Pan-European Ecological Network:

DELIVERING BENEFITS BEYOND BIODIVERSITY CONSERVATION

ECNC - European Centre
for Nature Conservation

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Today, habitat and landscape fragmentation is considered to be one of the main causes of biodiversity loss in Europe. And biodiversity loss is threatening the sustainability of all benefits that nature provides to humans and society. It undermines not only the health of the planet, but also our livelihoods, well-being and, most importantly, our democracies.

Ecological networks can positively support and maintain vital ecosystem services, including climate regulation, and can bring an added value to numerous sectors, such as water management, transport, agriculture, and tourism. In addition, there are social and economic benefits to be gained by contributing to the creation of multifunctional landscapes.

The idea of creating the Pan-European Ecological Network (PEEN) was concretised in 1995 at the Third Ministerial Conference 'Environment for Europe', held in Sofia (Bulgaria). The objective of creating the PEEN was to promote nature protection, both inside and outside protected areas, by linking a physical network of core areas by corridors, supported by buffer zones or other appropriate measures, thus facilitating the dispersal and migration of species.

This leaflet has been prepared by ECNC–European Centre for Nature Conservation, in cooperation with and with the financial support of the Bern Convention on the Conservation of European Wildlife and Natural Habitats, and is aimed at decision-makers, politicians, and planners, but also nature conservationists. It is designed to illustrate the benefits of creating and maintaining ecological networks such as the Emerald Network under the Bern Convention and the EU Natura 2000 Network. It provides arguments for action to integrate and link the core areas provided by these two networks in Europe in the wider landscape and within various human activities.

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Biodiversity in Europe

Landscape and habitat fragmentation caused by human activities and infrastructure is a major cause of the well recorded decrease in many European wildlife populations. In fact, at the European level, fragmentation and habitat loss are now considered to be the main causes of biodiversity loss. They also lead to the loss of the benefits that biodiversity provides to people, known as *ecosystem services*. The current trend of steadily increasing landscape fragmentation contradicts the principle of sustainability, and there is a clear and urgent need for action.

The direct impact of these changes has been a reduction in the functioning and functionality of ecosystems. This is why they are not only losing their value for wildlife and nature conservation, but are also producing fewer of the ecosystem services on which many people, in rural areas in particular, have come to rely. These include a whole range of basic goods such as food, water, wood, building materials and fuel. However, at a more sophisticated level ecosystems can and do provide, for instance: natural waste management systems in the form of wetlands, which absorb and neutralise pollution; or floodplain grasslands and woodlands that reduce the risk of flooding to towns and cities by alleviating the threat of extreme weather events (which appear to be one of the consequences of climate change).

The extent of landscape fragmentation in 28 countries in Europe is quantitatively investigated in EEA Report No 2/2011 *Landscape fragmentation in Europe*.

Ecological connectivity in European policy instruments

In 1991, Recommendation No. 25 (1991) of the Standing Committee to the Bern Convention was already targeting biodiversity protection outside protected areas proper. The Recommendation recognises that biodiversity conservation is possible only in the context of a comprehensive approach to regional planning; it encourages the conservation and restoration of ecological corridors and proposes some measures and actions.

Twenty years later, ecological connectivity remains a priority for international biodiversity conservation policy. Target 11 of the Aichi Biodiversity Targets, signed at COP 10 of the Convention on Biological Diversity (CBD) in 2010, therefore states that:

> *By 2020, at least 17% of terrestrial and inland water areas and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.*

As a response to the Aichi targets, connectivity has been taken forward by the European Commission under the umbrella of Green Infrastructure – a much broader and much more complex concept which is emerging as the leading policy instrument for connectivity. It has been included in headline target 2 of the Communication from the European Commission: *Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (COM(2011) 244)* EU 2020 Biodiversity Strategy whose aim is to halt and reverse the loss of biodiversity across the EU Member States. The Green Infrastructure Strategy was adopted on 6 May 2013 in the form of the Communication on *Green Infrastructure (GI) – Enhancing Europe's Natural Capital*.

For the wider pan-European region, at the level of the Bern Convention an Action Plan for the establishment of the Pan-European Ecological Network was adopted in 1995, aiming in particular to promote awareness-raising among various stakeholders about the benefits of ecological connectivity. The importance of connectivity has also been reiterated and further reinforced by the Pan-European 2020 Strategy for Biodiversity adopted by the Council for the Pan-European Biological and Landscape Diversity Strategy (PEBLDS).

Ecological networks at different levels

Pan-European level

The concept of ecological networks is implicit in a variety of international conventions (e.g. Ramsar Convention, Bern Convention), European agreements (Habitats and Birds Directives) and related policy implementation (Natura 2000 and Emerald Networks). It has now become operational in a number of national and European strategies.

Ecological networks represent a very effective tool for combating the effects of fragmentation by: counteracting fragmentation; conserving and buffering core areas; maintaining and establishing ecological connectivity; being a tool for ecological design and planning; being a tool for interaction with other land uses; and being an important political instrument. A lot of work has been done in relation to implementing the ecological networks in Europe at various levels, with the Pan-European Ecological Network (PEEN) as an umbrella initiative. The PEEN approach was successful in reaching its goal of promoting the idea of a pan-European vision of biodiversity conservation through a European ecological network. It has been and still is a genuine framework for strategic cooperation and a useful tool for international cooperation, providing all European countries with a single, flexible monitoring and coordination mechanism.

Establishment of the PEEN was one of the priorities of European nature conservation under the original Pan-European Biological and Landscape Diversity Strategy (PEBLDS), which was endorsed by 54 European countries in Sofia, Bulgaria, in 1995. This Strategy has been visionary in its goals, which still remain, perhaps more than ever before, at the very core of nature conservation policy. The Strategy aims to ensure that:

- A full range of ecosystems, habitats, species and landscapes of European importance are conserved;
- Habitats are large enough to guarantee key species a favourable conservation status;
- There are sufficient opportunities for dispersal and migration of species;
- Damaged parts of the key environmental systems are restored;
- The key environmental systems are buffered from threats.

From national to local level

Over the past 35 to 40 years (starting in the 1970s and 1980s), ecological networks have been developed and implemented at various levels. The Natura 2000 Network is now well developed across the EU Member States and comprises more than 26,000 sites covering over 750,000 km^2, more than 18% of the territory of the EU. Even though the functional connectivity of sites has not yet been achieved, Natura 2000 is still the largest network of protected areas in the world.

Outside the EU, the establishment of the Emerald Network of sites is making progress at a pan-European level, particularly in the Western Balkans, Central and Eastern Europe, and the South Caucasus, as well as Norway and Switzerland. In December 2012, the Standing Committee to the Bern Convention officially adopted 37 areas in Switzerland as Emerald sites, making them the

first to officially join the Network. Over 1,500 sites (covering approximately 50,000 km^2) have been nominated as candidate Emerald sites, and are awaiting official inclusion in the Network, pending the outcome of a scientific evaluation. The setting-up of the Emerald Network at national level is considered one of the main tools for the Contracting Parties to comply with their obligations under the Bern Convention.

The European Union is also a Contracting Party to the Bern Convention. In order to fulfil its obligations arising from the Convention, particularly in respect of habitat protection, it issued the Birds and Habitats Directives in 1979 (modified 2009) and 1992, respectively, and then set up the Natura 2000 Network. The Natura 2000 sites are therefore considered to be the EU Member States' contribution to the Emerald Network. In practice, the Emerald Network and Natura 2000 are now based on harmonised principles. Together with other networks of protected sites that stem from international, national or sub-national arrangements, Natura 2000 and Emerald sites provide the basis for planning and joint action across the European continent.

At regional and local level many planning authorities have applied the principles of ecological connectivity to spatial planning and strategies. Often they have included a significant level of stakeholder and public involvement and participation in the planning process.

However, ecological networks on a larger scale are unlikely to function effectively unless they cross national boundaries. Again, there are a number of particularly good examples of cross-boundary and regional ecological networks (e.g. within the framework of the Alpine Convention, Carpathian Convention and in the Dinaric Arc).

Why ecological networks?

Ecological networks and ecosystem services

Ecological networks and, on a more detailed scale, 'green veining' (which describes the network of shelterbelts, hedges, walls, grassy banks and other features within agricultural landscapes) provide a range of services. These include: shelter and the reduction of erosion; pollination; adaptation to climate change; corridors for the movement of animals and, to a lesser extent, plants; and recreational and cultural services. Maintaining and enhancing these services can also be seen to provide significant economic and social benefits and to promote the establishment of green economies.

It is certainly important to ensure that the full value of ecological networks is incorporated into policy appraisal and decision-making mechanisms in order to increase the likelihood of the sustainable use of natural resources, the protection of the natural environment and the long-term sustainability of rural and urban economies. Such an approach could be applied to existing networks as well as to the creation of new networks.

Ecological networks and climate change

Ecological networks can provide physical measures for combating the effects of extreme weather: for example, more shade for farm animals; or flood relief by providing a 'natural sponge' to hold water. With higher connectivity, the existing habitat is better able to fulfil an adaptation function. In addition to connecting wildlife areas and connecting people to wildlife, Green Infrastructure in towns and cities can provide shade and many other functions. In fact, certain elements of ecological networks, in particular buffer zones, could provide important functions in terms of increased resilience and adaptive capacity for vulnerable protected areas and habitats.

Ecological networks and different sectors

Water management

Large rivers can be regarded as natural ecological corridors. Enhancing the quality of the water and (re)establishing connections to other water sources by removing unnecessary barriers improves biological diversity and offers pathways for migratory fish species. Building of resting or nesting islands in fish ponds for birds is a great way to create stepping-stone corridors for wildlife. Ensuring that wetland areas are connected significantly contributes to overall water retention and flood control.

Transport and infrastructure

The transport sector can pose a threat to natural areas because of the fragmentation of important green areas caused by road and rail links. The connectivity of fragmented areas can be partly restored by constructing ecoducts and wildlife corridors across highways, existing roads and railway networks. These pathways are mainly used by large mammals. It should be noted that by choosing the option of locating the infrastructure away from natural areas most impacts can be completely avoided.

Agriculture

Green veining to improve connectivity for nature in agricultural areas can take a number of forms. Planting or natural colonisation of wide field margins with native herbs and grass species or the creation of hedges and windbreaks all enhance the naturalness of the agricultural areas and provide corridors for the movement of wildlife. In addition, they deliver economic benefits by providing shade and encouraging natural pest control agents such as beetles. Such measures are often supported by agri-environment funding. Temporary uncultivated grass 'beetle' banks can be established across fields in order to provide additional habitats and connectivity for a range of species. Turning monocultures into land-use mosaics, planting native forest alongside arable land, and reducing the use of chemicals all contribute to increasing the benefits of green veining.

Forestry

The natural functioning of forests can be enhanced by establishing protected forests for the high-value parts of ecological networks, implementing sustainable forest management principles, and reforesting areas with native forest species, where appropriate.. These forest areas can then be linked by new tree planting or by maintaining existing forest patches or treelines as ecological corridors. Forest management could also include zoning and other measures based on ecological principles.

Tourism

Improvement of natural areas enhances the tourism and recreational strength of an area, as well as public awareness of ecological connectivity. Just a few of the examples that could be considered are: creating walking, riding and cycling paths along field margins, lake shores and riverbanks or in forests; establishing camping sites and bed & breakfasts in farmlands; turning old, traditional field buildings into visitor centres; and opening gardens and public parks.

Emerging policies

In May 2013, the European Commission published a new Green Infrastructure Strategy in the form of the Communication: *Green Infrastructure (GI) — Enhancing Europe's Natural Capital*. According to this document, Green Infrastructure is a successfully tested tool for providing ecological, economic and social benefits through natural solutions. It helps us to understand the value of the benefits that nature provides to human society and to mobilise investments to sustain and enhance them. It also helps avoid reliance on infrastructure that is expensive to build when nature can often provide cheaper, more durable solutions. Many of these natural solutions also create local job opportunities. Green Infrastructure is based on the principle that protecting and enhancing nature and natural processes, and the many benefits that human society derives from nature, are consciously integrated into spatial planning and territorial development.

Clearly, ecological networks are at the very core of Green Infrastructure. It would therefore seem prudent to take into account and build further on the work that has already been done at various geographical levels in order to define areas of existing and potential ecological connectivity.

In many ways the lessons learned through the years of work on building ecological networks can and should be applied when thinking about Green Infrastructure, as most of the issues remain the same.

The way forward

The key today more than ever is sectoral integration. Linking ecological networks to spatial planning at different geographical scales can be seen as a key to effective delivery in the field. This is not only because of the obvious functional relationship between ecological networks and other forms of land use and infrastructure, but also because delivering the concept through the vehicle of spatial planning is one of the main mechanisms for sectoral integration. This is due to the fact that the primary function of spatial planning is to guide and govern decisions about land use.

As a spatial concept, maps presenting ecological networks are easily accommodated by spatial planners in their strategic documents. Perhaps the elaborated concept of Green Infrastructure, with its inclusion of ecosystem services and other aspects, will provide an added impetus to this.

Some important learning points can be extracted from the projects implemented so far:

- The development of a 'flagship species' approach (e.g. a charismatic species such as the Brown bear) is powerful from the perspective of (ecological) prioritisations of corridors and in determining connectivity needs, as well as for communication and promotion of the ecological networks concept, awareness-raising and gaining support at stakeholder level and with the wider public.

- Mobilising a sufficient number of relevant stakeholders to participate in the process of developing the national ecological network map can be a key to successful delivery.

- From the start, an ecological network map should be communicated as a map of 'opportunities' rather than 'barriers'. Such an approach will significantly improve the map's acceptance by stakeholders and will result in them adopting a constructive attitude and a greater willingness to work together towards its practical implementation.

- The implementation of a communication campaign based on a carefully thought-out communication strategy that targets a wide enough range of stakeholders is very important for the broad outreach of the process, for placing the ecological network and the connectivity issues on the agenda of relevant sectors, as well as for raising public awareness and gaining public support for the issue.

- It is useful to link the development of the ecological network map to a strategic national planning document, such as rural and urban regeneration and development strategies, spatial plans and delivery (where available). In this way, it is possible to influence these documents and their implementation and at the same time to make a link to possible existing financing instruments for the implementation of the necessary measures on the ground (e.g. regeneration funding, agri-environment schemes and other subsidies).

Knowledge and capacity for the implementation of ecological networks

Lack of knowledge and capacity should not be allowed to become a barrier to keeping the momentum alive and implementing ecological network projects at all levels across Europe. Interested stakeholders (i.e. decision-makers, spatial planners, sectoral representatives, companies, NGOs and individuals) who would like to get involved in implementing ecological network projects in practice, but feel that they lack the necessary skills, should reach out for assistance. Training materials already exist, often based on examples of best practice, for a number of relevant topics, including:

- Involvement of stakeholders in the delivery of ecological networks, in particular at local level;
- Integration of Green Infrastructure into ecological networks and their subsequent delivery;
- Integration of biodiversity into local plans and actions combined with opportunities for local sustainable development;
- There are a number of organisations that can facilitate the development of capacity-building programmes based on existing materials and methodology. These include the Council of Europe and the European Commission, as well as several European environmental NGOs.

Benefits of ecological networks for decision-makers

- Ecological networks provide a clear and appealing European vision that can be widely communicated and which offers significant socio-economic benefits in terms of the ecosystem services it delivers.
- Delivery can be straightforward through linking it to planning and sectoral policies at national and local levels.
- Ecological networks are in harmony with other EU directives and provide benefits and synergy for the Natura 2000 and Emerald Networks and their management.
- Implementation provides many opportunities for a cross-sectoral approach that in particular can integrate land-use sectors (agriculture; transport; climate change; water management; marine and coastal issues).
- Ecological networks provide a basis for developing innovative funding schemes for the establishment and management of ecological networks at all geographical levels.
- Ecological networks provide an opportunity to create partnerships at national level and a potential platform for resolving cross-border issues.

Bern Convention

The Bern Convention is a binding international legal instrument in the field of nature conservation, which covers most of the natural heritage of the European continent and extends to some States of Africa. Its aims are to conserve wild flora and fauna and their natural habitats and to promote European co-operation in that field.

www.coe.int/bernconvention

European Centre for Nature Conservation

ECNC is an independent European expertise centre for biodiversity and sustainable development. We promote an integrated approach for both land and sea and actively stimulate the interaction between science, society and policy.

www.ecnc.org

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The Council of Europe is the continent's leading human rights organisation. It comprises 47 member states, 28 of which are members of the European Union. All Council of Europe member states have signed the European Convention on Human Rights, a treaty designed to protect human rights, democracy and rule of law. The European Court of Human Rights oversees the implementation of the Convention in the member states.

Fragmentation and habitat loss are now considered to be the main causes of biodiversity loss in Europe. The benefits that biodiversity provides to people are also being lost.

The Pan-European Ecological Network (PEEN), established in 1995, helps to protect biodiversity.

Ecological networks can be beneficial for ecosystem services and climate change mitigation, as well as for numerous sectors, including water management, transport, agriculture, and tourism. In addition, there are social and economic benefits to be gained by contributing to the creation of multifunctional landscapes.

This leaflet has been prepared for key decision-makers in government ministries, politicians, and planners. It illustrates the benefits of creating and maintaining ecological networks such as the Emerald Network and Natura 2000 Network, and their importance to the European Commission's Green Infrastructure strategy.

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