

A VISION FOR A WILDER EUROPE

**Saving our wilderness, rewilding nature
and letting wildlife come back. For all.**



WILD10

MAKE THE WORLD A WILDER PLACE
POR UN PLANETA MÁS SALVAJE
ESPAÑA  2013

www.wild.org
www.wild10.org

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A Vision for a Wilder Europe

October 2013

The return of wild nature across Europe – wilderness, wildness and wildlife on land and in the sea, from the biggest cities to the most remote corners of the continent – is well-documented. This is occurring for many reasons, not the least because conservation works in Europe in combination with favourable socio-economic and demographic changes. It offers a singular opportunity for Europeans to both re-shape our own relationship with the nature upon which we rely for health, prosperity and enjoyment, as well as to create a modern-day model from which other countries and regions can gain inspiration and practical guidance. If we can show that wild nature can successfully and remarkably return on the world's most densely populated continent, we have a message of hope and real potential for a wilder world.

Yes, wild nature is returning, but Europe's environment is far from perfect and much work is needed for us to redirect unwise exploitation, save the remaining wildlands and seas, and rewild areas that can help recreate a better, more fascinating, richer Europe. We have this rare opportunity to do so – the tide is momentarily with us. We need to act now.

This is a major reason why delegates from across Europe and around the globe have assembled for WILD10 – the 10th World Wilderness Congress – in Salamanca, Spain. This Vision is their call to action for all Europeans – politicians, businessmen, landowners, city dwellers, young and old. It does not need to be complicated. The Vision can be stated very simply: A wilder world is a better world... for all people, all life.

Carpe diem!

VANCE G. MARTIN
President, The Wild Foundation

MAGNUS SYLVÉN
Co-chair, WILD10



A New Conservation Agenda for Europe

Dear Friends and Colleagues,

Loss of biodiversity and climate change are among the biggest challenges for mankind. Humans have developed a quasi-geological force and are modifying the planet on a huge scale and at an unprecedented rate. The future of the planet lies in our hands. The time to act is now.

As part of the solution, we envision a European continent where the last wilderness areas are protected and where wildlife, natural processes and biodiversity are allowed the space and freedom to come back and shape our land- and seascapes as they did for millions of years.

Conservation in Europe has been different to the rest of the world. Because most of the wilderness was lost a long time ago, nature conservation focused on cultivated land, ancient farming systems and semi-natural, managed habitats, often depending on public subsidies and private engagement. This compensatory habitat approach has its value and certainly rescued many species from extinction, but an important part for conservation and biodiversity protection was left out: the preservation of wilderness and natural processes.

Europe is highly diverse in its landscapes, habitats, cultures and development. While we are still rapidly losing species and natural ecosystems through urbanisation, infrastructure development, industrialisation of agriculture, forestry and fishery – new conservation opportunities are emerging. Additionally, there is a growing understanding of the imperative for wilderness. We have begun to recognise the need for wild land to provide ecosystem services like clean water and air, as base-line scientific reference areas, for recreation and tourism... and indeed, to refresh our human spirit and wellbeing. People understand that wilderness protection and rewilding are at the core of sustainability – handing over a healthy environment to coming generations and not limiting their choices. The comeback of species like wolves, beavers, vultures and white storks gives hope. Initial approaches in rewilding have shown that European ecosystems have a high potential for regeneration, while existing wilderness benefits from strict protection. Europe now has the chance to catch up with the global approach, where conservation is intrinsically linked to wilderness protection.

We, the initial signatories to this vision, have been working together on this new perspective for European conservation for more than a year in the process leading up to WILD10 – The 10th World Wilderness Congress – in Salamanca, Spain, 4–10 October 2013. We also present with this document a ten point action programme to kick-start the necessary change process as well as the factual background of the vision.


We all hope you will feel inspired by the Vision for a Wilder Europe, and we invite you to take action now, and work with us to make it reality.



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La Pedrera**



WILDERNESS
FOUNDATION • UNITED KINGDOM



**WILD WONDERS
OF EUROPE**

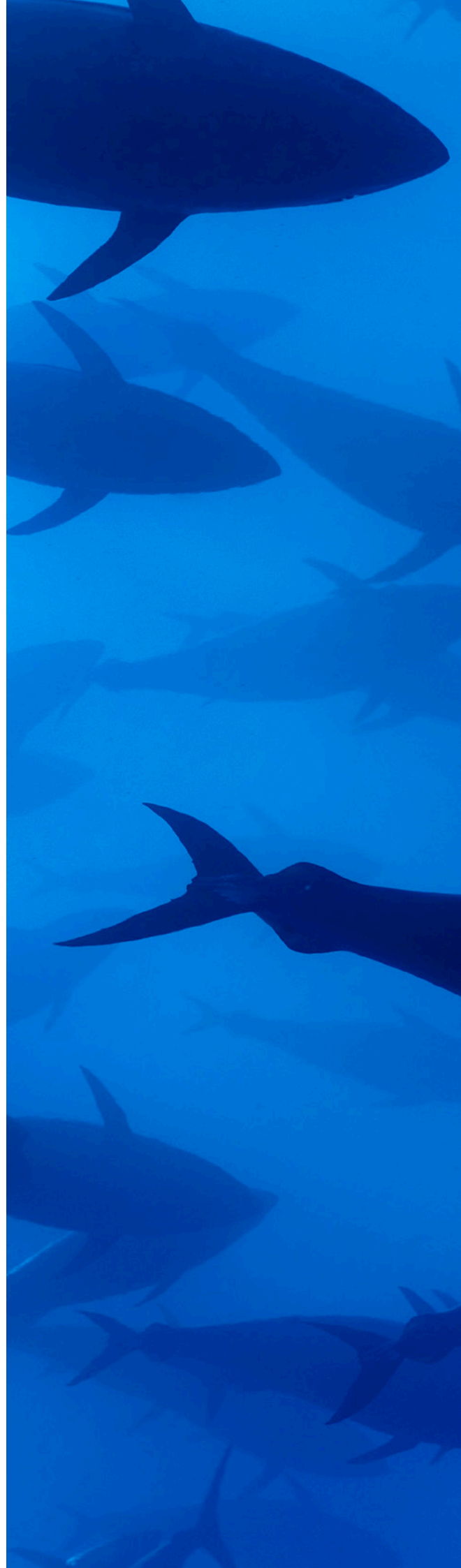
We are particularly grateful to The WILD Foundation for all the support during the development process. The never-ending encouragement and dedication of its President, Vance G. Martin, served as an inspiration for us all. The Fundación Catalunya-La Pedrera also generously organised a milestone workshop 31 January – 1 February 2013 in Barcelona, bringing together an interesting spectrum of conservationists and communication experts from different corners of Europe.



“In his magnificent but sadly neglected book *The Unnatural History of the Sea*, Professor Callum Roberts recalls the herring migrations that once stormed the coasts of Britain. Some shoals, he estimates, ‘could block the light from 20 or even 40 square kilometers of seabed’. He quotes Oliver Goldsmith who, in 1776, described the arrival of a typical body of herring ‘divided into distinct columns, of five or six miles in length, and three or four broad; while the water before them curls up, as if forced out of its bed ... the whole water seems alive; and is seen so black with them to a great distance, that the number seems inexhaustible’. Goldsmith noted how these shoals were harried by swarms of dolphins, sharks, fin and sperm whales, in British waters, within sight of the shore. The herring were followed by bluefin and longfin tuna, blue, porbeagle, thresher, mako and occasional great white sharks, as well as innumerable cod, spurdog, tope and smoothhound. On some parts of the seabed the eggs of the herring lay six feet deep.”

GEORGE MONBIOT

“FERAL – SEARCHING FOR ENCHANTMENT ON THE FRONTIERS OF REWILDING”, 2013









Where do we want to be by 2023?

By 2023, wilderness, wildlife and wild nature have become essential elements of Europe's identity and are seen as a reflection of a new, modern society in the 21st century. The new, liberated relationship with nature creates increasing health and happiness at a personal level for many people – young and old, urban and rural – throughout our continent.

All remaining wilderness areas in Europe are given adequate protection, which is seen as an essential investment in the future. Rewilding has become the new conservation mantra and is applied in the green areas of cities as well as the wider countryside, in all kinds of protected areas, on land as well as in wetlands, rivers, and the coastal and marine environment. Whales, seals, wolves, eagles, bears, beavers, otters, bison, deer, tuna, salmon, sturgeon, cod and many other species are experiencing a renaissance and provide joy, excitement, inspiration and new income opportunities for all facets of society. Increased awareness of the largely untapped potential of European nature in terms of species richness and abundance has generated dreams and a determination in creating a future with some of the past glory back in place, but in the modern setting of today.

New businesses have sprung up, generating jobs and income for more people than ever before. The “business case for the wild” is regarded as a rural development priority and attracts both public and private investments. A new stewardship of land, water and sea based on wild values and a liberated nature is seen as essential by increasing numbers of landowners, communities and managers of forests, water, fisheries and wildlife. Natura 2000, the Emerald Network and nationally protected areas are seen as a crucial asset to build future prosperity on, and European nature conservation legislation is viewed favourably by a majority of the public.

People's interest in nature has resurfaced as a priority for society.

Why a New Conservation Vision?

The overall goal of this initiative is to build on the significant conservation achievements in Europe over the past decades and to launch and promote a new perspective in management and view of nature in European conservation with emphasis on recognising, mobilising and sustaining natural processes, which ultimately could create more robust and more cost-effective conservation management systems, reduce the loss of biodiversity across the continent, and generate new economic opportunities and better services for society.

The WILD10 Action Points for a Wilder Europe

THEREFORE, delegates to and collaborators with WILD10, the 10th World Wilderness Congress, RESOLVE and CALL UPON all social change-makers and leaders from all European governments, businesses, communities and organisations to adopt the following concepts:

1. NATURAL PROCESSES

Allow nature to take care of itself in wider land and seascapes

Whenever possible “non-intervention management” and restoration of natural processes should be the underlying principle for nature conservation in Europe. These processes should be applied to Europe’s larger and wilder areas where good ecological function already exists, but the potential for many other locations should also be explored, especially in a wider land/seascape perspective. Wild nature needs to be decoupled from farming, and improved natural resource management systems based on these principles should be adopted, which ultimately will benefit both nature and human users. The possibilities for installing more and larger sanctuaries where fishing and hunting are not allowed should be promoted.

Natural processes should be seen in the context of four basic conservation principles:

- o All the native ecosystems should be represented in a protected area system and conservation landscapes;
- o Viable populations of all native species should be maintained and allowed to fluctuate in a natural way, including dispersal through ecological corridors;
- o Ecological and evolutionary processes such as free-flowing rivers, wind, snow, herbivory and carnivory must be ensured, and

- o The conservation landscape should be designed and managed so that it is resilient to both short-term and longer-term change, such as climate, through establishing ecological corridors.

This will generate a better functioning ‘wilder’ nature in Europe that operates far better than ‘managed areas’, with more cost-effective management systems being less dependent on unpredictable shifts in the economic system, and a more sustainable future for most animal and plants species. Naturally-functioning ecosystems are also more robust and less vulnerable to external impact, thereby delivering better environmental services such as clean air and water, protection against flooding, sea level rise and forest fires, carbon storage/sequestration, and adaptation to climate change.

This approach is already allowed by European legislation and it is more a task of making it happen, for instance, by identifying natural processes as an essential tool for achieving “favourable conservation status”. Management concepts identified as part of the new “Working Definition of European Wilderness and Wild Areas” should be promoted.



2. APEX SPECIES

Recognize the underestimated ecological and economical value of wildlife and the importance of ensuring its protection and continued comeback

So called “Apex Species” play a critical role in the functioning of ecological systems. The disappearance or diminishing of (i) big predators, such as wolves on land, tuna and sharks in the oceans, (ii) larger predators and fish in freshwater ecosystems, such as otter and salmon, and (iii) larger herbivores, such as European bison, red deer, reindeer, moose and beaver can generate extensive disruptions to trophic cascades in marine, terrestrial and freshwater ecosystems. This “trophic downgrading” affects functions and resilience of ecosystems and has negative impacts on biodiversity as well as the spread of infectious diseases, wildfires, carbon sequestration, invasive species, and biochemical cycles. Some of these species

show a remarkable comeback in parts of Europe over the last decades and we need further promote this ‘upgrading’ of European nature and ecosystems across the continent.

Since wildlife comeback sometimes leads to local conflicts (e.g. between wolves & livestock), different preventive measures should be applied together with new and innovative incentives for enhancing co-existence. In particular large wildlife species also serve as inspiration and a tool for attracting people’s attention and bringing visitors to natural areas, which also can serve as a source for revenue generation and socio-cultural development.

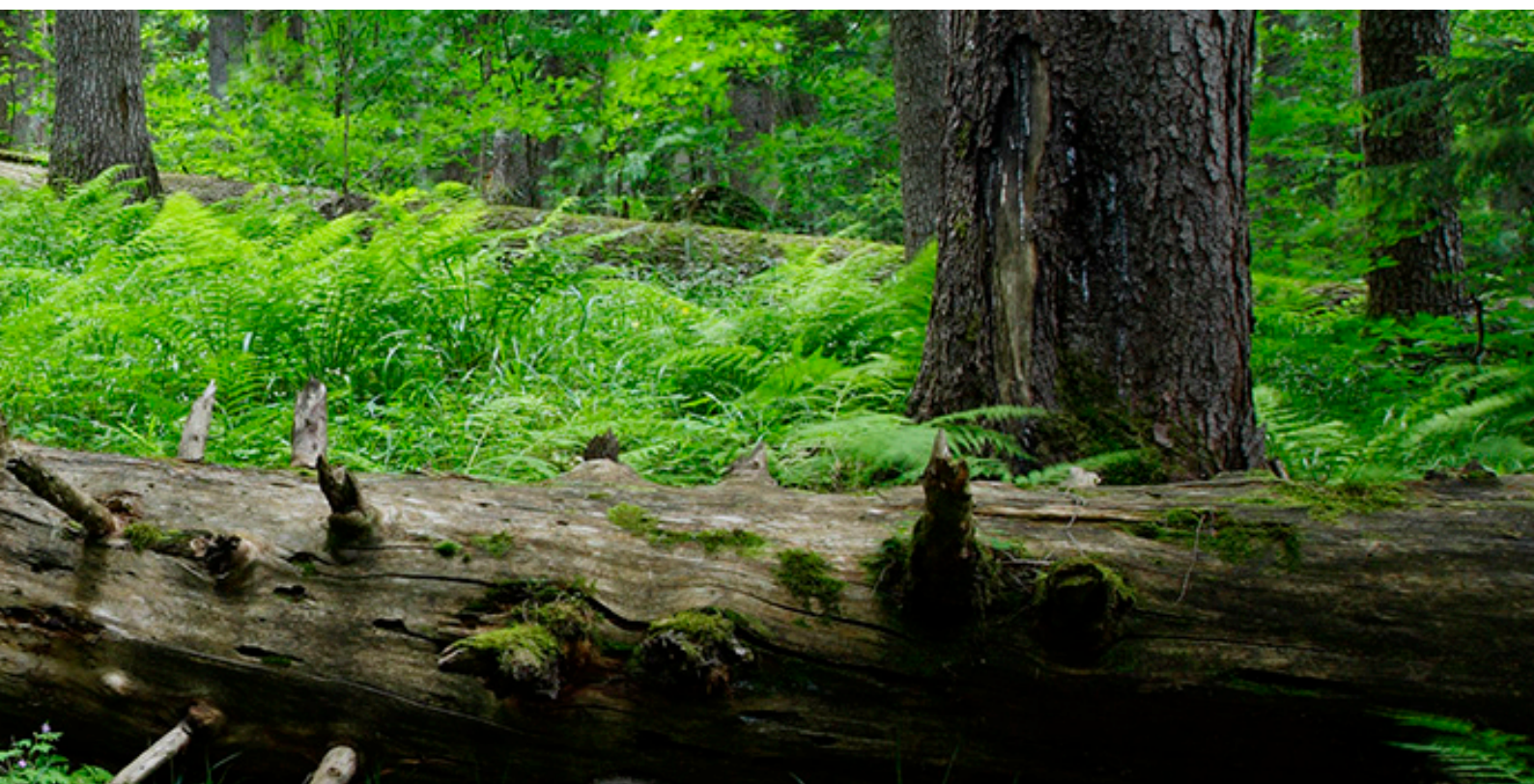
3. EXISTING WILDERNESS

Ensure full protection of all existing wilderness areas across the European Continent, both on land and at sea, as an immediate priority

Less than 1% of the European territory has been designated as ‘wilderness’, but larger areas still possess the essential qualities of wilderness but remains without formal protection. However, threats to these areas still mount, such as from forestry, farming, mining, development hydropower and wind farms. It is a question of decency, moral obligation, heritage, history, identity and significant economic and emotional value for a prosperous and healthy European society to ensure the strongest

levels of protection of these areas for eternity using existing legal instruments at national and international level.

In addition, the need and opportunity for establishing a new European Wilderness Convention under the auspices of Council of Europe should be explored, with increased commitment from states for the protection of wilderness landscapes, transboundary cooperation, and strengthened links to the Convention on Biological Diversity.





4. REWILDING

Support the rewilding of Europe

Through abandonment of old, traditional farming systems in the less productive regions of Europe during the last decades in combination with significant wildlife comeback and an increasing demand to experience wildlife, wilderness and wild nature, there is an unprecedented chance to let wild nature return at a large scale – rewilding. Rewilding needs to be recognised as an important tool for nature conservation along the entire “wildness scale” from city centres, via rural areas to some of the wildest areas of the continent, including land, water & sea. There exists a spectrum of

opportunities from just letting nature take its course to actively rebuilding important, lost ecological functions, such as carnivory, herbivory, flooding, and many other natural processes. Active measures such as removing dikes along rivers and coastal areas, reintroducing species and others are often needed for activating a successful rewilding process.

Hundreds of smaller and larger rewilding initiatives already take place or are planned in Europe. This movement needs support and serves as an important vehicle to realise “A Vision for a Wilder Europe”.

5. THE BUSINESS CASE FOR THE WILD

Invest in businesses linked to the values of wild nature and wildlife

New jobs and economic developments can be generated from the ‘wild’, which still is not a fully explored business opportunity in Europe. The potential has already been proven in many places across the world, particularly linked to wildlife watching, but is also starting to happen in some European countries. We need to support enterprise development based on wild values and its associated multiplier effects in the wider economy. This provides a new opportunity for rural development across the whole spectrum from cities to the wildest corners of our continent (with non-extractive uses).

In every case there should be a financial feedback mechanism in support of conservation of nature. However, care should be taken to ensure the primacy of wilderness with ultimate decisions resting on ecological rather than commercial logic.

We invite financial institutions, impact investors, businesses and private sector to help developing the ‘Business Case for the Wild’ by sharing their knowledge, ideas and interest how to generate and provide capital and support to enterprises relating to wilderness and rewilding.

6. NEW STEWARDSHIP OF LAND, WATER & SEA

Invite and inspire land owners, communities and managers of land/water/sea and natural resources to embrace “A Vision for a Wilder Europe”.

Private lands dominate the European countryside, based either on long-held historical land rights or, more recently, land restitution in Eastern Europe. The majority of farmland is private but also more than half of all forests, whilst in some countries the state is still the predominant owner of forest areas. Land in communal ownership is in most cases in the minority but still nevertheless important. States have the jurisdictional rights of the national territorial waters. Hunting is permitted across much of Europe with the exception of certain protected areas.

We invite land owners, managers and communities to work together with the nature conservation sector to explore new benefit-sharing opportunities, including land easements, conservation enterprises, community conservancies, no-take fishing and hunting zones, and innovative commercial funding/financing mechanisms. As a step in this direction, a “European Landowners Alliance for Wildlands & Nature” will be established. For Europe new conservation tools should be explored, such as community conservancies, which also could make land owners and resource managers less dependent on public subsidy systems.

7. FINANCIAL MECHANISMS

Inspire and invite all funding institutions to support this vision

Although the new management approach proposed by the Vision will generate management efficiency gains, it is essential to maintain the rather limited financial and human resources available to European nature conservation and avoid further erosion at the national and EU level. In addition, the European Commission – DG Environment and the Council of Europe are invited to apply the concepts of “A Vision for a Wilder Europe” when implementing the new LIFE Regulations for the period 2014–2020, using the three key elements: Basic Principles, Natural Processes, and the importance of Apex Species. The possibilities for local communities and entrepreneurs to explore the different socio-

economic concepts of the vision through rural and regional development funding lines should be promoted in partnership with private foundations and the corporate sector (“Public-Private Partnerships”). Different market-based instruments, offsets and various options for payment for ecosystem services are also to be explored.

By acting collaboratively and in unison, the first steps could be taken to realise the potential benefits of “A Vision for a Wilder Europe”. We also need to end those public subsidies, which maintain wasteful practices as well as threaten the management principles outlined in the Vision.

8. PUBLIC SUPPORT

Reach out to larger constituencies across Europe through communications and education

During the last 20 years, the public interest and concern for the environment has declined dramatically in Europe, from a top ranking position in the early 1990’s to level 11 and 12 during 2010 and 2012. The loss of biodiversity (“extinction of species, loss of wildlife and habitats”) only rank tenth amongst 15 important environmental issues. Unsurprisingly, the main concerns of European citizens are jobs and the economy.

Without a clear political mandate from voters, nature conservation is fighting an uphill battle. A communications campaign combined with educational material should therefore illustrate the advantages of “A Vision for a Wilder Europe”, how nature, people, jobs and the economy can mutually benefit, with specific messages for different target audiences that utilize the most cost-effective communication tools.

9. MONITORING, RESEARCH & COMPILATION OF EXISTING KNOWLEDGE

Learn from existing knowledge, experiences & new work

There is still much to be learned about ecological processes and how they interact with different aspects of nature conservation. One such aspect relates to the concept of “Apex Species” and “trophic cascades” and how to best use already existing knowledge and lessons learnt to advance the agenda of “A Vision for a Wilder Europe”. Other important aspects address the critical interface between conservation and socio-economic developments. The experiences gained from new and on-going field work will provide the possibility of creating a learning community, with

land owners, science, land/sea managers, government agencies, NGOs and others, for instance, in accordance with Article 18 of the Habitats Directive and Article 10 of the Birds Directive, and the Convention on Biological Diversity’s “Strategic Plan for Biodiversity 2011–2020”.

Based on a wealth of already published information on the historical richness of European nature and ecosystems, we can create an account of the potential for wilderness and rewilding to serve as inspiration and stimulate action.

“SAVING OUR WILDERNESS, REWILDING NATURE AND LETTING WILDLIFE COME BACK. FOR ALL.”



10. LEADERSHIP & STRATEGY

Promote the new conservation vision to key constituencies and develop an action strategy

Strong leadership is required to engage different constituencies, covering various facets of society – political leaders, NGOs, corporate sectors, communities, cities, land owners, managers of land, water and sea, researchers, etc. The **European Union** and the **Council of Europe** play a particularly important role and are invited to use and promote this new conservation vision. Key issues to be communicated in relation to “A Vision for a Wilder Europe” include halting the loss of biodiversity, creating more cost-effective conservation management systems, allowing the development of

more robust and resilient ecosystems that are less vulnerable to impacts like climate change, providing better ecosystem services, and offering new economic opportunities across the whole spectrum of human communities from cities and rural areas to the wildest parts of the continent.

We invite **IUCN-Europe** to develop **Guidelines, Strategy and Policy** for “A Vision of a Wilder Europe”, working in close collaboration with the wilderness conservation and rewilding movement – with concrete targets, expected results, and measurement of success.

Technical Background Paper



Despite many challenges, there have probably never been better opportunities for nature conservation in Europe than today – there is more land available, there are higher wildlife numbers, there is lower pressure on nature due to less people in the countryside as a result of rapid urbanisation, and there is an extensive knowledge base from decades of ecological studies and practical nature conservation work across the continent. A political foundation is also in place with targets for more nature-adapted land and sea use practice in combination with a spatial perspective, including the designation and management of conservation areas, the establishment of an ecologically coherent network with core areas and corridors, and the initiation of restoration and rewilding efforts. There is also a political mandate to address the protection and comeback of wild nature. At the same time, the awareness of the urgent need for safeguarding, restoring and linking the last remnants of wilderness in Europe is rapidly gaining support¹.

To capitalise on these opportunities, this paper proposes the introduction of a new management perspective - “A Vision for a Wilder Europe” - based on the critical role in a healthy human society of the ecological, economic and social services provided by functioning natural, wilder areas and their wild values. This involves better recognition for and mobilisation of natural processes, both abiotic (wind, water, geology, climate) as well as biotic factors (wildlife - especially apex species, natural cycles, habitats and flora).

This is a conservation practice that rarely has been applied in Europe. With its roots in the emerging wilderness/rewilding movement in Europe, such a paradigm shift in perspective and application has the potential for reducing the loss of biodiversity, creating much more cost effective conservation management systems as well as providing a more sustainable future for most animal and plant species across the continent that is less dependent on unpredictable shifts in the economic and political system. Naturally-functioning ecosystems are also more robust and less vulnerable to external impact such as climate change, thereby delivering better environmental services to a financially challenged world.

A wilder face of Europe with an abundance of wildlife can also serve as the basis for a new economy across the whole spectrum from cities, rural areas to pristine core wilderness areas as well as providing non-material and spiritual values with proven benefits for many sectors of society.

By taking stock in the successful work to date, and applying the best conservation, business and social science, the Vision for a Wilder Europe can make a significant contribution to the ecology, economy, people and the overall prosperity of a modern Europe.

¹ A new definition of wilderness, building on the IUCN Category 1B classification, has been adopted by the EC in its recent guidelines for non-intervention management.

Context

1. The last three decades have seen significant improvements of Europe's fauna and flora, with four international agreements playing a particularly important role as impetus for conservation action: The Berne Convention – “Convention on the Conservation of European Wildlife and Natural Habitats” (Council of Europe, 1979), and the European Union's Birds Directive (1979), Habitats Directive (1992) and Water Framework Directive (2000).
2. There are clear indications that, where and when carried out successfully, Europe's key policy instruments have had positive impacts, with the status of several targeted species and habitats improving in parts of the region. In particular, the Birds Directive², the Habitats Directive and the Water Framework Directive have had important positive impacts on biodiversity in the EU³.
3. The last 30-40 years has been an era of significant wildlife comeback in Europe. According to the 2012 “Living Planet Report”⁴, the period 1970 to 2008 saw an average increase in animal population size of 6% in the Palearctic realm (which mostly includes data from Europe), in contrast to an overall decrease in biodiversity indices in tropical regions. Better environmental protection is one explanation put forward to be a contributing factor, but recent changes in land use with abandonment of farmland, reduced hunting pressure, and higher productivity of many ecosystems due to more nutritional input from human activities (e.g. eutrophication of lakes and coastal areas, nitrogen deposition from air, etc.) have probably also played an important role.
4. The wildlife come back encompasses a long list of species, particularly mammals and birds. In today's Europe there are probably larger populations of certain species than we have had for many centuries, such as Roe deer⁵, Eurasian elk/Moose⁶, Wild boar⁷, Chamois⁸, Alpine⁹ & Iberian Ibex¹⁰, Cormorant¹¹, Greylag goose¹², Barnacle goose¹³, White Stork¹⁴, and White-tailed Eagle¹⁵. With active protection and re-introductions, other species have also benefited including Beaver¹⁶, Otter¹⁷, Peregrine¹⁸, Bearded, Griffon and Black vulture¹⁹. All the five species of large carnivores – Brown bear, Eurasian Lynx, Iberian Lynx, Wolf and Wolverine – are also staging a comeback²⁰.
5. In a recent study²¹ of the comeback of 18 mammals²² and 19 bird species²³ in Europe since the mid-20th century it was shown that the return of wildlife predominantly were due to species management, legal protection, habitat/site protection, and reduction in hunting pressure and protection from persecution due to better laws and enforcement (see graph). Conservation seems to have been particularly successful where it has been able to profit from social change, such as abandonment of marginal farming areas. However, despite increasing abundance and expanding distributions, these positive results have to be viewed in the context

**POLITICAL
COMMITMENTS
GENERATE
POSITIVE RESULTS**

**WILDLIFE
COMEBACK**

SPECIES EXAMPLES

**REASONS FOR
COMEBACK**

2 “International Conservation Policy Delivers Benefits for Birds in Europe”, P.F. Donald et al., *Science*, Vol 317 (2007): 810-813

3 “Assessing biodiversity in Europe – the 2010 Report”, European Environment Agency, Report No. 5/2010

4 “Living Planet Report 2012: Biodiversity, biocapacity and development”, WWF, Zoological Society of London, Global Footprint Network & European Space Agency

5 Vilt och Fisk Fakta, Aktuell Forskning om vilt, fisk och förvaltning Nr 4, 2009 (in Swedish)

6 IUCN (2011a) *The IUCN Red List of Threatened Species*, <http://www.iucnredlist.org/>

7 <http://www.lhnet.org/wild-boar/>

8 Apollonio, M., R. Andersen, and R. Putman (2010) *Present and future challenges for European ungulate management*, in *European ungulates and their management in the 21st century*, M. Apollonio, Andersen, R., Putman, R., Editor, Cambridge University Press

9 <http://www.pngp.it/gse/>

10 Apollonio, M., R. Andersen, and R. Putman (2010) *Present and future challenges for European ungulate management*, in *European ungulates and their management in the 21st century*, M. Apollonio, Andersen, R., Putman, R., Editor, Cambridge University Press

11 <http://ec.europa.eu/environment/nature/cormorants/numbers-and-distribution.htm>

12 <http://www.maartenloonen.nl/literatuur/Ornis2010Fox.pdf>

13 <http://www.maartenloonen.nl/literatuur/Ornis2010Fox.pdf>

14 EBCC/RSPB/BirdLife/Statistics Netherlands (2011) *Trends of common birds in Europe, 2011 update: White Stork (Ciconia ciconia)*. Available from: <http://www.ebcc.info/index.php?ID=457>

15 BirdLife International (2004) *Haliaeetus albicilla WHITE-TAILED EAGLE*, in *Birds in Europe: population estimates, trends and conservation status*, I.v.B. Burfield, F., Editor, BirdLife International: Cambridge.

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18 J. Sielicki & T. Mizera 2007: Peregrine Falcon populations – status and perspective in the 21st century, European Peregrine Falcon Working Group

19 Margalida, A., et al. (2012), “Good news for European vultures”, *Science*, 335 (284)

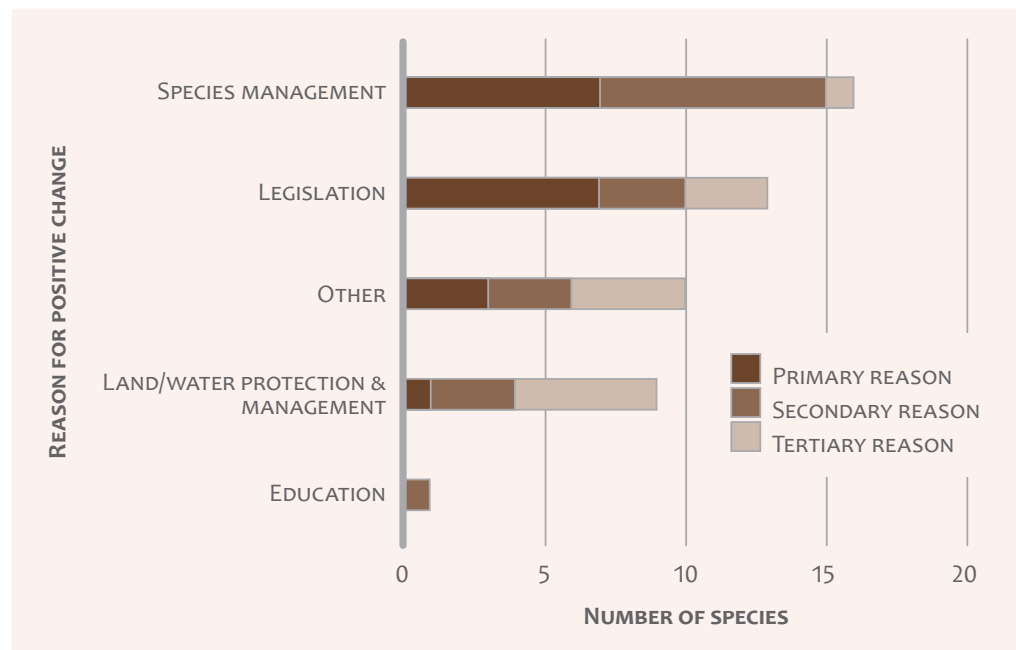
20 <http://www.lcie.org/>

21 Deinet, S., Jeronymidou, C., McRae, L., Burfield, I.J., Foppen, R.P., Collen, B. and Böhm, M. (2013). Wildlife comeback in Europe: the recovery of selected mammal and bird species. Final report to Rewilding Europe by Zoological Society of London (ZSL), BirdLife International and the European Bird Census Council. London, UK: ZSL

22 *Brown bear, Grey wolf, Golden jackal, Eurasian lynx, Iberian lynx, Wolverine, Grey seal, Harbour seal, Eurasian beaver, European bison, Wild boar, Pyrenean ibex, Alpine ibex, Northern chamois, Southern chamois, Eurasian elk, Red deer & Roe deer*

23 *Pink-footed goose, Barnacle goose, Whooper swan, White-headed duck, White stork, Eurasian spoonbill, Dalmatian pelican, Common crane, Roseate tern, Lesser kestrel, Saker falcon, Peregrine falcon, Red kite, White-tailed eagle, Bearded vulture, Griffon vulture, Cinereous/Black vulture, Spanish imperial eagle, Eastern imperial eagle*

of large historical declines in range and density. In some instances, such as with European carnivores, ranges had already declined dramatically from historical distributions by the mid-20th century. In cases such as this, wildlife resurgence has occurred from already severely depleted and range-restricted populations, including regional and national extinctions. As the report concludes, while certain groups are still in decline in Europe, “understanding the mechanisms allowing wildlife comeback is crucial to better conservation of wildlife both in Europe and across the world, if we can apply the principles underlying conservation success to reverse declines in other species”. One of the interesting aspects of this study is the comeback of some apex species, which play a critical role in the functioning of ecological systems (see section: “A Vision for a Wilder Europe” – Basic Principles & Application).



Reasons for resurgence of 18 mammal species in Europe since the mid-20th century (source: see footnote 21). Horizontal bar shows the proportion of species/populations for which each reason was identified.

CHALLENGING TRANSITION

- In assessing the status of biodiversity in the UK, the 2013 “State of Nature” report²⁴, concludes that 60% of the 3,148 UK species assessed (about 5% of the estimated total) have declined over the last 50 years, most of them invertebrates and plants. In contrast 60% of the vertebrates increased, such as the otter. Many species associated with semi-natural habitats, such as farmland, heathland, lowland meadows and coppiced woodlands, suffered in particular. For many habitats the largest changes took place in the first half of the 20th century. The report gives interesting examples of the positive impact of concerted conservation action but also illustrates the challenges experienced in European nature in the transition from a landscape largely influenced by human management into either even more artificial (i.e. urban) or ‘abandoned’ farmland ecosystems.

LAND ABANDONMENT

- Europe is one of the continents where urbanisation is particularly prominent, and in 2020 it is estimated that four out of five European citizens will live in urban areas. As result, many of the less productive rural areas on the continent have experienced a dramatic change in land use and abandonment of previously cultivated or grazed land over the last decades. This trend is projected to continue but could reverse depending on population and demand for resources particularly in the face of climate change (Box 1). Independently of what we might think about this process, it is currently happening in some areas of Europe and so creates large-scale opportunities for nature conservation.

NATURA 2000

- The development of the Natura 2000 network of nature protection areas is the centrepiece in conservation in the EU. By mid-2012²⁵ no less than 26,406 sites covering a total of 18% of the land area of the 27 EU Member States have been designated. In six countries, more than 25% of the territory has been set aside for conservation under Natura 2000: Bulgaria (34%), Greece (27%), Cyprus (28%), Slovakia (30%), Slovenia (36%), and Spain (27%).

²⁴ <http://www.rspb.org.uk/ourwork/science/stateofnature/index.aspx>

²⁵ Natura 2000 Newsletter, No 32, July 2012

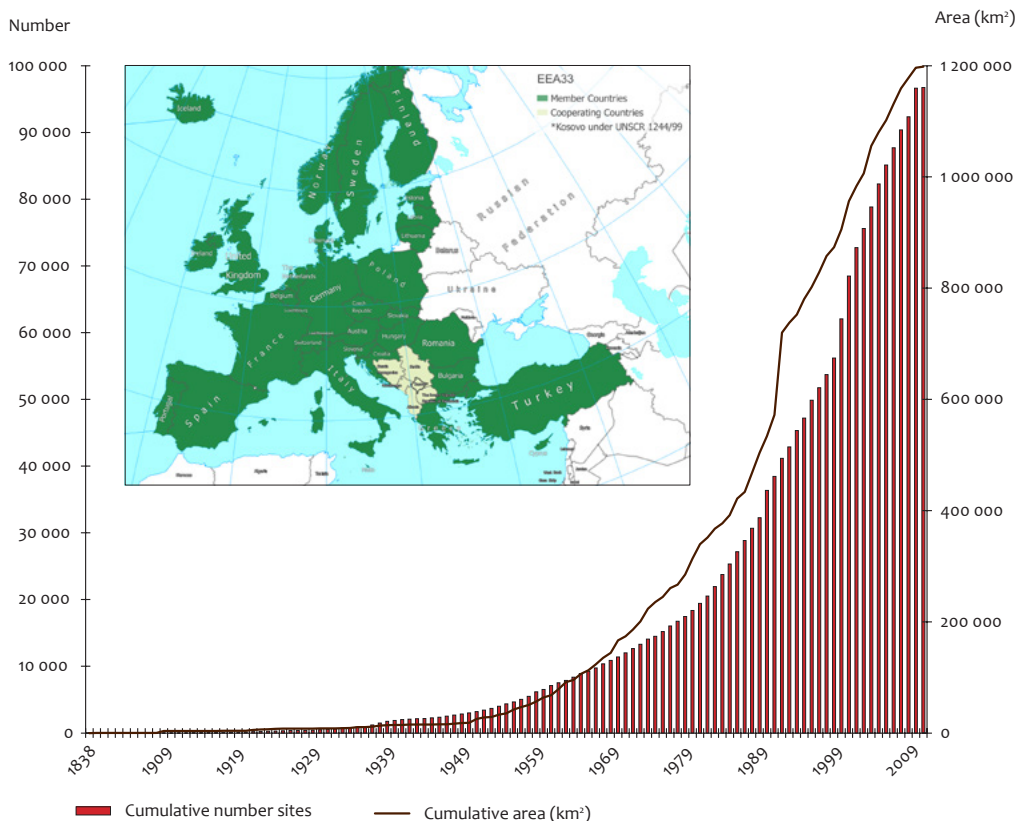
With further work on-going to identify also marine areas, it is expected that 1 million square km of EU territory will be managed in the future with the primary objective of conserving biodiversity. Natura 2000 is the largest coordinated network of protected areas anywhere in the world²⁶.

9. The “Emerald Network”²⁷ was launched by the Council of Europe in 1998 to comply with their obligations under the Bern Convention and is modelled on a similar basis as Natura 2000. For the non-EU countries of Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, FYR of Macedonia, Georgia, Moldova, Montenegro, Morocco, Norway, Russia, Serbia, Switzerland and Ukraine close to 3,000 areas covering 421,828 square km has been protected. In December 2012, the 37 sites (672 square km) from Switzerland were the first ones to be officially adopted by the Standing Committee to the Bern Convention.
10. Growth in the protected areas system has been significant across the entire Pan-European area²⁸ as illustrated by the graph below.
11. A fundamental aspect of the Convention of Biological Diversity (CBD) is “the in-situ conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings”²⁹. All European countries have signed up to the CBD, “Strategic Plan for Biodiversity 2011 – 2020 and the Aichi Biodiversity Targets”³⁰, which includes commitments for improving management of farmland, forests and fish resources, reducing degradation and fragmentation of natural habitats, as well as targets for protected areas (17% of land, 10% of coastal and marine areas) and restoration of degraded land (15%), and improved benefit sharing with local communities. In addition, all European countries are part of the Europe for Environment process³¹.

EMERALD NETWORK

PAN-EUROPEAN PICTURE

CBD COMMITMENTS



The graph shows the cumulative number and surface area of protected areas 1838 to 2009 in the 33 EEA countries indicated in the map above. Today more than 100,000 protected areas cover an area of 1.2 million km².

26 “Investing in Natura 2000 – For Nature and People”, European Commission – Environment, 2011
 27 http://www.coe.int/t/dg4/cultureheritage/nature/econetworks/default_en.asp
 28 Assessing biodiversity in Europe – the 2010 Report”, European Environment Agency, Report No. 5/2010
 29 <http://www.cbd.int/doc/legal/cbd-en.pdf>
 30 <http://www.cbd.int/decision/cop/?id=12268>
 31 The European non-EU countries and EU countries collaborate as part of the “Environment for Europe” process (<http://www.unece.org/env/efe/welcome.html>) under the umbrella of the United Nations Economic Commission for Europe (UNECE) with incorporates 56 countries (also Caucasus, Central Asia, Russian Federation & Turkey). The process is based on Ministerial Conference Declarations and lacks the targeted and committal approach of the EU.

CBD OUTLOOK

12. In the CBD Global Biodiversity Outlook 3³², the section on “Terrestrial ecosystems to 2100”, states that “there are opportunities for rewilding landscapes from farmland abandonment in some regions – in Europe, for example, about 200,000 square kilometres of land are expected to be freed up by 2050. Ecological restoration and reintroduction of large herbivores and carnivores will be important in creating self-sustaining ecosystems with minimal need for further human intervention”.

EU 2020 HEADLINE TARGET

13. In addition, the European Union (EU)³³ has set itself the ambitious “headline” target of “Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss”.

EU SUPPORTIVE TARGETS

14. Among the EU “supportive targets” are (i) to complete the establishment of the Natura 2000 network and ensure good management, (ii) ensure adequate financing of Natura 2000, (iii) set priorities to restore at least 15% of degraded ecosystems and employ a Green Infrastructure Strategy in urban and rural areas, and (iv) ensure no net loss of biodiversity and ecosystem services. In addition, the strategy emphasises the importance of improving farming, forestry and fishing practices.

FORESTRY & WILDERNESS

15. Under the forestry target³⁴, Action 12: Integrate biodiversity measures in forestry plans, there is an obligation to “preserve wilderness areas”, which is important for the protection of old-growth forests. This is the first time “wilderness” is referred to in an EU Biodiversity Strategy.

EUROPEAN PARLIAMENT RESOLUTION

16. Through the “European Parliament Resolution on Wilderness in Europe” in February 2009³⁵ there is also a political mandate to start addressing the protection and comeback of wild nature. It calls on the European Commission to (1) develop a clear definition of wilderness, (2) mandate the European Environment Agency to map existing wilderness areas in Europe, (3) undertake a study on the values and benefits of wilderness, (4) develop a EU wilderness strategy, (5) promote the development of new wilderness areas (restoration or “rewilding”), and (6) promote the values of wilderness together with NGOs & local communities. Through the Wild Europe network, a definition document for wilderness has already been agreed (see Annex 3) and a map of existing wilderness areas has been provided through the Wildland Research Institute, Leeds University (see map below).

17. As part of the Resolution, the EU Member States were also invited to exchange ideas and information on ‘best practices’ of managing wilderness, develop a code of conduct for tourism in wilderness areas, and to ensure the best protection of wilderness areas, reducing the threats to these. Particular emphasis was given to how to best integrate the wilderness concept into the Birds and Habitats Directives, especially through the Natura 2000 Network with wilderness areas having “a central place”.

EUROPEAN MANIFESTATIONS

18. Political manifestations of the growing interest in wilderness and rewilding at the European level include the “Conference on Wilderness and Large Natural Habitat Areas” in Prague, May 2009, hosted by the Czech European Union Presidency and the European Commission, with a key outcome being “An Agenda for Europe’s Wild Areas – the ‘Poselství’ from Prague” containing some 24 recommendations from the participants on policy, research, awareness raising through mass communications, and partnerships³⁶. Other milestones are the Belgium EC Presidency Conference on Restoration of Large Wild Areas (“Rebuilding the Natural Heart of Europe”) in Brussels 16-17 November 2010³⁷, and the Ireland Conference on “The Potential and Challenges of Developing Wilderness in a Modified European Landscapes” 14-16 May 2013³⁸. WILD Europe played an important role supporting these initiatives.

³² <http://gbo3.cbd.int>; see page 75

³³ “EU Biodiversity Strategy to 2020”, European Commission – Environment, December 2011

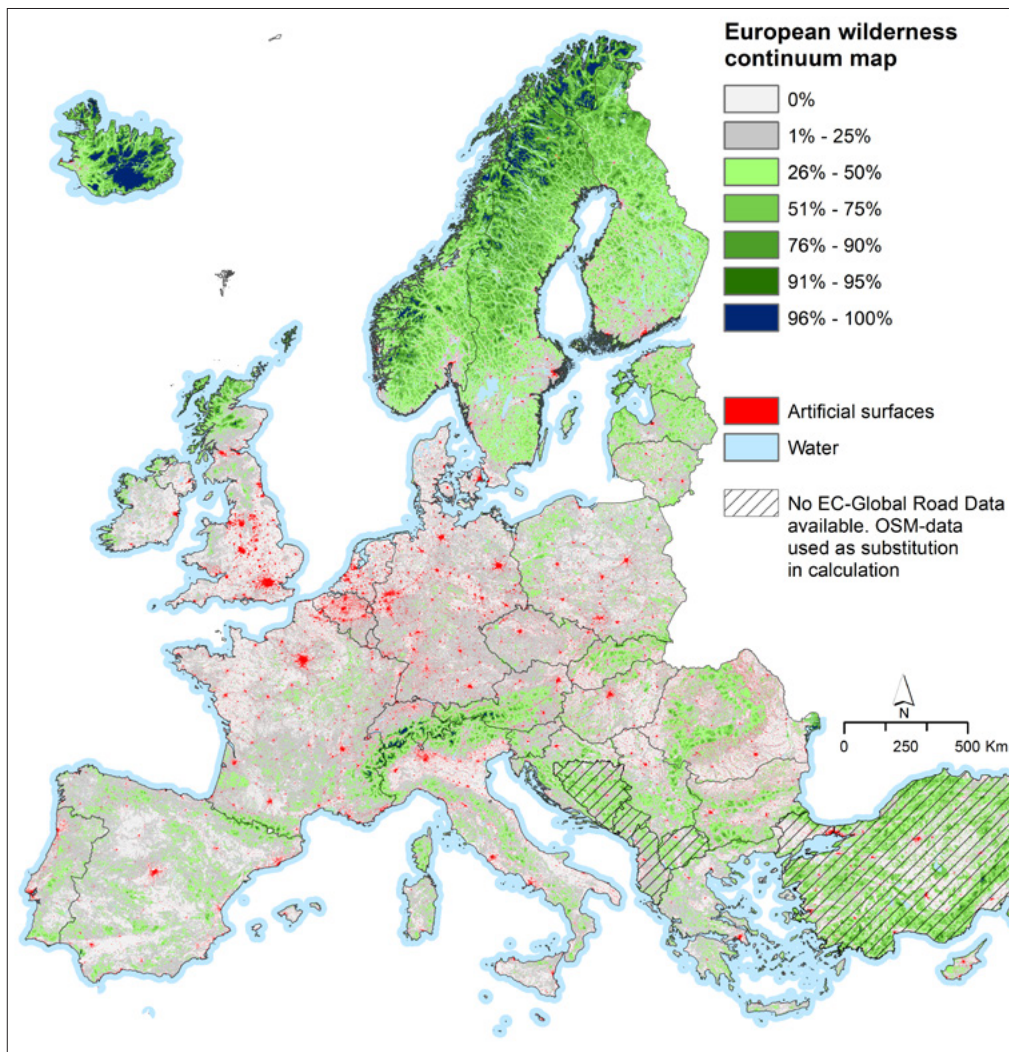
³⁴ Headline target 3B: Forests: By 2020, Forest Management Plans or equivalent instruments, in line with Sustainable Forest Management (SFM), are in place for all forests that are publicly owned and for forest holdings above a certain size (to be defined by the Member States or regions and communicated in their Rural Development Programmes) that receive funding under the EU Rural Development Policy so as to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by forestry and in the provision of related ecosystem services as compared to the EU 2010 Baseline”

³⁵ <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-2009-0034+0+DOC+XML+Vo//EN>; The resolution built on an initiative “Resolution of Wilderness Areas” developed under the umbrella of the Wild Europe Initiative signed by more 100 organisations like IUCN Europe, EUROPARC, Eurosite and WWF in autumn 2007.

³⁶ http://www.wildeurope.org/index.php?option=com_content&view=article&id=4&Itemid=11

³⁷ http://www.wildeurope.org/index.php?option=com_content&view=article&id=56&Itemid=19

³⁸ <http://www.nrn.ie/wilderness-in-a-modified-european-landscape-conference-14-16-may-in-westport/>



European wilderness map produced by Alterra/ Wageningen University, the Wildland Research Institute/ Leeds University, and the PAN Parks

19. At the national level, the establishment of the Wilderness Act in Finland 1991³⁹ and the 2020 targets in Germany of setting aside 2% of the national territory for “wilderness” (“left to develop naturally undisturbed”) and that “natural forest development should account for 5% of the wooded area”⁴⁰ are interesting examples of a shift in the management of European nature.
20. The Wild Europe initiative promotes a coordinated strategy for protection and restoration of wilderness and large wild areas of natural process and habitat, addressing the threats and opportunities facing them⁴¹. Objectives of Wild Europe are to (i) ensure implementation of policy recommendations for wild and wilderness areas, (ii) devise and support initiatives for protection and restoration for wild and wilderness areas, (iii) promote exchange of best practice in protection, restoration, management and utilization of benefits, and (iv) to communicate the concept and value of wildness in Europe to key decision makers.
21. The PAN Parks Foundation works for the protection, greater understanding and appreciation of Europe’s wilderness areas⁴². The Foundation aims to safeguard 1 million hectares of European wilderness by 2015. The goal is to ensure that Europe’s last remaining wilderness areas are preserved for future generations through the network of the European Wilderness Preservation System⁴³. There are currently 13 National Parks (11 in Europe, 1 in Turkey, 1 in Georgia) certified under criteria established by PAN Parks in support of wilderness⁴⁴.

GOVERNMENT INITIATIVES

NGO INITIATIVES – WILD EUROPE

NGO INITIATIVES – PAN PARKS

39 “Challenges to Wildlands in Finland”, L. Kajala, Metsähallitus, September 2005 (WILD8)
 40 “National Strategy on Biological Diversity”, Federal Agency for Nature Conservation (BfN), November 2007
 41 http://www.wildeurope.org/index.php?option=com_content&view=article&id=3&Itemid=10
 42 <http://www.panparks.org/>
 43 <http://www.panparks.org/what-we-do/the-million-project/wilderness-preservation-system>
 44 <http://www.panparks.org/learn/partnerships-for-protected-areas/apply-for-verification>

NGO INITIATIVES – REWILDING EUROPE

22. The Rewilding Europe Initiative was launched in 2010⁴⁵. The Mission is “Making Europe a wilder place with much more space for wildlife, wilderness and natural processes, bringing back the variety of life for us all to enjoy and exploring new ways for people to earn a fair living from the wild”. Rewilding Europe has set itself the target of establishing ten rewilding areas together covering, at least, 1 million hectares by 2020 representing a wide selection European regions and ecosystems, including areas of both land and sea. Each area should experience a substantial wildlife comeback, supported by reintroductions where necessary. All work on location is done together with, or through a network of local conservation partners that share our visions and goals. These ten areas are to serve as leading examples and inspirational bench marks for a large-scale shift in land use across Europe towards more nature-based economies. The programme builds on three guiding principles (i) every area should host complete and naturally functioning ecosystems specific to the region, with the full span of native wildlife typical for the region present, (ii) the areas should be embedded within the social, historical and cultural fabric of their respective region, and (iii) the new land use should be based on what nature can offer, be economically viable and competitive with other alternatives.

5% TARGET

23. In January 2012, a policy forum “Protecting Wilderness in Europe” in the European Parliament was organised by PAN Parks and Wild Europe where, among other issues, a target of setting aside 4-5% of the land area of Europe was proposed⁴⁶.

ECOLOGICAL NETWORKS

24. There is also an increasing recognition that a new spatial perspective for nature conservation is required⁴⁷. For more than two decades, the concept of “ecological networks” has been promoted in Europe through the Pan-European Ecological Network (PEEN), launched by Council of Europe in 1995. To address a special provision of the EU Habitats Directive, countries like the Netherlands, Germany, Denmark, the Czech Republic and Slovakia have introduced planning for, as well the creation of, ecological corridors. Important work has also been done in identifying the ecological connectivity for regions such as the Alps⁴⁸ and Carpathians⁴⁹. A “Review of Status and Conservation of Wild Lands in Europe” by the Wildland Research Institute provides a spatial perspective of the distribution of more natural areas in Europe with a specific focus on developing policy in Scotland⁵⁰. The institute has also developed a draft European wilderness indicator with support by the European Environment Agency.

GREEN INFRASTRUCTURE

25. The concept of ecological networks has been widened to “green infrastructure” in recognition of its importance for ecological services and is now being addressed in the context of climate change/adaptation, transport, agriculture, urban development, etc⁵¹. The requirement for taking a more holistic view addressing simultaneously both spatial as well as functional aspects at a landscape scale has been recognised.

NO-TAKE ZONES

26. The concept of “no-take zones” has potential to be expanded beyond strict protected areas to enhance the spatial and functional aspects of both land and sea. The importance of marine no-take zones as a tool for fisheries management has been demonstrated around the world. No-take zones lead to larger fish density, biomass, size and diversity, where larger fish produce significantly more eggs and larvae than smaller ones⁵². After setting aside large no-take zones in the Great Barrier Reef, a remarkable fish rebound of 30-75% within just two years has been demonstrated⁵³, and from Lundy Island in the UK, the local populations of lobsters and crabs grew more than seven times in ten years, with a very positive spillover effect in the adjacent fishing zone⁵⁴. The optimal design of marine no-take zones remains complex, and it has been demonstrated that the catch rates of the entire fishery in and around no-take zones were higher when the no-take areas were smaller⁵⁵. It has also been demonstrated that no-take fishing zones have had a positive impact on tourism - divers, sightseers, and recreational anglers - in surrounding areas⁵⁶. In the context of recreational fishing, there are also interesting indications that with appropriate handling techniques catch-and-release angling could help enhance conservation and management associated with marine protected areas while maintaining public support and providing alternative tourism-based revenues for displaced fisheries⁵⁷. The lessons-learned from the marine environment could also be applicable to freshwater systems as well as hunting.

45 <http://rewildingeurope.com/programme/background-and-goals/>

46 http://www.wildeurope.org/index.php?option=com_content&view=article&id=72&Itemid=45

47 “Green infrastructure and territorial cohesion”, European Environment Agency, Technical Report 18, 2011

48 <http://www.alpine-ecological-network.org/the-alpine-ecological-network>

49 Maanen, E. Van et al. 2006, “Safeguarding the Romanian Carpathian ecological network” and Deodatus. F.D et al 2010, “Creation of ecological corridors in Ukraine – A manual on stakeholder involvement and landscape-ecological modelling to connect protected areas, based on a pilot in the Carpathians”

50 <http://www.scotland.gov.uk/Resource/Doc/1051/0109251.pdf>

51 “Green infrastructure and territorial cohesion: The concept of green infrastructure and its integration into policies using monitoring systems”, EEA Technical Report, No 18/2011

52 http://www.mpa.gov/pdf/helpful-resources/do_no_take_reserves_benefit_adjacent_fisheries.pdf

53 <http://www.newscientist.com/article/mg19826623.600-reef-fish-rebound-in-notake-zones.html>

54 <http://www.naturalengland.org.uk/ourwork/marine/lundyntzfeature.aspx>

55 “Effects of no-take area size and age of marine protected areas of fisheries yields: a meta-analytical approach”, F. Vandeperre et al., Fish and Fisheries 12(2011).412-426

56 http://cmsdata.iucn.org/downloads/marine_protected_areas_lundy.pdf

57 “Is catch-and-release recreational angling compatible with no-take marine protected areas?”, S.C. Cooke et al, Ocean & Coastal Management 49(2006):342-354

27. The ideas of wilderness and rewilding have already attracted large audiences across Europe. One of the main drivers behind that has been the Wild Wonders of Europe mass communication initiative⁵⁸, which by January 2013 had reached more than 600 million people through a combination of outdoor/indoor exhibitions, books, TV, printed media, apps, web media, social media, etc.
28. During the last 20 years, the public interest and concern for the environment has declined dramatically in Europe, from a top ranking position in the early 1990's to a level of 11th or 12th during 2010 and 2012⁵⁹. The loss of biodiversity ("extinction of species, loss of wildlife and habitats") only rank tenth amongst 15 important environmental issues⁶⁰. Perhaps unsurprisingly the main concerns of European citizens are jobs and the economy.
29. At the same time many challenges exist to capitalise on these gains and opportunities. One important aspect is the inadequate and now even declining financial (Box 2) and human resources needed to maintain the traditional, often quite labour intensive, conservation management of species and habitats. Recent budget cuts at the national level in some countries, such as Italy⁶¹, might lead to "environmental recession"⁶². The main conservation NGOs in Europe has therefore argued that the EU should significantly increase the direct allocation in the 2014-2020 EU budget to Natura 2000 as well as LIFE+, eliminate 'perverse subsidies', improve the integration into other financial instruments, etc.⁶³
30. In many EU Member States, labour intensive measures dominate the management, such as mowing/grazing (more than 25%), forestry, support of traditional land use, fish management, species population support, and increase/decrease of water levels⁶⁴, which together account for more than half of the total interventions.
31. Subsidies have sometimes negative impacts on the environment, which for example aggravate the problem with overfishing⁶⁵. Although farming subsidies sometimes are seen as a way to maintain "high nature value grasslands" for biodiversity, ecosystem services and rural employment⁶⁶, there are also numerous examples on how subsidies become perverse and even detract from wider efforts to maintain biodiversity⁶⁷, supporting unsustainable management practices, such as the "sheepwrecked" uplands in the UK and other regions of the world⁶⁸ and current mowing subsidy practices in parts of Europe⁶⁹. For the long-term perspective of nature conservation, it is important to decouple management as far as possible from (subsidised) farming systems⁷⁰.
32. Others challenges include:
- o *Eliminating still existing and in some cases increasing threats to some of the wildest areas in Europe, especially old-growth forests⁷¹, and better use existing legislation for the protection for Europe's remaining intact wilderness, and wild lands/seas.*
 - o *Reducing the threats to Europe's coastal and marine areas, such as through overfishing, nutrient run-off from land, coastal development, and exploitation of oil, gas and other resources⁷².*
 - o *The current conservation management approach, targeting the increase of the abundance of specific species or the maintenance of particular habitats – often at a particular succession stage⁷³ – which is becoming less and less viable, especially in the age of climate change.*
 - o *To strengthen conservation efforts in hunting⁷⁴, such as through improved laws and regulations and implementation of best-practice game management, including hunting free zones .*
 - o *The need for creating new economic avenues for local communities and land owners to better benefit from the wild, natural values and their conservation, such as through direct income generating activities.*

MASS COMMUNICATION

DECLINING PUBLIC ATTENTION

INADEQUATE MANAGEMENT RESOURCES

MANAGEMENT APPLICATIONS

PERVERSE SUBSIDIES

CHALLENGES

58 <http://www.wild-wonders.com/>

59 "Public Opinion in the European Union", Standard Eurobarometer 78, Autumn 2012, European Commission

60 "Attitudes of European citizens toward the environment", Special Eurobarometer 365, August 2011, European Commission

61 <http://www.wwf.gr/crisis-watch/>

62 <http://www.rtcc.org/eu-commissioner-warns-of-imminent-environmental-recession/>

63 <http://www.eeb.org/?LinkServID=94C27FED-CFCB-33B9-863DCC558767CA14&showMeta=0>

64 "Best practice guidelines for management planning in Natura 2000", J. Černecký 2011, Alpen-Adria Universität Klagenfurt

65 <http://ictsd.org/downloads/2012/06/tackling-perverse-subsidies-in-agriculture-fisheries-and-energy.pdf>

66 http://www.fundatia-adept.org/?content=HNV_Grasslands_Conference

67 <http://www.guardian.co.uk/environment/georgemonbiot/2013/may/22/britain-uplands-farming-subsidies>

68 Georg Monbiot 2013, "Feral: Searching for enchantment of the frontiers of rewilding", Penguins

69 <http://www.tandfonline.com/doi/abs/10.1080/00063657.2013.811464?journalCode=tbis20>

70 "Nature Development: An exploratory study for the construction of ecological networks", F. Baerselman & F. Vera, 1995, Ministry of Agriculture, Nature Management and Fisheries

71 See for instance "Virgin forests in Romania and Bulgaria: results of two national inventory projects and their implications for protection", P. Veen, et al. 2010, Biodiversity and Conservation 19: 1805-1819

72 "The European Environment – State and Outlook 2010: Marine and Coastal Environment", European Environment Agency 2010

73 "Rewilding Abandoned Landscapes in Europe", L.M. Navarro & H.M. Pereira, Ecosystems 2012 (open access publishing)

74 "European Charter on Hunting and Biodiversity", Council of Europe & FACE 2007, "The Hunters' Message for Biodiversity in Europe", FACE 2010

- o *The inability of animal and plant species to adapt to current climate change (e.g. high mountain species) and obstacles created by habitat fragmentation and natural barriers*⁷⁵.
- o *The threat to a very significant number of animal⁷⁶ and plant species of Europe dependent on open/semi-open farmland through agricultural land intensification and the abandonment of low impact, traditional farming systems, and land surface loss due to the spread of built-up areas*⁷⁷.
- o *Land abandonment also serves as incentive for new economic initiatives, such as wind farms and mining, which sometimes conflict with nature conservation interests*

NATURAL PROCESSES

33. To overcome these challenges at the same time as capitalising on the existing opportunities, it is proposed to introduce a new management paradigm based on natural processes to gradually replace a sizeable part of the often labour intensive, costly and to certain extent even unnecessary, traditional management of European nature. The principle of natural processes has its roots in and draws inspiration from the wilderness/rewilding movement⁷⁸, which rapidly is gaining increasing attention and support across Europe from conservation science, NGOs, governments, intergovernmental institutions (e.g. EC, European Parliament), protected areas, media, banks, investment institutions and the like⁷⁹.

RESTORE KEY FUNCTIONS

34. However, due to the long-term human footprint on most European ecosystems, there is often a need to restore one or several of the missing key functions. Such an approach has the potential of creating a much more sustainable future for most animal and plants species, being less dependent on unpredictable shifts in the economic system, and achieving more robust and cost-efficient management systems. At the same time, due attention is needed to protect and remove existing and emerging threats to the most untouched and valuable core wilderness areas of the continent. Ultimately this approach would reduce the loss of biodiversity across the continent and hopefully even bring back some of the previously lost diversity.

WILDLIFE BASED ECONOMY

35. A wilder face with much more wildlife in Europe can also serve as the basis for a new economy. Information from the USA indicates the potential. A survey in 2011 showed that 90 million or almost 40% of all citizens 16 years old or older enjoyed some form of wildlife-related recreation⁸⁰. One out of every 100 dollars of all goods and services produced in the U.S. is due to wildlife-related recreation, which amounts to a total of \$ 145 billion. Most popular was wildlife watching (\$ 55 billion, 72 million people) followed by sport fishing (\$ 42 billion, 33 million people) and hunting (\$ 34 billion, 14 million people). In Europe, 25 million anglers⁸¹ spend about € 25 billion every year⁸² whilst the annual expenditure of 7 million hunters⁸³ amounts to € 16 billion⁸⁴. Wildlife watching in Europe is still at a more infant stage.. In Scotland⁸⁵, 1.12 million trips with the primary purpose of viewing wildlife spent £ 276 million in 2009, 75% by domestic tourists, and generated more than 2,700 FTE jobs. Middle-aged professional and middle-class couples dominated the clients. Although wildlife watching currently only account for 5.2% of all domestic tourism in Scotland, the research shows that wildlife tourism has been growing even in a period of recession in the UK economy, and it is expected to continue increasing – even significantly – in the future. Full board prices in Europe per person per day for watching wildlife (owls, eagles, orcas, wolves, bears, etc.) range between € 100 and € 800⁸⁶.

A NEW ECONOMY

36. Building conservation enterprises provides a vehicle for shifting from a subsidized, natural resources extraction and agricultural economy to a modern service economy based on more nature and wild values⁸⁷. Besides providing new local income opportunities, part of the revenue stream can also go directly into support of

75 For instance: "Future Impacts of Climate Change across Europe", Centre for European Policy Studies (CEPS), Working Document No 324/ February 2010

76 For instance, the decline of butterflies in Europe is very much linked to the disappearing half-open, grazed lands and the intensification of agriculture with use of herbicides and pesticides; <http://www.wildlifeextra.com/go/news/europe-butterflies013.html#cr>

77 http://agrienv.jrc.ec.europa.eu/activities_HNV.htm

78 In October 2012, the European Commission adopted the following definition: "A wilderness is an area governed by natural processes. It is composed of native habitats and species, and large enough for the effective ecological functioning of natural processes. It is unmodified or only slightly modified and without intrusive or extractive human activity, settlements, infrastructure or visual disturbance."

79 <http://www.wildeurope.org/>, <http://www.panparks.org/>, <http://rewildingeurope.com/>

80 "2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation – National Overview", U.S. Fish & Wildlife Service, 2012

81 European Anglers Alliance (EAA), <http://www.eaa-europe.org/>

82 http://www.eaa-europe.org/fileadmin/templates/eea/docs/EFTA_JK_Sweden_16March2007.pdf

83 Federation of Associations for Hunting and Conservation of the EU - www.face.eu

84 Kenward, R. & Sharp, R. (2008) Use Nationally of Wildlife Resources Across Europe, 117-132.: in Manos, P. & Papathanasiou, J. [eds.] (2008) GEM-CON-BIO: Governance & Ecosystems Management for the Conservation of Biodiversity. Thessaloniki

85 "The Economic Impact of Wildlife Tourism in Scotland", International Centre for Tourism and Hospitality Research, Bournemouth University, Scottish Government Social Research 2010

86 Rewilding Europe, June 2011

87 "Impacts of Wilderness on Local Economic Development", R.S. Rosenberger & D.B.K. English 2005, in "The Multiple Values of Wilderness", Venture Publishing, State College Pennsylvania

conservation on the ground⁸⁸. With fewer financial resources available to conservation from public sources, private sector investments are becoming increasingly important⁸⁹ and can also fill an emerging niche between philanthropic and pure commercial financing.

37. The potential of wild nature as an attraction for modern economic development has already become reality in some parts of the world. In the western USA it has also been shown that the quality of life around national parks, monuments and wilderness areas offer high-tech and services industries located in adjacent areas a competitive advantage, which is a major reason why the economy there has outperformed the rest of the U.S. economy in key measures of growth - employment, population, and personal income during the last four decades⁹⁰. Pilot projects in different parts of Europe have already shown local interest in trying this new approach, creating jobs and additional sources of income.
38. Privately owned land dominates much of the European countryside, based either on long held historical rights or a more recent land restitution process, particularly in Eastern Europe⁹¹. The majority of farmland is privately owned but so are more than half of all forests⁹². The private landowners play a critical role in land use, with issues such as Natura 2000⁹³, business & biodiversity⁹⁴ and hunting/wildlife management⁹⁵ addressed in a collaborative way in the context of the EU. Several initiatives also exist where land owners work more directly together to promote conservation action on the ground, both at the regional level⁹⁶, national⁹⁷ as well as European level⁹⁸. Specific land trusts have been established for the conservation of land, such as the John Muir Trust⁹⁹, the Scottish Wildlife Trust¹⁰⁰, Conservatoire Littoral¹⁰¹, Conservatoire d'espaces naturels Languedoc-Roussillon¹⁰² and Conservatoire d'espaces naturels Midi-Pyrénées¹⁰³.
39. In the USA, the Wildlands Network¹⁰⁴ has over the last couple of years helped to create the Western Landowners Alliance¹⁰⁵. It is a group of privately owned, large scale ranching properties in the American West that advances policies and practices that sustain working lands, connected landscapes and native species. They are pledged to manage their lands to ensure recovery and maintenance of all native species, including top predators, and ecosystem function. When formed in the summer of 2012, the group had the participation of landowners in eleven states and on some 10 million acres of land (4 million hectares).
40. The Australian Bush Heritage Initiative¹⁰⁶ currently owns and manages 34 reserves throughout Australia, covering over 960,000 hectares. The reserves are managed in a similar way to national parks – the land is legally protected, with the intention of safeguarding it forever. The initiative also builds partnerships with other landowners, to manage important areas of their land for conservation. These partnerships account for a further 2.5 million hectares of land under conservation management.
41. Wild nature also provide essential non-material and spiritual values¹⁰⁷ through therapeutic, educational and experiential programmes with proven benefits for many sectors of society, like underserved communities, the adjudicated, urban dwellers, and marginalised/non-integrated cultures, as well as for general leadership development, conflict resolutions, and more¹⁰⁸.

ECONOMIC IMPACTS

PRIVATE LAND EUROPE

PRIVATE LAND USA

PRIVATE LAND AUSTRALIA

NON-MATERIAL IMPACTS

88 www.conservation-capital.com

89 <http://www.african-parks.org/>

90 <http://headwaterseconomics.org/land/west-is-best-value-of-public-lands/>

91 <http://www.europeanlandowners.org/>

92 <http://www.unece.org/fileadmin/DAM/timber/publications/SP-26.pdf>

93 http://www.elo.org/UserFiles/File/Natura_2000.pdf

94 http://ec.europa.eu/environment/biodiversity/business/index_en.html

95 <http://www.wildlife-estates.eu/>

96 Fundació Catalunya-La Pedrera coordinate conservation-oriented land stewardship of a total of 159,000 ha – or 5.2% of Catalunya – based on 15 landowner agreements (<http://www.fundaciocatalunya-lapedrera.com/ca/content/cust%C3%B2dia-del-territori>)

97 The Dutch Natuurmonumenten (<http://www.natuurmonumenten.nl/>) manages 355 sites with a total area of 103,000 ha with a combination of land owned by the organization and others.

98 <http://www.eurosite.org/>

99 <http://www.jmt.org/>

100 <http://scottishwildlifetrust.org.uk/>

101 <http://www.conservatoire-du-littoral.fr/front/process/Home.html>

102 <http://www.cenlr.org/>

103 <http://www.cren-mp.org/>

104 <http://www.twp.org/>

105 <http://www.westernlandownersalliance.org/>

106 <http://www.bushheritage.org.au/>

107 “Spiritual Values of Protected Areas of Europe”, J-M., Mallarach (Ed.), Workshop Proceedings, 2-6 November 2011, International Academy for Nature Conservation on the Isle of Vilm, Germany

108 <http://www.wildernessfoundation.org.uk/what-we-do/wilderness-therapy/>

“A Vision for a Wilder Europe” – Basic Principles & Application

BASIC PRINCIPLES

1. Conservation management needs to be developed according to four basic principles¹⁰⁹:
 - (i) All the native ecosystems should be represented in a protected area system and conservation landscapes;
 - (i) Viable populations of all native species should be maintained and allowed to fluctuate in a natural way, including dispersal through ecological corridors¹¹⁰;
 - (i) Ecological and evolutionary processes such as free-flowing rivers, wind, fire, herbivory and carnivory must be ensured, and
 - (i) The wider conservation landscape should be designed and managed so that it is resilient to both short-term and longer-term change such as climate, for instance, through establishing ecological corridors.

A large-scale landscape/seascape approach is always the most appropriate to meet these requirements¹¹¹.

APEX SPECIES

2. Recent findings show that apex species at the top of the food chain are of particular importance¹¹². The disappearance of (i) big predators, such as wolves on land, whales, tuna and sharks in the oceans, (ii) larger predators in freshwater ecosystems, such as otter and salmon¹¹³, and (iii) larger herbivores, such as European bison, red deer, reindeer, Eurasian elk/moose & beaver can generate extensive disruptions to trophic cascades in marine, terrestrial and freshwater ecosystems. This “trophic downgrading” negatively affects natural functions and resilience of global ecosystems and in turn has negative impacts on biodiversity as well as the spread of infectious diseases, wildfires, carbon sequestration, invasive species, and biochemical cycles.

NATURAL PROCESSES

3. A key element in the Vision for a Wilder Europe is the concept of “Natural Processes”. Those include both abiotic (*wind, water, fire, avalanches, geology, climate*) and biotic factors (*wildlife – especially apex species, natural cycles habitats/flora, natural succession*) (see Annex 1 for more details). The application needs to consider the authenticity of natural areas, focusing “more on broad ecological function, resilience and persistence than on the minutiae of species composition and ecological history”¹¹⁴, at the same time as considering societal factors (culture, local economy, perceptions, attitudes, etc) but not being behest to them.

CURRENT APPLICATIONS

4. Principle (i) and (ii) are addressed in the European Union through implementation of the Habitats and Birds Directives and their associated Natura 2000 network, largely overlapping and enlarging the national networks of protected areas.
5. Both the Habitats Directive and the Birds Directive provide the legal means to apply principle (ii) and (iii) as part of area management¹¹⁵ (bold text highlights made by this paper):

Habitats Directive, Article 6 (i):

*“For special areas of conservation, Member States shall establish the necessary conservation measures involving, if need be, appropriate management plans specifically designed for the sites or integrated into other development plans, and 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.**”*

109 “Protected areas: How much is enough?”, R.F. Noss 1996, in National Parks and Protected Areas. Their Role in Environmental Protection, Cambridge, Blackwell Science & “Conservation Beyond Crisis Management: A Conservation-Matrix Model”, F.K.A. Schmiegelow, et al. 2006, BEACONs Discussion Papers

110 If required supported by re-stockings and reintroductions of species temporarily lost

111 For examples, see the Strategic Landscape Approach adopted by the U.S. Fish & Wildlife Service, <http://www.fws.gov/southeast/SHC/pdf/LandscapeConservationQA-10232008.pdf>, or the Yellowstone to Yukon Conservation Initiative, <http://jy2y.net/>

112 “Trophic Downgrading of Planet Earth”, Science, Volume 333/15 July 2011, James A. Estes, et al

113 “Ecosystem Services generated by fish populations”, C.M. Holmlund & M. Hammer 1999, Ecological Economics 29: 253-268

114 “Authenticity in Nature: Making Choices about the Naturalness of Ecosystems”, Nigel Dudley, Earthscan 2011

115 “Managing Natura 2000 Sites – The provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC”, European Communities, 2000

Birds Directive, Article 2 & 4:

*“Member States shall take the requisite measures to maintain the population of the species referred to in Article 1 at a level which corresponds in particular to **ecological**, scientific and cultural **requirements**, while taking account of economic and recreational requirements, or to adapt the population of these species to that level.”*

*“The species mentioned in Annex I shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution. In this connection, account shall be taken of: (a) species in danger of extinction; (b) species vulnerable to specific changes in their habitat; (c) species considered rare because of small populations or restricted local distribution; (d) other species requiring particular attention for reasons of the specific nature of their habitat. **Trends and variations in population levels shall be taken into account as a background for evaluations.**”*

6. The concept of “favourable conservation status” (FCS) for both habitats and species is a challenging and sometimes ambiguous principle to implement and the site level¹¹⁶, and the European Commission has therefore published a guidance note of how it should be applied¹¹⁷. In that, it is clarified that the objective of favourable conservation status “can only be defined and achieved at the level of the natural range of a species or a habitat type” and “that each site will have a specific function in contributing to the overall coherence of the network”.
7. The main aim of the Berne Convention – “Convention on the Conservation of European Wildlife and Natural Habitats” – is “to conserve wild flora and fauna and their natural habitats, especially those species and habitats whose conservation requires the co-operation of several States, and to promote such co-operation.” In 1994 the Berne Convention took the initiative for the Pan-European Biological Landscape Diversity Strategy¹¹⁸, which promotes the “ecological coherence” and to increase “resilience” of European landscapes and ecosystems. With the emphasis on species in their “natural” habitats and a more functional approach to conservation indicates that there exist no legal obstacles within the Convention to promote the perspectives of the Vision for a Wilder Europe.
8. It can therefore be concluded that existing European nature conservation legislation is quite well placed to meet the requirements of all four principles. However, an even more holistic, functional approach is needed in Europe to meet the challenges of conservation of biodiversity where also new concepts like trophic cascades and apex species are taken into account.
9. In summary, the ideas behind “A Vision for a Wilder Europe” are to promote a more functional approach to nature conservation in Europe. It invites for a shift in conservation approach, away from the traditional, hands-on and expensive management of many natural areas, to a system governed more by natural processes with a reduced human control of landscapes, “trophic upgrading”, less investment needs for conservation management, and higher revenues from the ‘natural capital’ (ecological/environmental services). A landscape approach is required, especially for smaller conservation areas to function properly.

SUMMARY

116 For example, see <http://jncc.defra.gov.uk/PDF/commo2Do7.pdf>

117 http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/commission_note2.pdf

118 <http://www.pebls.org/>

Gaining Support

REGIONAL RELEVANCE

1. To be successful, this new conservation approach must be embedded within the social, economical, cultural and historical fabric of the relevant region.

BENEFIT SHARING

2. To optimise support it is essential that land owners, land managers, local communities and governing bodies understand the opportunities offered by the economic, social and environmental benefits, and intrinsic values of areas governed by natural processes and that they are invited to share the benefits from the new approach.

RESILIENCE PROMOTION

3. Naturally-functioning ecosystems, with all key elements in place, are also considered more resilient to external impacts, including climate change¹¹⁹. As these ecosystems are likely to provide better ecological/environmental services, this new management approach should be promoted as vital in order to receive political attention and support.

GENERIC GUIDELINES

4. Clear reference should be made to the new recommendations for 'non-intervention management' for Natura 2000 wilderness and wild areas¹²⁰, and an assessment needs to be made of how this work can be used for the development of more generic guidelines applicable to a wider set of ecosystems and geographical aspects of Europe.

INVENTORY

5. As the first practical step, it is recommended to make an inventory across Europe of already existing examples of the application of the concepts outlined in the "Vision for a Wilder Europe". The LIFE Nature and Biodiversity portfolio could serve as the starting point. Another valuable input could be provided through the Wilderness Register, a study recently commissioned by the European Commission¹²¹. The aim could be to have at least one demonstration project with naturally functioning ecosystems in each European country, incorporating environmental, social and economic aspects.

INCOME & JOBS

6. It is vitally important to include socio-economic aspects, trying out new ways of generating income and jobs in local communities, for land owners and other interest groups. Since a wilder nature sometimes lead to local conflicts of interests (e.g. wolf migrations, designation of wilderness areas), different preventive measures should be applied as well as new and innovative incentives for enhancing co-existence.

LEARNING

7. The experiences gained from field work, will provide the possibility of creating a learning community, with land owners, science, land/sea managers, government agencies, NGOs and others (for instance, in accordance with Article 18 of the Habitats Directive and Article 10 of the Birds Directive).

GUIDELINES & POLICY

8. With those experiences, clear guidelines could be developed, which in turn could serve as input for new policies both at the European level (EU, Council of Europe) and country level.

ROLL-OUT STRATEGY

9. The wider roll-out of "A Vision for a Wilder Europe" will require a more specific strategy, with targets, expected results and measurements of success. The possibility of applying the no-take zone approach in fisheries and hunting is recommended. Non-traditional conservation partners such as private land owners, communities, cities, and the business sector should be engaged.

OUTREACH

10. A communications and outreach plan should be developed with specific messages for different target audiences and the application of different tools. Such a plan should avoid being too prescriptive and recognise the value of many models, including already existing management approaches. It is important to include already existing, practical examples illustrating the advantages of the Vision for a Wilder Europe and how both nature, people and the economy benefit. To attract attention, well-known, public individuals should be engaged, especially from the non-conservation sector, to carry the message to the community and wide audiences. In the communications, explicit reference should also be given to IUCN's "Natural Solutions" concept¹²², which highlights the value of natural systems (such as wetlands) and protected areas for solving issues such as climate change and the water crisis.

119 For a general debate, see <http://www.plosbiology.org/article/info%3Adoi%2F10.1371%2Fjournal.pbio.1000438>

120 "Guidelines for the management of wilderness and wild areas in Natura 2000", Report prepared by Alterra in collaboration with PAN Parks Foundation and Eurosite, European Union 2012/13

121 http://www.wildeurope.org/index.php?option=com_content&view=article&id=8:wilderness-register&catid=4&Itemid=17

122 "The economics of ecosystems and biodiversity for water and wetlands", Institute for European Environmental Policy (IEEP) and RAMSAR Secretariat, 2013

Target Countries

The aim is to disseminate the vision widely in Europe and seek wide support from all European countries, namely:

Albania, Andorra, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kosovo, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia (FYROM), Malta, Moldova, Monaco, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, and United Kingdom (including England, Northern Ireland, Scotland & Wales)

Box 1: Land Abandonment

Europe is one of the continents where urbanization is particularly prominent. During the last 50 years, the cities of Europe have expanded on average by 78%, whereas the overall population has grown by only 33%. In 2020, it is estimated that four out of five European citizens will live in urban areas. With the depopulation of the country side and ageing rural society, more land has been taken out of agricultural production.

Between 1960 and 2000, the European countryside experienced a dramatic change in land use. Some regions were more affected than others, especially those of less importance for agricultural production: the Alps, Pyrenees, Portugal, central Spain, Sardinia, Apennines, former East Germany, the Baltic States, Carpathians, Poland, and the Balkans. No precise figures exist for the amount of land abandoned, but in some countries - like Estonia, Latvia, Lithuania, Poland, Romania and Slovakia- between 10 and 21% of the farmland was lost within ten years. In the period 1960 to 1990, the percentage of grasslands across the 27 EU countries decreased from 19% to 7%.

Projections for the future speak the same language with a continuation of current trends. Although there is some uncertainty in the different scenarios at the European level, the trend of further land abandonment is evident. According to the Institute for European Environmental Policy (IEEP), widespread land abandonment is forecasted to continue until 2030, particularly in Spain, Portugal, parts of Finland and Sweden, highland area of France, Italy, central Europe, Romania, Bulgaria and parts of Greece. Estimates indicate a total decline of agriculture, grasslands and semi-natural habitats of more than 30 million hectares and a subsequent increase of forests areas across the EU. Present market conditions underline

the future vulnerability and fragility of low-intensity grazing livestock systems in many parts of the EU and especially small, semi-subsistence farms – further increasing the abandonment on land unsuited to other systems of production. The biofuel market will grow, but only in a few EU states (France, Germany, Italy, Poland, Romania and United Kingdom), and if nothing else, it will only serve to put pressure on grasslands in the more fertile areas.

The EU Common Agriculture Policy (CAP) has played an important role in shaping the agricultural landscape in Europe since it was introduced in 1958. Until now, however, the main beneficiaries have been those farmers located on the most fertile soils – not the ones trying to survive in the more marginal areas. A new reform of CAP is in making, scheduled for 2013. In the future, the most likely scenario is that the current trends of shifting the production away from the less productive areas to the more fertile will continue:

- o The restructuring of the dairy sector will continue towards fewer, larger production units
- o Low-intensity grazing systems for cattle, sheep and goats together with mountain dairy systems will become even less viable, leading to significant declines in the livestock numbers
- o Environmentally important systems will often not survive without significant long-term public funding, which is of questionable sustainability

Sources: “Farmland Abandonment in the EU: an Assessment of Trends and Prospects”, Institute for European Environmental Policy, November 2010, <http://www.eea.europa.eu/pressroom/speeches/urbanisation-in-europe-limits-to-spatial-growth>

Box 2: Financing Natura 2000

The minimum, annual cost for implementing Natura 2000 is estimated at € 5.8 billion, one-third consisting of one-off investments and 2/3 recurrent annual costs (e.g. habitat management, monitoring), with expected increases in the future. Based on a review of available funding sources at the EU level, less than 25% is potentially available. However, reality shows a different picture: less than 2% of the Agriculture Fund for Rural Development (EAFRD) has been used for Natura 2000 and the amount of Structural Funds allocated for Natura 2000 has been “exceptionally low”. The annual amount of funds allocated by LIFE+ for Natura 2000 only amounts to around 60 million. So, the main responsibility

for financing Natura 2000 lies with the Member States, of which many face serious public funding constraints. On-going work by the European Commission suggests that the economic benefits that flow from the network of Natura 2000 sites are of the order of €200 to 300 billion/year, but still the annual costs (€ 5.8 billion) must be met to ensure those benefits.

Sources: “Costs and Socio-Economic Benefits associated with the Natura 2000 Network”, Institute for European Environmental Policy, October 2010, “Investing in Natura 2000 – For Nature and People”, European Commission – Environment, 2011, “Financing Natura 2000 – Delivering benefits for nature and people”, Commission Staff Working Paper, December 2011

Annex 1:

Overview of different components of natural processes

ABIOTIC FACTORS:

Wind (transport of soil, blowing down trees: making open spots in the forest and holes and heaps for varied micro habitats)

Water: streams, waves, flooding, ice, snow, sedimentation – including hydrological impact, flood mitigation, water table maintenance

Fire

Avalanches

Geology: minerals and salt impact – including soil and water composition and richness

Climate

BIOTIC FACTORS:

Wildlife

- Herbivores (large and small)
 - As food for carnivores, carrion eaters/scavengers, dung eaters etc.
 - Seasonal/diurnal migration & population dynamics
 - For natural management
 - Grazing & browsing
 - Tree bark stripping
 - Manuring
 - Dam building, wetland creating (beaver)
 - Burrowing (rabbits), rooting (wild boar)
 - Seeding (squirrel, jay)
 - Cleansing (filtration from sedges, dam oxygenation)
- Carnivores
 - Prey-predator relationship: equilibrium densities for a balanced ecosystem
 - Managers of prey populations
 - Indirect impact on vegetation and processes via effect on prey
- Scavengers (large and small)
- Disease – vectors including bark beetle, moth, fungus
- Genetic selection and evolution, diversity
- Reproduction, migration internally and repopulation of external areas
- Adaptation, resilience (eg in response to climate change, alien species impact)

Habitats and flora

- Natural succession to ‘climax’ vegetation
- Habitat mosaics determined by natural dynamics
- Diverse ecotone functioning
- Food source provision
- Shelter, bedding, medicinal use
- Genetic selection and evolution, diversity
- Reproduction, spread internally and repopulation of external areas
- Adaptation, resilience (e.g. in response to climate change, alien species impact)
- Large trees needing a long development period to fulfil ecological potential

Natural cycles

- Sequestration, storage, emission of carbon dioxide, nitrous oxide, methane
- Carbon – availability of dead biomass (trees, reeds, grasses) as base for micro biotic activity and invertebrates in the food chain
- Nitrogen
- Other elements

KEY PRINCIPLES AND INDICATORS FOR PROPER FUNCTIONING OF NATURAL PROCESSES:

Scale – large enough to permit as full a range of processes as possible to function

- Abiotic: room for the water, fire and wind processes
- Biotic: especially on the level of meta-populations: “key (steering) species”, facilitating viable gene pools, enabling migration and adaptation

Self-contained so far as possible – including water sources, habitat range

Influence from external influences (pollution, alien species, human impact) minimal

Highest species variability and broadest age structure within species that can be permitted by local geography



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