Oliver & Leus (2008) "few, if any, practical measures have been taken in any country for the specific purpose of conserving wild populations of any subspecies of S. scrofa, except in the sense of maintaining stock levels for hunting, particularly for sport hunting". Were these measures abolished, this species might start to decline in those areas, although it is unlikely that there is nowadays culturally a large desire for the wild pig hunting that would thereby be unregulated. Also, the extent to which PAs in heavily hunted parts of its range are keeping at bay landscape-level habitat clearance and fragmentation is mostly fairly low. Thus, even if maintaining populations for hunting is considered conservation action, it is highly implausible that if all conservation had ceased in 1996 that by 2008 the species would approximate, let alone exceed, thresholds for categorisation even as NT.