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Keeping Nature Connected – Environmental Impact Assessment (EIA) for Integrated Green Infrastructure Planning

Training Package

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Keeping Nature Connected – Environmental Impact Assessment (EIA) for Integrated Green Infrastructure Planning
Training Package

Part of Output 3.2 Planning Toolkit

TRANSGREEN Project "Integrated Transport and Green Infrastructure Planning in the Danube-Carpathian Region for the Benefit of People and Nature"

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About TRANSGREEN

TRANSGREEN means a better connected Carpathian region with transport infrastructure that takes nature into account. The project aims to contribute to safer and environmentally-friendly road and rail networks that are being developed in the Czech Republic, Hungary, Romania, Slovakia, and Ukraine. www.interreg-danube.eu/transgreen

Output 3.2 Planning Toolkit consists of the following parts:

- Wildlife and Traffic in the Carpathians - Guidelines how to minimize the impact of transport infrastructure development on nature in the Carpathian countries
- TRANSGREEN Policy Recommendations on integrated road and rail transportation planning in the Carpathians
- State of the Art Report and Gap Analysis in the field of environmentally-friendly transport infrastructure development
- Keeping Nature Connected – Environmental Impact Assessment (EIA) for Integrated Green Infrastructure Planning
- Public Participation – Scheme for an integrated linear transport infrastructure development/planning
- Tools for registering animal-vehicle collisions

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General introduction of the Training Package

The "Keeping Nature Connected - Environmental Impact Assessment (EIA) for Integrated Green Infrastructure Planning" Training Package is part of the TRANSGREEN Output 3.2 Planning Toolkit which has been developed within the framework of the Project "Integrated Transport and Green Infrastructure Planning in the Danube-Carpathian Region for the Benefit of People and Nature" (2017-2019).

The Package represents a set of training and background materials to be used for trainings on Environmental Impact Assessment (EIA) with a focus on integrating ecological connectivity into linear transport infrastructure planning. The Package aims at contributing to raise capacity in the region by developing practitioners' competences. The Package addresses representatives of the national road and rail infrastructure companies, representatives of the ministries of transport and environment, environmental consultants involved in the elaboration of EIA and appropriate assessment studies for linear transport infrastructure projects, NGOs with activity in environmental protection, and transport infrastructure planners.

The concept and the delivery of the Training Package was commissioned by the project to Propark Foundation for Protected Areas in Romania, which is an NGO with 10 years of experience of developing and delivering capacity building for protected area and conservation practitioners in Romania and Eastern Europe for 10 years.

A model Training Package has been developed and tested in Romania through a training seminar by Propark, Romania.

Simultaneously, a pool of future trainers received guidance on how to use and further develop the resources included in the Training Package. All trainers had experience in delivering EIA trainings in their respective countries. Four training events have been carried out in Romania, Ukraine, and cross-border for the Czech Republic and Slovakia.

The Training Package has two sections: (I) the Training manual that provides basic information about the subject including case studies, (II) the Training course including schedule, the general presentation (*ppt format), the description of the group exercises, case studies and the feedback form.

SECTION I: Training Manual

Introduction

The Manual has been designed to provide reference material for the stakeholders who are involved directly in connectivity issues and it can be used as a training guide for trainers. The manual presents ecological connectivity in relation to the environmental impact assessment and provides information and case studies which can enable the practitioners and decision-makers to maintain and increase connectivity.

The contents of the manual are structured in 3 sections:

Part I provides an introduction into the issue of biodiversity conservation and a framework for the debate concerning the transport infrastructure and ecological connectivity.

Part II introduces the overall conceptual and practical framework for environmental impact assessment.

Part III represents a ready to use guide for the practitioners who are using the impact assessment tools to secure biodiversity conservation.

Abbreviations

AA	Appropriate Assessment
BACI	Before-after-control-impact
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EU	European Union
GI	Green infrastructure
GIS	Geographical Information System
IAIA	The International Association for Impact Assessment
MCA	Multi-criteria analysis
PP	Plans and programs
SEA	Strategic Environmental Assessment
TEN-G	Trans-European Network for Green Infrastructure

1

Integrating the issue of biodiversity conservation into territorial planning and development

1.1 What is biodiversity conservation?

The accelerated development of the human society in the last 2 centuries took its toll on the natural environment. The intensive, often unplanned use of natural resources, the sectoral approach to their management and the lack of coordination between different sectors have led to what is often referred to as the "environmental crisis". Given our society's generalized, profound and often irreversible anthropogenic interventions in all of Earth's natural systems (atmosphere, geosphere, biosphere etc.), the current geological time has been called 'the Anthropocene'.

The profound degradation of natural systems' structures and functions as well as the definitive loss of some elements of biological diversity (such as habitats or species) are major effects of our society's transformation in the Anthropocene. For example, more than 75 species gone extinct from the beginning of the 19th century, some of which popular species, such as the passenger pigeon (1914), the Javan tiger (1970), the western African black rhinoceros (2011), the Galapagos giant tortoise (2011), the northern white rhino (2018). The rate of extinction is considered as unprecedented. According to the Global Biodiversity Outlook (2010), 'the population of wild vertebrate species fell by an average of nearly one third (31%) globally between 1970 and 2006', with the greatest rates of extinctions in Europe and North America. The same source indicates the severe transformation of habitats and ecosystems as, for example, the American grasslands, 95% of which has been lost, while human communities around the world are facing the depletion of vital resources such as their water reserves (e.g. Cape Town in South Africa, New York, Sao Paulo and Brasil in Brazil, Bogota in Colombia). Motivated by both the moral obligation to ensure long term persistence of other species, and direct interests in nature's services and economically quantifiable benefits, nature conservation movement and science have grown in importance.

Nature conservation comprises actions that are intended to enhance the chances of habitats and species to persist in the wild[1], varying from preservation – focused on protecting nature entirely free from people – to conservation – including sustainable management and use and active management interventions meant to create favourable conditions for the natural values to persist[2] (e.g. mowing, extensive grazing or forest management).

Beyond our moral obligation and aesthetic reasons to conserve nature, our impacts on nature have economic consequences. These are reflected at social and economic level, by direct damage and indirect costs (e.g. costs with ecological restoration of habitats and water catchments, depollution, human health) and by depletion/reduction of resources which are of vital importance for the human society (e.g. drinkable water reserves, good quality air). For example, the value of artificial honeybee pollination in the USA was estimated to 14.6 billion dollars in 2001[3] while pollinating insects, are estimated to be worth more than US$ 200 billion per year to the global food economy[4]. Similarly, the Okavango Delta in Southern Africa (pictured below) is estimated to generate US$ 32 million per year to local households in Botswana through the use of its natural resources, sales and income from the tourism industry. The total economic output of activities associated with the delta is estimated at more than US$ 145 million, or some 2.6% of Botswana's Gross National Product[5].

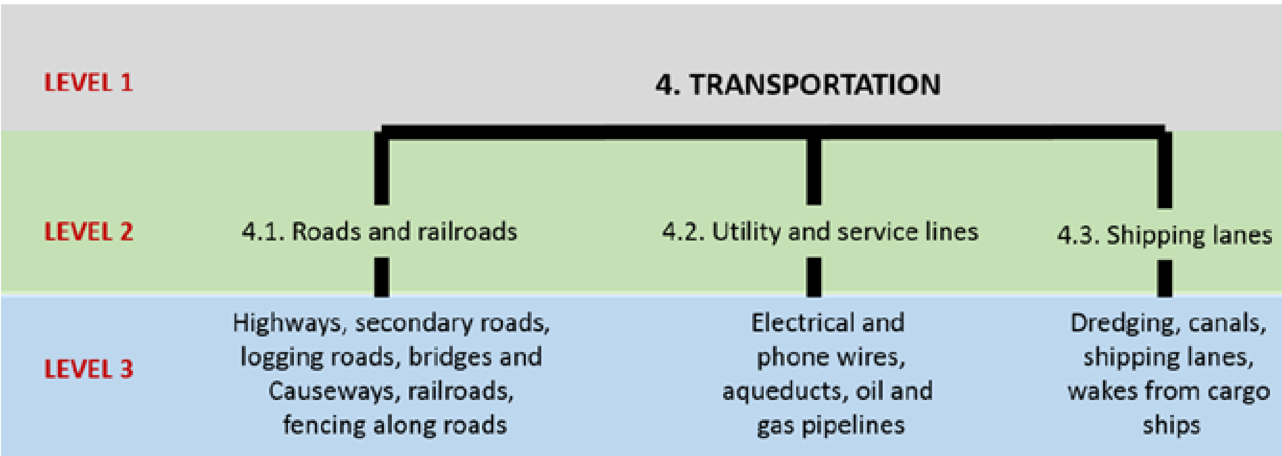
Managing threats to nature

To preserve biodiversity and the functions of natural systems and to maintain the balance between conservation and development, the intensity of human activities needs to be kept under control and the irreversible changes need to be avoided.

The Convention of Biological Diversity has defined a **threat** as 'any human activity or related process that has a negative impact on key biodiversity features, ecological processes or cultural assets within a protected area' (CBD, 2014).

While in the past most developments were done without any concern for the environmental impacts, in the second part of the 20th century legislative frameworks, monitoring and assessment tools have been developed worldwide to measure the negative impacts of human activities over the natural environment. For example, the Red List of Threatened Species developed by IUCN provides a standardised Classification Scheme for threats to species and habitats, as well as a scale to assess their impacts[6], which is used worldwide.

The most utilized framework for the classification and assessment of threats to protected areas all over the world has been developed by the International Union for Conservation of Nature (IUCN) and Conservation Measures Partnership (CMP) – **The Unified Classification of Threats and Actions** (Salafsky et al. 2008)[7]. This classification includes 11 categories of threats,: (1) Residential & Commercial Development, (2) Agriculture & Aquaculture, (3) Energy Production & Mining, (4) Transportation & Service Corridors, (5) Biological Resource Use, (6) Human Intrusions & Disturbance, (7) Natural System Modifications, (8) Invasive & Other Problematic Species & Genes, (9) Pollution, (10) Geological Events, (11) Climate Change & Severe Weather. Each of these is constructed in a hierarchical manner with 3 different levels, as shown in Figure 1.



Source: Mathur et al, 2015, pg. 476 – adapted from Salafsky et al. 2008

Fig. 1 Example of threat classification for the field of transportation.

An appropriate assessment identifies and analyses: direct threats, indirect threats and their underlying causes. The categories of threats, in the context of protected areas, are defined as follows[8]:

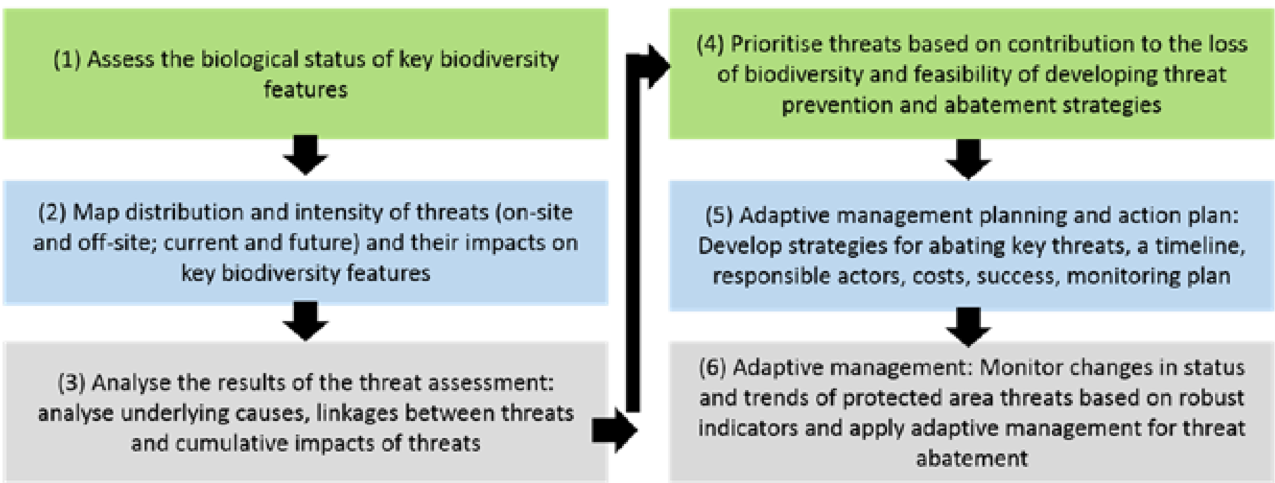
- **Direct threats:** the proximate human activities or processes that have caused, are causing, or may cause the destruction, degradation and/or impairment of biodiversity targets (e.g. unsustainable logging within protected areas) and hinder progress towards meeting conservation goals.

- **Indirect threats:** arise from protected areas but affect values within protected areas and jeopardise their conservation goals.

- **Underlying causes or contributing factors** are the factors (usually social, economic, political, institutional or cultural) that enable or contribute to the occurrence or persistence of direct threats.

Some threats can have natural causes (e.g. floods, climate change, fires). It is equally important to identify this type of threats, the eventual synergies with anthropogenic threats and to develop appropriate mitigation measures, if possible.

Threats are often interrelated and interacting; therefore, the cumulative impacts need to be taken into consideration when assessing the impacts on nature values. Figure 2 presents the main steps to be taken in a threat assessment in protected areas.



Source: Mathur et al, 2015, pg.482 – adapted from CBD, 2014

Fig. 2 Key steps in assessing threats to biodiversity in protected areas.

According to the IUCN's Red List of Threatened Species, habitat loss and degradation is the most important cause for the decline and extinction of species. A key root cause of this problem is the development of infrastructure, whose negative impacts on biodiversity components include: habitat loss, habitat degradation, fragmentation, disturbance and mortality[9].

Environmental impact assessment (EIA) process is one of the most important instruments for the management of threats to biodiversity and practical conservation. Mitigation of threats can be addressed by simple EIA, or by a cumulative impact assessment or strategic environmental assessment, depending on the complexity of the issue in cause. These tools represent the focus of Parts II and III.

9 Nistorescu et al, 2016, pg. 34.

1.2 Tools for in situ conservation

Historically, the approach to biodiversity conservation has evolved from a narrow perspective, only focusing on particular species and/or habitats, to a more complex and systemic approach, which focuses on ecosystems and landscapes.

At international level, there are 4 means to conserve biological communities: (i) the establishment of protected areas, (ii) their effective management, (iii) the implementation of conservation measures outside the protected areas, and (iv) the restoration of biological communities from degraded habitats[10].

'Protected areas are the cornerstones of virtually all national and international conservation strategies, set aside to maintain functioning natural ecosystems, to act as refuges for species and to maintain ecological processes that cannot survive in most intensely managed landscapes and seascapes'[11].

IUCN defines a protected area as 'an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal and other effective means' (Dudley, 2008).

IUCN has defined **6 management categories of protected areas**, depending on their scope and management objectives, as follows:

- Category I: Strict protection – I(a) I, and I(b) wilderness area;
- Category II: Ecosystem conservation and protection – national parks;
- Category III: Conservation of natural features – natural monument;
- Category IV: Conservation through active management – habitat/species management area;
- Category V: landscape conservation and recreation – protected landscape/seascape;
- Category VI: Sustainable use of natural resources – managed resource protected area[12].

Their definitions and scopes are presented in **Box 1.** It needs to be noted that the names can vary substantially between countries and they do not always indicate a correspondence with the IUCN designations (e.g. often protected areas nationally designated as 'national parks' can correspond to IUCN category V or IV). Also, all the categories are equally important and reflect different contexts and the most suitable approaches.

10 After Primack & Pătroescu 2008, pg. 158.
11 Dudley N., 2008, pg. 13.
12 Dudley N. 2008, pg. 15.

Ia – strict nature reserves are strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring.

Ib – wilderness areas areas are usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.

II – national parks are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.

III – natural monuments are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value.

IV - habitat/species management areas aim to protect particular species or habitats and management reflects this priority. Many category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.

V – protected landscapes / seascapes are protected areas where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.

VI managed resource protected areas conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area.

Source: after Dudley, 2008

Box 1 Definitions of protected area management categories according to IUCN guidelines.

Although the different management categories share a common set of management objectives (as shown in Box 1), each category should ideally focus on those which are in line with the designation. Hence, according to IUCN, 75% of the total area of a protected area should be managed to achieve its primary goal (e.g. 'to conserve outstanding ecosystems and species' – category I, 'to protect natural ecosystems and use natural resources sustainably' – category VI). This goal needs to be reflected by the protected area management plans, whose conservation measures should be designed accordingly.

Despite their key role in conservation, in 2014, only 15.4 % of the global land (excluding Antarctica) and 3.4% of the global ocean area was covered by protected areas of national and international designations (except for the UNESCO biosphere reserves)[13].

Effective protected areas are only one of the tools in the toolbox of conservation actions. Other complementary measures to achieve conservation and sustainable use of biodiversity outside protected areas[14] need to be put in place as those provided by the Malawi and Addis Ababa Principles concerning the sustainable use and enhancement of biological diversity (CBD VII/11-12). These refer to other instruments, such as certification schemes for the management and use of natural resources (such as e.g. the schemes of FSC – Forest Stewardship Council for forests and MSC – Marine Stewardship Council for fisheries), subsidies and financial or market facilities for the resource users (such as HNV – high nature value farmlands), payments for ecosystem services, etc.

Moreover, to ensure the representativeness and connectivity of all conservation values, protected areas need to be designed as networks, at wide scale (national, regional, continental). One of the most well-known European networks of protected areas is Natura 2000.

13 Bertzky, 2015, pg. 66.
14 Dudley N., 2008, pg. 13.

1.3 Connectivity, conservation and ecological corridors

In the second part of the 20th century, the intensification of industrial scale clearing of forests and productive agricultural lands have dramatically disrupted ecological functions and reduced the space which is available for wildlife (Figure 3).

Fig. 3 The forest in Warwickshire, England (in black) has been fragmented along the centuries by trails, roads, agricultural lands and human settlements, from year 400 B.C. to 1960's. (Source: Primack and Patroescu, 2008).

Protected areas alone cannot counterbalance the negative effects that human activities have on ecosystems' structures and functionality. Even when effectively designed and managed, these are at risk of becoming isolated islands which are incapable to provide the ecological conditions needed for the species to thrive, including the permeability for mobility. This can threaten the viability and survival of small populations of species. To be successful in tackling these problems, a much wider, integrative and more inclusive approach, at landscape level needs to be put in place.

In this context, the concept of connectivity has become increasingly important over the past three decades in conservation and landscape planning and it is considered as 'one of the key principles for conserving biodiversity and ecosystem function'[15].

Connectivity generally refers to the ease with which organisms move between particular landscape elements, the number of connections between patches of habitat relative to the maximum number of potential connections or the interlinks of key processes within and between ecosystems[16].

15 Pulsford et al, 2015, pg. 857.
16 Lindenmayer and Fischer 2007 in Pulsford et al, 2015, pg. 853.

There are two perspectives on connectivity which need to be considered and balanced in practice:

- **Structural connectivity or habitat connectivity** – which refers to the spatial relation of contiguity or connectedness between patches of suitable natural habitats, as opposed to habitat isolation, and is measured by analysing landscape structure[17].

- **Functional connectivity** – which, broadly speaking, considers the capacity of the physical structure of habitats to satisfy species' ecological needs, and 'considers the behavioural responses of an organism to the various landscape elements'[18].

Therefore, the design of human developments (such as transport infrastructure) needs to ensure:

- an adequate spatial connectedness between habitats (structural connectivity), and their ecological functions (functional connectivity), and

- from a functional point of view: the connectedness of ecological processes across multiple scale (known as **ecological process connectivity**), the natural evolutionary processes, including genetic differentiation, and evolutionary diversification of populations, which require the movement of species over long distances, hence large-scale connectivity (known as the **evolutionary process connectivity**).

Although not synonymous, these concepts are interrelated and complementary and it is particularly important to consider their logic and the relation between them into practice. The analysis needs to be multiscale. For some species, such as birds of prey, the structural connectivity is not as critical as for large carnivores. Habitat connectivity can have relatively little impact on the overall connectedness of ecological processes[19]. Also, in some cases, the structural connectivity does not guarantee the functional connectivity unless these have the capacity to assure the ecological requirements of species. For example, logging activities covering the full width of an ecological corridor in full migration season for feeding will reduce the functional connectivity in that corridor drastically. Landscape connectivity may increase habitat connectivity for some species but not for others[20].

Ecological corridors and '**stepping stones**', as part of the establishment of wider, national and regional ecological networks, are important elements of the work of maintaining and re-establishing connectivity. One of the first and most well-known continental scale conservation corridor networks was the 'Yellowstone to Yukon' or 'Y2Y' Initiative, in 1993, which extends along more than 5,150 km of the Rocky Mountains, from Yellowstone National Park in the USA to Yukon region in NW Canada and involved more than 300 conservation organisations[21].

Ecological corridors refer to continuous or discontinuous stripes of habitats (dispersed patches between two protected sites known as 'stepping-stones') which allow the movement of species and the maintenance of ecological processes, improving the coherence of natural systems. These areas can often allow certain economic and land use activities to happen, being managed in a way which enables them to fulfil their function. Environmental impact assessment is very important in selecting the suitable economic activities and the impact mitigation measures.

17 After Tischendorf and Fahring, 2000. pg. 8.
18 Tischendorf and Fahring, 2000. pg. 8.
19 Pulsford et al, 2015, pg. 854.
20 Idem.
21 Pulsford et al, 2015, pg. 854.

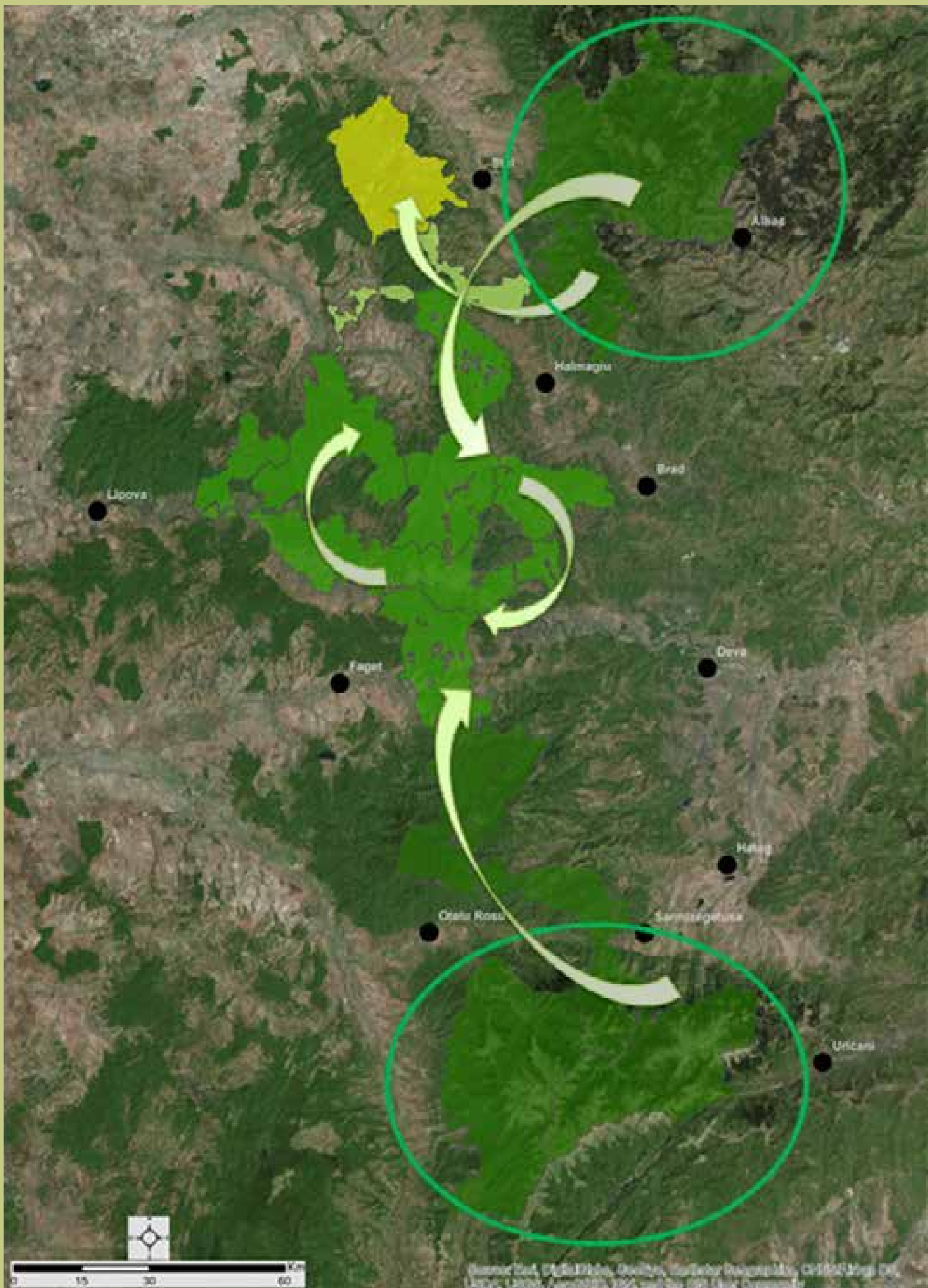
The trans-Carpathian ecological corridor Apuseni-Meridionali in Romania is a good exemplification of how ecological connectivity between protected areas can contribute to the conservation of large carnivores and other species (Box 2).

The area between the Apuseni Mountains (Western Romanian Carpathians) and the Southern Romanian Carpathians is recognized as one of the most important European ecological corridors, spanning over 150 km (N-S), a width of 20 km in average and an area of 434,935 hectares. The area includes 17 protected areas and Natura 2000 sites which preserve forest habitats, cultural landscapes and important flagship species, contributing to the sustainable development of the local communities. Most importantly, the area preserves the integrity of the narrow corridor in Mures river valley – a passage area for the large carnivores in particular, which would otherwise remain isolated due to the development of transport infrastructure and other anthropogenic disturbances (e.g. forest management, intensive agriculture, invasive species – e.g. *Amorpha fruticosa*). The local context was threatening both the landscape connectivity and the viability of the large carnivore populations, thus increasing the occurrence of human-wildlife conflicts.

A landscape conservation approach has been put in place here, driven by a wide participatory approach, in the framework of "Connect Carpathians Project" http://connectcarpathians.ro/.

The map below shows the core areas for the bear populations (the areas circled in green), the movement of bears between sites (with arrows) ecological classification of different habitats depending on their role (nucleus zones – dark green, corridors – light green, recolonization areas – yellow-green).

Box 2 The ecological corridor Apuseni-Meridionali in Romania (after Pop et al, 2017).



Box 2 Continued

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1.4 Green infrastructure

The European Commission[22] defines GI (Green Infrastructure) as a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings.

Previously, there were several other attempts to define the GI. As Naumann et al (2011)[23] indicates, the definitions of green infrastructure tend to emphasise certain characteristics, which include:

- **Critical mass** – the components of green infrastructure normally have some degree of scale, critical mass and/or connectivity;
- **Benefits to people** – their contribution to the delivery of ecosystem services;
- **Multi-functionality** – GI is normally recognised as serving a variety of functions for both people and nature;
- **Substitutability with grey infrastructure** – GI has the potential to replace some of the functions that would otherwise be served by man-made or "grey infrastructure" (e.g. flood defences, water treatment, pollution control, recreational infrastructure);
- **Co-ordinated interventions** – GI is often defined by human interventions which aim to identify, map, protect, restore, enhance or maintain it.

A very simple interpretation is that GI represents everything which is not part of the Grey (or built) Infrastructure (European Commission, Towards a Green Infrastructure for Europe, Developing new concepts for integration of Natura 2000 network into a broader countryside).

The GI network constituents are those physical features in which and through which natural functions and processes are sustained[24]. Such physical features may include:

- On the local scale: biodiversity-rich parks, gardens, green roofs, ponds, streams, woods, hedgerows, meadows, restored brownfield sites, coastal sand-dunes and other features if they deliver multiple ecosystem services, or connecting elements like green bridges and fish ladders;
- On the regional or national scale: large protected natural areas, large lakes, river basins, high-nature value forests, extensive pasture, low-intensity agricultural areas, extensive dune systems, coastal lagoons etc.;
- On the EU scale: trans-boundary features such as international river basins, forests and mountain ranges.

22 Green Infrastructure (GI) – Enhancing Europe's Natural Capital, EU Communication 6.5.2013.
23 Naumann, Sandra, McKenna Davis, Timo Kaphengst, Mav Pieterse and Matt Rayment, 2011, Design, implementation and cost elements of Green Infrastructure projects. Final report to the European Commission, DG Environment.
24 Technical information on Green Infrastructure (GI), Accompanying the EU Communication 6.5.2013.

The role of the GI is to deliver ecosystems' services and benefits, among which: biodiversity protection, climate change adaptation and mitigation, water management, food production and security, recreation and health, culture and well-being communities.

The Environment DG has identified the following potential components of green infrastructure (European Commission, 2010):

- **areas with a high value for biodiversity in protected areas** in a coherent network, such as Natura 2000 sites with their buffer zones;
- **healthy ecosystems and areas of high nature value outside protected areas**, such as floodplain areas, wetlands, extensive grasslands, coastal areas, natural forests;
- **natural landscape features** such as small water courses, forest patches and hedgerows, which can act as eco-corridors or steppingstone for wildlife;
- **restored habitat patches** that have been created with specific species in mind, e.g. to help expand the size of a protected area, increase foraging areas, breeding or resting for these species and assist in their migration/dispersal;
- **artificial features such as eco-ducts or eco-bridges**, or permeable soil covers that are designed to assist species movement across insurmountable barriers (such as motorways or paved areas);
- **multifunctional zone**s where land uses that help maintain or restore healthy ecosystems are favoured over other incompatible activities;
- **areas where measures are implemented** to improve the general ecological quality and permeability of the landscape;
- **urban elements** such as biodiversity-rich parks, permeable soil cover, green walls and green roofs, hosting biodiversity and allowing ecosystems to function and deliver their services; this should also connect urban, peri-urban and rural areas.

The GI includes the ecological networks (areas covered by a wide range of conservation measures, from a single eco-duct to intercontinental interconnected networks of protected and non-protected areas) but also includes the urban elements that are not part of ecological networks. Connectivity represents an important function of GI but that does not mean that all physical elements have to be connected to each other; some physical components of the GI are only important for their function of delivering benefits (natural goods and services). Natura 2000 network represents one of the core elements of the GI.

Green Infrastructure is developed on the principle that natural processes and natural solutions offers more benefits to human society than grey infrastructure which is in most of the cases built for single purposes (e.g. channelized rivers have the only purpose of preventing flooding while flood plains can provide multiple other benefits to local communities and biodiversity).

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Ecological restoration of natural functions and processes, along conservation, plays a crucial role in maintaining and expanding the GI. The EU Biodiversity Strategy to 2020 established six specific targets which are designed to achieve the headline target of halting biodiversity loss and the degradation of ecosystem services. Target 2 of the Strategy relates to the maintenance and restoration of ecosystems and their services: "by 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems". In 2015 the European Commission[25] notes that "progress has been made on policy and knowledge improvement actions under this target, and some restoration activities have taken place in the Member States. However, this has not yet halted the trend of degradation of ecosystems and services. National and regional frameworks to promote restoration and green infrastructure need to be developed and implemented. A lot remains to be done to halt the loss of ordinary biodiversity outside the Natura 2000 network".

The overall objective of the EU's GI related policy ambitions is to have an EU network of green infrastructure in optimal condition to deliver essential ecosystem services throughout Europe, including the potential introduction of a Trans-European Network for Green Infrastructure (TEN-G)[26].

1.5 Ensuring connectivity at landscape scale – Key pre-requisites

Fulfilling the connectivity requirements and delivering wide scale, integrative approaches to conservation require complex knowledge and consideration of multiple social aspects. The elements presented below represent key preconditions for the success of landscape conservation initiatives.

(1) Evidence-based, scientific approaches and the integration of local knowledge

The establishment and the appropriate management of ecological corridors, the development of wide and well-connected protected area networks, the environmental impact analysis, the design of conservation and impact mitigation measures, all need to be, as far as possible, based on the best available knowledge, scientific methods and scientific evidence. Also, scientific approaches play an important role in innovation for the improvement of technical solutions available to practitioners working on connectivity issues. To this purpose, investments need to be made in applicative research, which have to include the local traditional knowledge, if applicable. An important element for the evidence-based approach is the availability of data and information, which is also linked to the need to have well-designed monitoring systems in place, open data and transparency. Moreover, scientific evidence needs to be integrated into policy and decision making at all levels.

25 The Mid-Term review of the EU Biodiversity Strategy to 2020, Report from the Commission, 2.10.2015.
26 European Commission, Supporting the Implementation of Green Infrastructure - Final Report, May 2016.

(2) Appropriate enabling environment

Getting out of the protected area "box" and developing coherent, functional systems for the conservation of nature (with its full range of values and functions, including biodiversity) poses great challenges, if ever possible, if not stipulated in the regulatory framework. Concepts as 'connectivity', 'ecological corridors', 'green infrastructure' need to be integrated in the national regulations (as e.g. the national law for protected areas in Romania) in such a way to allow their adoption into practice (by e.g. removing any contradictory provisions, gaps, overlaps). The sectoral legislation needs to be aligned in such a way to allow nature resource management, spatial planning and territorial development at all levels to integrate the concept and vision on connectivity in their policies, strategies and operational plans. It is equally important to have an appropriate institutional and governance setting, including institutional and organisational networks (either formal or informal), to allow for an integrative and collaborative approach to be put in place.

(3) Technical solutions and norms

Legal provisions need to be accompanied by technical and methodological norms (e.g. for the assessment of connectivity gaps and identification of new corridors, the assessment of their suitability), which need to be based on a sound scientific, hence practical approach. The approach to ensuring connectivity into practice needs to be adaptable but coherent (at national level and across countries) and recommendations for the best practice technical solutions need to be available to all practitioners.

(4) Inter-sectoral collaboration and participatory processes

Dealing with the complexities involved in the landscape scale approaches, crossing administrative borders is not possible without a real and meaningful involvement of all stakeholders, including the local communities. In addition to collaborative arrangement for the inter-institutional collaboration, participatory approaches need to allow for the various local interests to be represented in the decision-making process.

2 Legal framework for SEA/ EIA

2.1. Environmental Assessment – general considerations

According to the European Commission[27], environmental assessment is a procedure that ensures that the environmental implications of decisions are taken into account before the decisions are made. Environmental assessment can be undertaken for **individual projects**, such as a dam, motorway, airport or factory, on the basis of Directive 2011/92/EU (known as "Environmental Impact Assessment" – EIA Directive), or for **public plans or programmes** on the basis of Directive 2001/42/EC (known as "Strategic Environmental Assessment" – SEA Directive). A common principle of both Directives is to ensure that plans, programmes and projects likely to have significant effects on the environment are made subject to an environmental assessment, prior to their approval. Consultation with the public is a key feature of environmental assessment procedures.

The Directives on Environmental Assessment aim to provide a high level of protection of the environment and contribute to the integration of environmental considerations into the preparation of projects, plans and programs with a view to reduce their environmental impact. They ensure public participation in decision-making and thereby strengthen the quality of decisions. Hence, the Directives on Environmental Assessment are crucial tools for sustainable development.

Impact assessment was the main process adopted worldwide (originated in 1969, The National Environmental Policy Act, USA). Strategic Environmental Assessment (SEA) subsequently emerged as a response to the need to identify potential negative environmental impacts early in the planning process. It is considered that the SEA offers more guarantees for sustainable development due to its pro-active strategic character (it has the ability to shape strategies, plans and programs) compared to the EIA that is traditionally reactive (analyses a previously defined project) (Goodland and Tillman, 1995; Partidario, 1996; Bailey & Renton, 1997).

SEA has the capacity to better identify the potential of the cumulative impact and to avoid it by intervening in the types of projects that are promoted by strategies and plans. Therefore, it is important to note that while the main question that guides the EIA process is "how it is intended to be done", in the SEA process, the questions are: why? what? where?

The main differences between SEA and EIA are presented in Table 1 and discussed in the following.

27 http://ec.europa.eu/environment/eia/index_en.htm

2

Table 1

Main difference between SEA and EIA

Stage	Planning	
Environmental assessment process	**SEA**	**AA**
Subject of assessment	Plans, Programs, Strategies	
Perspective	Long term	
Adaptive management	≈ 4-6 years or more	
Uncertainty	Large	Average
Main source of data	Statistics, State of Environment Reports	EU/national data on N2k network
Filed data collection	Not necessary	Not necessary / difficult or impossible depending on the plan's scale
Main output	Environmental Report	AA Report
Main focus	Achieving environmental objectives by avoiding significant effects	Coherence of Natura 2000 network
Keywords	Alternatives, avoidance of effects /impacts	Alternatives, avoidance of effects /impacts on N2k
Assessment of effects and impacts	Qualitatively	Mainly qualitatively
Impact significance	Thresholds related to environmental objectives	Thresholds related to N2k management objectives
Monitoring	Statistics and subsequent projects' generated data	EU/national data on N2k network

Project design	
AA	**EIA**
Feasibility studies, Technical projects	
Short & medium term	
Preferably yearly	
Low	
N2k Management Plans + field data collection for the project	Literature, State of Environment Reports + field data collection for the project
Essential (preferably minimum 4 consecutive seasons)	
AA Report	EIA/ESIA Report
Maintain conservation status of N2k habitats & species	Avoid / reduce significant impacts
Mitigation and compensation measures	Mitigation of impacts
Quantitative	Mainly quantitative
Thresholds relates to the deterioration of conservation status of N2k habitats & species	Thresholds defined by environment sensitivity and magnitude of changes. Often rely on legislation and norms
Field data monitoring (project's impact area) + data provided by N2k sites	Field data monitoring (project's impact area) + data provided by competent authorities

2.2. What is SEA?

2

This section presents the goals, objectives and the legal context for SEA and clarifies when the procedure needs to be applied.

The Strategic Environmental Assessment (SEA) process is governed in the European Union by Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive). The SEA Directive should have been transposed in the national legislation of the Member States by July 2004.

According to the Directive, its goal "is to provide for a high level of protection of the environment and contribute to the integration of environmental considerations into the preparation and adoption of plans and programs with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans and programs which are likely to have significant effects on the environment".

SEA originated after the environmental impact assessment (EIA), with inputs from biophysical planning and policy analysis. The overall purpose of SEA was to ensure that environmental issues would be adequately considered at early stages of development policy-making and planning (broadly considered). SEA relates to highly complex issues, at multiple spatial and temporal scales, engaging a variety of stakeholders and consequently, multiple perspectives and expectations (Partidario, 2012).

SEA, in a strategic thinking approach, has three very specific objectives (Partidario, 2012):

1. Encourage environmental and sustainability integration (including biophysical, social, institutional and economic aspects), setting enabling conditions to nest future development proposals;
2. Add value to decision-making, discussing opportunities and risks of development options and turning problems into opportunities;
3. Change minds and create a strategic culture in decision-making, promoting institutional cooperation and dialogues, avoiding conflicts.

Through these objectives, SEA can contribute to (Partidario, 2012):

- Ensure a strategic, systemic and broad perspective in relation to environmental issues within a sustainability framework;
- Contribute to identifying, selecting and discussing major development options towards more sustainable decisions (intertwining biophysical, social, institutional and economic issues);
- Detect strategic opportunities and risks in the options under analysis and facilitate the consideration of cumulative processes;
- Suggest follow-up programmes, through strategic management and monitoring;
- Ensure participative and transparent processes that engage all relevant stakeholders through dialogues, and foster more integrated decisions in relation to the array of relevant points of view.

Due to its systematic and participatory approach, SEA is particularly relevant in the context of connectivity projects for protected areas, and in for the integration of protected areas into wider landscapes and seascapes[28].

The SEA Directive applies to a wide range of **public plans and programs** (e.g. on land use, transport, energy, waste, agriculture, etc.)[29]. The SEA Directive does not refer to policies. Plans and programmes in the sense of the SEA Directive must be **prepared or adopted by an authority** (at national, regional or local level) and be **required by legislative, regulatory or administrative provisions**.

An SEA is **mandatory** for plans/programmes which:

- are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste/water management, telecommunications, tourism, town & country planning or land use and which set the framework for future development consent of projects listed in the EIA Directive;

Or

- have been determined to require an assessment under the Habitats Directive.

The SEA Directive does not have a list of plans/programs similar to the EIA. Broadly speaking, for the plans/programs not included above, the Member States have to carry out a screening procedure to determine whether the plans/programmes are likely to have significant environmental effects. If there are significant effects, an SEA is needed. The screening procedure is based on criteria set out in Annex II of the SEA Directive.

The SEA procedure can be summarized as follows: an environmental report is prepared in which the likely significant effects on the environment and the reasonable alternatives of the proposed plan or program are identified. The public and the environmental authorities are informed and consulted on the draft plan or programme and the environmental report prepared. As regards plans and programms which are likely to have significant effects on the environment in another Member State, the Member State in whose territory the plan or programme is being prepared must consult the other Member State(s). On this issue, the SEA Directive follows the general approach taken by the SEA Protocol to the UN ECE Convention on Environmental Impact Assessment in a Transboundary Context.

The environmental report and the results of the consultations are taken into account before adoption. Once the plan or programme is adopted, the environmental authorities and the public are informed, and the relevant information is made available to them. In order to identify unforeseen adverse effects at an early stage, significant environmental effects of the plan or program are to be monitored.

SEA entry point should be as early as possible in the decision process, ideally with visioning and the establishment of strategic objectives, before strategic options are identified, and long before proposals are put forward (Partidario, 2012).

28 Mathur et al. 2015, Ervin et al. 2010
29 http://ec.europa.eu/environment/eia/sea-legalcontext.htm

2.3. What is EIA?

2

This section presents the goals, objectives and the legal context for EIA and clarifies when the procedure needs to be applied.

The Environmental Impact Assessment (EIA) process is governed in the European Union by Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive).

The development of the EIA concept took place in the 1960s with the onset of the environmental movement in the United States (IAIA, 2009; Felleman, 2010). From a legal point of view, the EIA bases were put in place in 1969 in the United States through the adoption of the National Environmental Policy Act (NEPA). The first EIA Directive was adopted in the EU in 1985 (Directive 85/337/EEC). The EIA Directive of 1985 has been amended three times, in 1997, in 2003 and in 2009. The initial Directive and its amendments have been codified by Directive 2011/92/EU. Directive 2011/92/EU has been amended in 2014 by Directive 2014/52/EU, which introduced new elements in the EIA procedure, e.g.: one-stop shop for assessments deriving from the EIA and Nature Directives, quality control mechanism, mandatory assessment of reasonable alternatives, monitoring, broader scope of the EIA covering new issues (climate change, biodiversity, risks prevention), as well as justification of screening/EIA decisions.

The goal of the EIA Directive is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for the environmental impact assessment of projects.

The main objective of the 2014 amendments was to simplify the rules for assessing the potential effects of projects on the environment. The amending EIA Directive is in line with the drive for smarter regulation, as it reduces the administrative burden. It also improves the level of environmental protection, with a view to making business decisions on public and private investments more sound, more predictable and sustainable in the longer term. The new approach pays greater attention to threats and challenges that have emerged since the original rules came into force some 25 years ago. This means more attention to areas like resource efficiency, climate change and disaster prevention, which are now better reflected in the assessment process. The main amendments are as follows[30]:

- Member States now have a mandate to **simplify their different environmental assessment procedures;**
- **Timeframes** are introduced for the different stages of environmental assessments: screening decisions should be taken within 90 days (although extensions are possible) and public consultations should last at least 30 days. Members States also need to ensure that final decisions are taken within a "reasonable period of time";
- The **screening** procedure, determining whether an EIA is required, is simplified. Decisions must be duly motivated in the light of the updated screening criteria;
- **EIA reports** are to be made more understandable for the public, especially as regards assessments of the current state of the environment and alternatives to the proposal in question;

30 http://ec.europa.eu/environment/eia/review.htm

- The **quality and the content of the reports** will be improved. Competent authorities will also need to prove their objectivity to avoid **conflicts of interest**;

- The grounds for **development consent decisions** must be clear and more transparent for the public. Member States may also set timeframes for the validity of any reasoned conclusions or opinions issued as part of the EIA procedure;

- If projects do entail significant adverse effects on the environment, developers will be obliged to do the necessary to avoid, prevent or reduce such effects. These projects will need to be **monitored** using procedures determined by the Member States. Existing monitoring arrangements may be used to avoid duplication of monitoring and unnecessary costs.

The EIA Directive applies to a wide range of public and private projects, which are defined in Annexes I and II:

- Mandatory EIA: all projects listed in Annex I are considered as having significant effects on the environment and require an EIA (e.g. long-distance railway lines, motorways and express roads, airports with a basic runway length ≥ 2100 m, installations for the disposal of hazardous waste, installations for the disposal of non-hazardous waste > 100 tonnes/day, wastewater treatment plants > 150.000 p.e.);

- Discretion of Member States (screening): for projects listed in Annex II, the national authorities have to decide whether an EIA is needed. This is done by the "screening procedure", which determines the effects of projects on the basis of thresholds/criteria or a case by case examination. However, the national authorities must take into account the criteria laid down in Annex III. The projects listed in Annex II are in general those not included in Annex I (railways, roads waste disposal installations, waste water treatment plants), but also other types such as urban development projects, flood-relief works, changes of Annex I and II existing projects etc.).

According to the European Commission[31], the EIA procedure can be summarized as follows: the developer may request the competent authority to say what should be covered by the EIA information to be provided by the developer (scoping stage); the developer must provide information on the environmental impact (EIA report – Annex IV); the environmental authorities and the public (and affected Member States) must be informed and consulted; the competent authority decides, taken into consideration the results of consultations. The public is informed of the decision afterwards and can challenge the decision before the courts.

According to the EIA Directive, the environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors: (a) human beings, fauna and flora population and human health; (b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC; (c) land, soil, water, air and climate and landscape; (d) material assets, cultural heritage and the landscape; (e) the interaction between the factors referred to in points (a) to (d). The effects on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned.

31 http://ec.europa.eu/environment/eia/eia-legalcontext.htm

2.4 Which are the procedural stages for EIA? Other procedures for impact assessment (SEA)

The procedural stages involved in the EIA procedure are represented by (Banfi et al., 2017):

1. Screening. The 'Screening stage' ascertains whether the Project's effects on the environment are expected to be significant, i.e. the Project is 'screened' to determine whether an EIA is necessary. Projects listed in Annex I to the Directive are automatically subjected to an EIA because their environmental effects are presumed to be significant. Projects listed in Annex II to the Directive require a determination to be made about their likely significant environmental effects. The Member State's Competent Authority make that determination through either a (i) case-by-case examination or (ii) set thresholds or criteria;
2. Scoping. The 'Scoping stage' provides the opportunity for Developers to ask competent authorities about the extent of the information required to make an informed decision about the Project and its effects. This step involves the assessment and determination, or 'Scoping', of the amount of information and analysis that authorities will need;
3. Preparation of the EIA Report. During the third stage the information relating to Project significant effects on the environment is gathered.

These three stages are complemented by specific steps in the EIA process, presented in the figure below, which sets out an overview of the stages and steps usually taken when completing an EIA. Implementation arrangements for these stages may vary slightly between Member States.

According to the preamble of the EIA Directive, "Effective public participation in the taking of decisions enables the public to express, and the decision-maker to take account of, opinions and concerns which may be relevant to those decisions, thereby increasing the accountability and transparency of the decision-making process and contributing to public awareness of environmental issues and support for the decisions taken. Participation, including participation by associations, organisations and groups, in particular non-governmental organisations promoting environmental protection, should accordingly be fostered, including, inter alia, by promoting environmental education of the public."

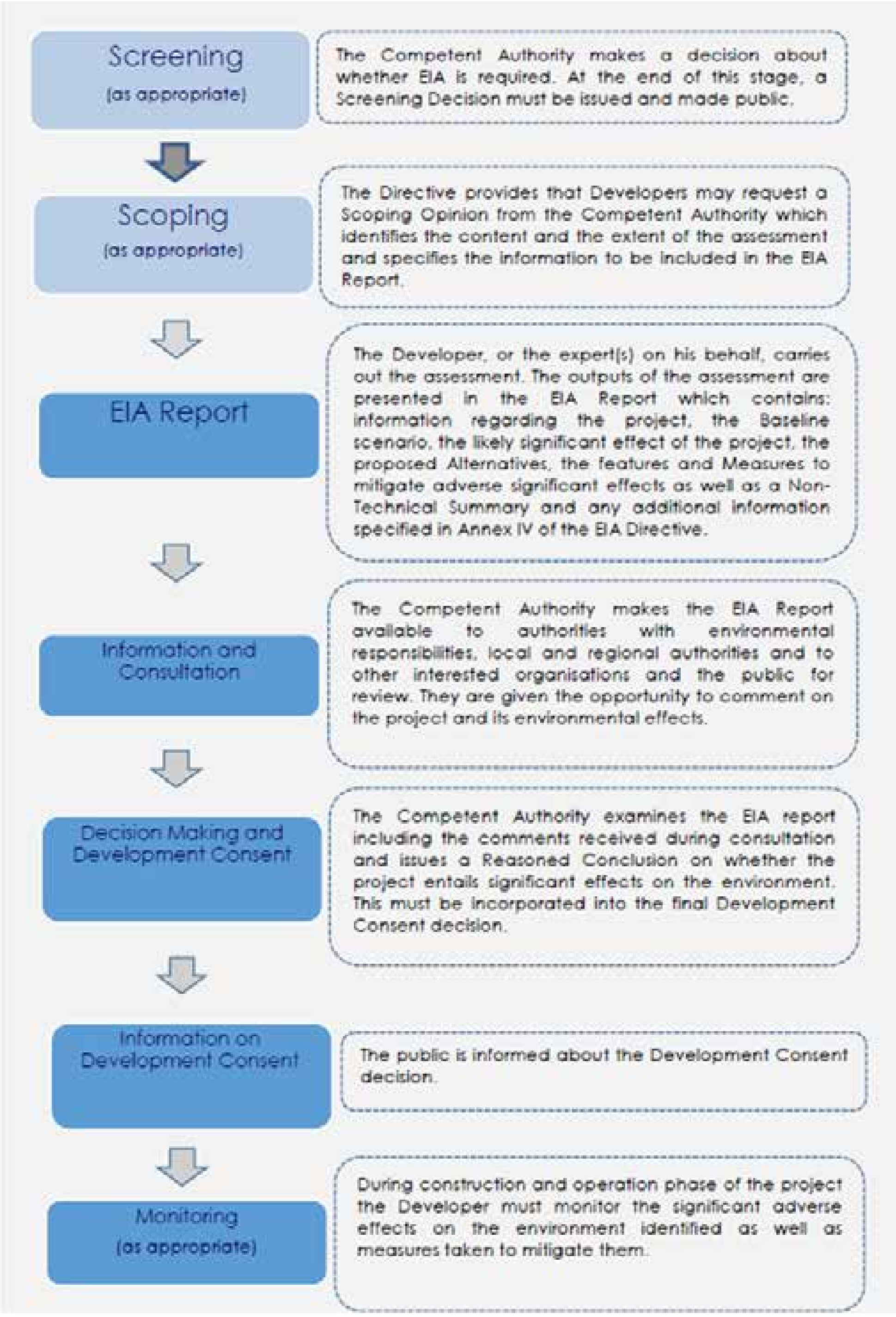

Fig. 4 Stages and steps usually taken when completing an EIA (source: Banfi et al., 2017)

The EIA Directive requires consultations with three different groups on the content of the EIA Report: the public concerned must always be consulted; public authorities must be consulted when they are likely to be concerned; and other Member States for Projects with transboundary impacts. Consultations include both the provision of information and the possibility to effectively prepare and participate in decision-making. The 2014 amendments included significant changes to consultations and highlighted time-frames concerning consultations (Banfi et al., 2017):

- The Directive now differentiates between information and participation;
- A minimum of 30 days for public consultation on the EIA Report is required. The Directive expressly refers to local or regional authorities as authorities likely to be concerned;
- The provisions on public consultation require 'reasonable time-frames' for each of the different phases of consultation with regard to both the public and public authorities. The notion of reasonable timeframes should be refined at the national level, depending on the Project at hand, in order to enhance administrative certainty and to reduce delays;
- The Directive now envisages information on public consultation to be made electronically available.

Projects are often subject to several environmental assessment procedures. In cases in which Projects are likely to have significant effects on a site protected under the Habitats and Birds Directives, the assessment of effects of Projects on biodiversity will be carried out as part of an Appropriate Assessment according to Article 6(3) of the Habitats Directive. In the 2014 amendments to the EIA Directive, Article 2(3) requires either a coordinated or joint procedure for Projects falling under the scope of both the EIA and the Birds/Habitats Directives, according to procedures specified in the European Commission guidance on streamlining environmental assessments under Article 2(3) of the EIA Directive. According to this guidance, experience shows that the joint procedure involving both EIA and AA ensures better assessment quality, and it is the recommended way to conduct the two assessments.

The scope of the AA and the EIA is different – the EIA should consider all significant environmental effects, while the AA focuses on the conservation objectives and the integrity of the Natura 2000 site in question; however, some of the information collected for one assessment can be used for the other.

Given the differences in the scope of the EIA and AA, the information relevant to the AA and the relevant conclusions with regard to it must be readily identifiable in the EIA report. Information gathered in the course of the EIA procedure cannot substitute the AA information, as neither procedure overrides the other.

Unlike the EIA Directive, Article 6(3) of the Habitats Directive stipulates that the results of the 'appropriate assessment' are binding for the development consent of a project. This means that the competent authorities cannot authorise the project unless the 'appropriate assessment' (AA) concludes that it will not adversely affect the integrity of the Natura 2000 site concerned. According to Art 6(4) of the Habitats Directive, if the 'appropriate assessment' concludes that adverse effects cannot be ruled out, authorisation can still be given, provided that specific strict conditions apply (there are no alternative solutions, there are imperative reasons for overriding public interest, compensation measures for damage have been found that will ensure the Natura 2000 network remains coherent). The Commission must be informed in such a case, and, under specific circumstances, give an opinion.

It is important to bear in mind that EIAs must assess impacts on biodiversity even in cases in which certain Projects do not have impact upon a Natura 2000 site.

2.5 How long should the process take?

Pursuant to the principle of subsidiarity, the EIA Directive leaves the precise determination of the time-frames applicable to consultations to Member States. Projects requiring an EIA differ in size, scale, location and complexity, and therefore setting standard and explicit time limits applicable to all Projects for the different stages, may not be considered to be appropriate (Banfi et al., 2017).

The average duration of an EIA procedure was estimated to be 11.3 months, but figures range from 5 to 27 months. The average time taken to reach the final EIA decision after completion of the consultations was 2 months (GHK, 2010, Collection of information and data to support the IA study of the review of the EIA Directive). According to the Compliance Committee of the Aarhus Convention: Lithuania ACCC/2006/16; ECE/MP.PP/2008/5/Add.6, 4 April 2008, para. 69, 'A time frame which may be reasonable for a small simple Project with only local impact may well not be reasonable in case of a major complex Project.' (Banfi et al., 2017).

A delicate aspect for the EIA and SEA processes is related to the duration of the field investigations. Due to the fact that every plan, programme or project has its own characteristics, related to its provisions, extent and location, it is very difficult to set general requirements. It was estimated that a project for road infrastructure will require at least 18 months for the EIA procedure, including at least 12 months of field observations (Nistorescu et al, 2016, Best Practice Guideline for Road Infrastructure, elaborated within the project "Natura 2000 and Rural Development in Romania" implemented by WWF Danube-Carpathian Programme Romania and its partners WWF Switzerland, Milvus Group Association, Ecotur and ProPark Foundation).

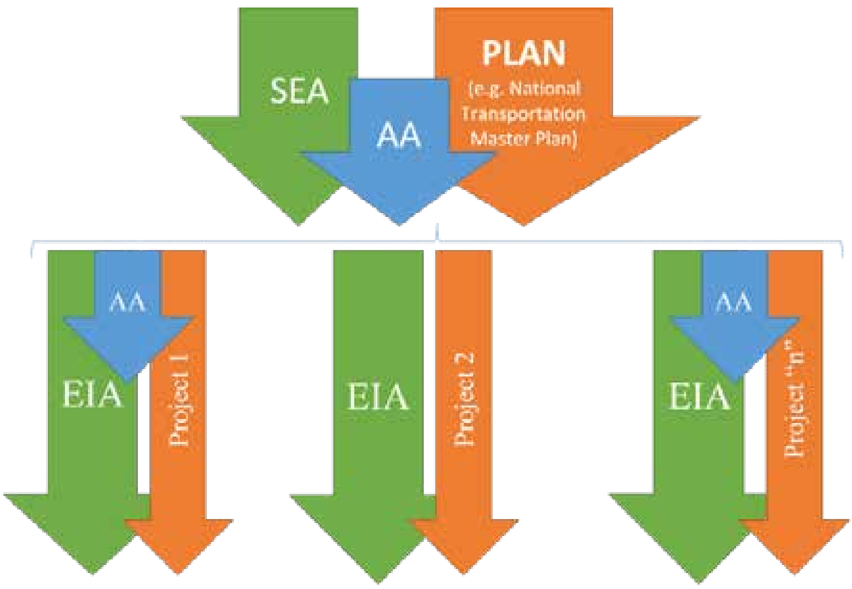

Fig. 5 SEA /AA process for Plans and Programs is guiding the EIA /AA processes for individual projects.

3 Putting SEA and EIA to work to ensure biodiversity conservation and ecological connectivity

3.1 How is SEA and EIA working for conservation

The SEA Directive contains a number of starting principles that provide a useful basis for considering biodiversity in SEA. 'Biodiversity' is specified in the list of factors to be assessed, as well as 'fauna' and 'flora'.

As previously presented, during the SEA procedure an environmental report is prepared in which the likely significant effects on the environment and the reasonable alternatives of the proposed plan or program are identified. Annex I(d) of the SEA Directive requires the environmental report to consider any existing environmental problem which are relevant to the PP including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Habitats Directive) and Birds Directive. Annex I(f) requires the environmental report to consider the effects on 'biodiversity', 'fauna' and 'flora'.

The recitals to the Directive acknowledge that "the Convention on Biological Diversity requires Parties to integrate as far as possible and as appropriate the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans and programmes".

Annex I of the SEA Directive requires the environmental report to consider environmental objectives at international, EU and Member State levels.

The EIA Directive also contains a number of principles that provide the basis for considering biodiversity in EIA. The revised EIA Directive refers now explicitly to 'biodiversity', unlike its previous version.

The recitals to the Directive clearly link the EIA process with the Convention on Biological Diversity and the EU 2020 Biodiversity Strategy: "The United Nations Convention on Biological Diversity ('the Convention'), to which the Union is party pursuant to Council Decision 93/626/EEC(9), requires assessment, as far as possible and as appropriate, of the significant adverse effects of projects on biological diversity, which is defined in Article 2 of the Convention, with a view to avoiding or minimising such effects. Such prior assessment of those effects should contribute to attaining the Union headline target adopted by the European Council in its conclusions of 25-26 March 2010 of halting biodiversity loss and the degradation of ecosystem services by 2020 and restoring them where feasible".

The revised EIA Directive includes the following references to biodiversity:

- Article 3: The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors: [...] (b) **biodiversity**, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC [...];
- Annex II A – Information to be provided by the Developer on the projects listed in Annex II: 3. A description of any likely significant effects, to the extent of the information available on such effects, of the project on the environment resulting from: (a) the expected residues and emissions and the production of waste, where relevant; (b) the use of natural resources, in particular soil, land, water and **biodiversity**;

3

- Annex III – Criteria to determine whether the projects listed in Annex II should be subject to an Environmental Impact Assessment:

  1. Characteristics of projects: The characteristics of projects must be considered, with particular regards to: […] (c) the use of natural resources, in particular land, soil, water and **biodiversity** […];

  2. Location of projects: The environmental sensitivity of geographical areas likely to be affected by projects must be considered, with particular regards to: […] (b) the relative abundance, availability, quality and regenerative capacity of natural resources (including soil, land, water and **biodiversity**) in the area and its underground; (c) the absorption capacity of the natural environment, paying particular attention to the following areas: (i) wetlands, riparian areas, river mouths; (ii) coastal zones and the marine environment; (iii) mountain and forest areas; (iv) nature reserves and parks; (v) areas classified or protected under national legislation; Natura 2000 areas designated by Member States pursuant to Directive 92/43/EEC and Directive 2009/147/EC […];
- Annex IV – Information for the Environmental Impact Assessment report:
- Description of the project, including in particular: […] (c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and **biodiversity**) used;
- A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, **biodiversity** (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydro-morphological changes, quantity and quality), […];
- A description of the likely significant effects of the project on the environment resulting from, inter alia: […] (b) the use of natural resources, in particular land, soil, water and **biodiversity**, considering as far as possible the sustainable availability of these resources […].

Biodiversity is the subjects of a many pieces of EU legislation, policies and strategies, including binding targets for Member States.

The Natura 2000 network of protected areas, created on the basis of the Habitats and the Birds Directives, is the backbone of the EU's biodiversity policy. However, it is important to remember that the concept of biodiversity is not limited to the Natura 2000 network; it is much broader (European Commission, 2013, Guidance on Integrating Climate Change and Biodiversity into Strategic Environmental Assessment and Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment):

- The Birds and Habitats Directives also cover species and habitats outside Natura 2000 sites;
- Under Article 6(3) of the Habitats Directive, an 'appropriate assessment' is required for any plan or project likely to have a significant effect on Natura 2000 site, even if it is implemented outside these sites;
- Article 10 of the Habitats Directive recognises the importance of ensuring the ecological coherence of the Natura 2000 sites;
- Finally, the **EU 2020 Biodiversity Strategy** as endorsed by the Council and European Parliament covers the whole territory and emphasises the benefits that ecosystems give us. It provides a package of actions needed to halt the loss of biodiversity and the degradation of ecosystem services by 2020 and to restore them so far as feasible.

Therefore, the SEAs and EIAs should look at all these aspects of biodiversity and the quality of surroundings. Biodiversity has been a core part of EU policy for over 20 years. Nevertheless, the overall trends are still negative and recent policy has been considered ineffective. This is shown by the EU's failure to achieve the target of halting biodiversity loss by 2010. In 2011, the European Commission adopted a new EU 2020 Biodiversity Strategy with its 2020 headline target — 'Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.' Target 2 of this Strategy (restoring at least 15% of degraded ecosystems) is broken down into accompanying actions, two of which seek to influence planning practices: set priorities to restore and promote the use of green infrastructure (Action 6) and ensure 'no-net-loss' of biodiversity and ecosystem services (Action 7). These provide a good policy basis for preserving ecosystem services and the use of ecosystem-based approaches and green infrastructure in SEAs to support PPs and in EIAs to support projects (European Commission, 2013).

It is very important to identify the key issues from the biodiversity perspective early in the SEA and EIA processes, when many options are still open, to ensure that they are assessed effectively throughout the process. It is necessary to consider not only the impacts of the plan, program or project on biodiversity but also the impact of the natural environment on the plan, program or project.

3

3.2 How can SEA and EIA contribute to maintaining ecological connectivity?

Why is SEA and EIA essential for maintaining ecological connectivity

SEA and EIA represent the two major pillars for the development of sustainable plans and projects. Both for SEA and EIA processes, one of the main concerns is to address habitat fragmentation focusing on maintaining the level of interconnectivity among ecosystems which allow them to sustain the natural processes.

Both SEA and EIA Directives do not address directly the GI and ecological connectivity but contains most of the requirements needed to do so. For example, in the EIA Directive the GI or the ecological corridors are not mentioned in the Annex III (selection criteria to determine if projects listed in Annex II should be subject to an environmental impact assessment) but the existing criteria, particularly the ones related to the "location of projects" (e.g. "the relative abundance, availability, quality and regenerative capacity of natural resources" or "the absorption capacity of the natural environment") allows for the consideration of site sensitivity and natural processes in the assessments of plans and projects.

Both procedures involve public participation and therefore they are extremely useful in debating the options regarding the socio-economic developments. SEA and EIA have also a technical component which constitutes a powerful instrument for adapting the proposed plans and projects. SEA process plays a crucial role in selecting the alternatives, particularly when the process is conducted at broader scales (national or regional). By doing so, SEA can contribute significantly to avoiding the significant impacts on green infrastructure and particularly on ecological connectivity by supporting alternatives which avoid sensitive areas or have the capacity to maintain a good level of permeability.

EIA, as a project-oriented process has also a good capacity to avoid significant impacts and also to contribute to the reduction of impacts when avoidance cannot be achieved at a satisfactory level. The best example is in the case of road infrastructure: large structures like bridges, viaducts or tunnels represent an ideal option to maintain ecological connectivity but when such constructions cannot be implemented, measures to reduce the impact of connectivity fragmentation have to be implemented (eco-ducts, green bridges or underpasses).

The key principles of using SEA and EIA to warrant ecological connectivity are:

1. Apply Ecosystem Based Management: a correct assessment of impacts should rely on the identification of ecosystems and their key processes. The intent is to maintain those spatial and temporal characteristics of ecosystems such that component species and ecological processes can be sustained and human well-being supported and improved[32];
2. No-net-loss of biodiversity and ecosystem services. The principle requires that damages resulting from human activities must be balanced by at least equivalent gains;
3. Assure interpenetration of grey and green infrastructure: development of grey infrastructure should not interrupt the connectivity of GI;
4. Apply hierarchy of interventions: avoidance is preferable to mitigation and compensation is the last option. Avoidance of significant impacts cannot be achieved without taking in consideration all feasible alternatives of a plan/project;
5. Apply adaptive management. As a formal response to the presence of uncertainty and risk, adaptive management is a systematic learning process that formally plans and monitors the outcomes of decisions to improve our ability to better manage natural resources given uncertainty[33].

The main methodological steps[34] to assure the implementation of the above-mentioned principles for road infrastructure plans/projects are:

1. Identification of ecosystems and their key processes (which might be affected by the implementation of proposed plan/project) based on an up-to-date and comprehensive database. Identification of critical connectivity areas should be an important task along the identification of other highly sensitive components like wilderness areas or critical habitats;
2. Identification of existing dysfunctionalities (existing pressures) in terms of GI carrying capacity and connectivity;
3. Analysis of a large spectrum of alternatives (including different locations and different constructive options);
4. Assessment of potential impacts for all feasible alternatives which has the potential to sustain and develop the GI (mainly the ecological connectivity);
5. Selection of the alternative(s) with the highest degree of avoidance for significant impacts;
6. Prediction of the impacts and quantification of all forms of impacts, particularly the ones leading to habitat loss and habitat fragmentation;
7. Defining all the mitigation measures required in order to reduce significant impacts on GI taking also, in consideration "historical" and cumulative impacts;
8. Implementation of compensatory measures if this is the only way to reduce the significant impacts on Natura 2000 sites. All mitigation or compensatory measures proposing the restoration, rehabilitation or creation of natural areas should primarily be focused on regaining/maintaining the ecological connectivity;
9. Implementation of a monitoring program during construction and operation in order to assess the efficiency of mitigation measures, to quantify the residual impacts and to propose and implement possible corrective measures.

32 Coast Information Team, 2004, Ecosystem-Based Management Framework, https://www.for.gov.bc.ca/tasb/slrp/citbc/c-ebmf-fin-03May04.pdf
33 Vold, T. and D.A. Buffett (eds.), 2008, Ecological Concepts, Principles and Applications to Conservation, BC. 36 pp. Available at: www.biodiversitybc.org
34 Not identical with procedural steps of EIA/SEA

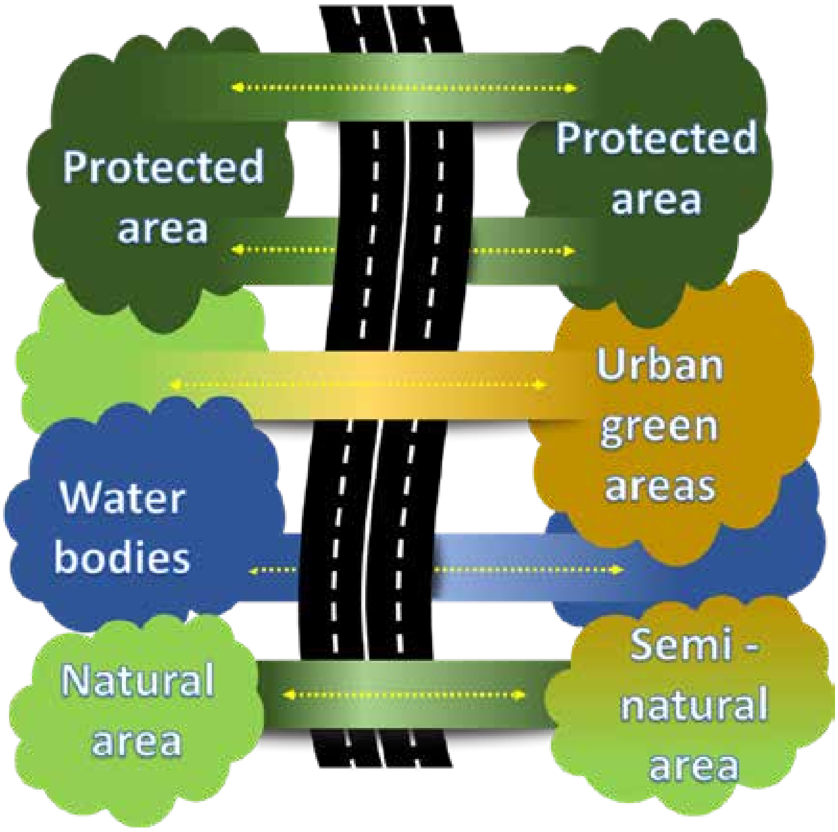

Fig. 6 Schematic representation of interpenetration of grey (road infrastructure in this case) and green infrastructure, with focus on ecological connectivity.

Opportunities for GI protection and enhancement within SEA/EIA (and AA) processes

SEA, EIA and AA processes represent essential milestones in reviewing the status of GI and taking decisions concerning GI protection and enhancement. A set of opportunities were identified and listed in the figure below, most of them having a critical role in the process of identification of pressures and threats for GI and substantiation of measures needed to maintain and enhance the GI structure and functionality.

It is important to emphasise that most of the identified opportunities are not implemented in current practice and therefore efforts are needed in order to assure (by plans and projects owners) the availability of time and financial resources for such purposes.

Considering GI in the SEA and EIA procedures also implies a change of approach: an impact assessment has to be conducted for every plans and projects including transportation infrastructure, not only for the large ones or when intersecting protected areas. For example, rehabilitation projects for transportation infrastructure represent important opportunities for defragmentation and/or wildlife mortality reduction.

The SEA process has an important role in creating a framework for EIA conducted for subsequent projects of the national/regional transportation plans. The main guiding role of SEA is to create an integrated approach for individual EIAs, which in turn will provide the necessary data and information needed to conduct cumulative impact assessments and therefore, to construct a more complete image of the impact of transportation infrastructure on GI.

Fig. 7 Main roles and opportunities for GI within SEA/EIA/AA processes.

Best practice approaches

The current section aims to clarify some sensitive issues by presenting a set of model approaches and solutions for the practitioners (e.g. such as EPA, National Agencies for Transport, etc.).

Identifying alternatives or how to avoid the impact on ecological corridors

One of the most important stages when avoidance measures can be implemented is the identification and selection of alternatives.

Many alternatives and avoidance measures which are important from the viewpoint of biodiversity should be addressed at strategic level, in a Strategic Environmental Assessment (SEA). For example, to avoid problems associated with flood risk, planners should prevent projects from being developed on flood plains or areas of flood risk or promote land management measures to increase water retention capacity. To avoid or minimise effects on Natura 2000 sites located near motorway or railway projects, it is necessary to assess the sitting of the whole corridor before leaving it to the level of individual sections, as this would limit the choice of alternative locations, etc. (European Commission, 2013)

The selection of alternatives (technical and location options) should be a real step ahead of the elaboration and approval of the Feasibility Study for a particular project. The role of this step is to ensure that the best alternative in terms of environmental protection has been identified and the construction and operating costs, including the costs of impact mitigation measures, are not disproportionate compared to the other options considered.

The selection process of the best alternative should be done through a multi-criteria analysis (MCA). The process should include at least two phases: i) Phase 1 – selecting two preferred alternatives from a variety of options; ii) Phase 2 – choosing the best alternative of the two selected. Within the MCA, the constraints and benefits for each of the analysed alternatives will be identified.

When selecting criteria for the MCA, the following main aspects should be considered:

- It is preferable to use quantifications instead of qualitative results (e.g. "estimated road permeability is 30% of its total length" instead of "estimated road permeability is good");
- Criteria should include at least: habitat loss, habitat fragmentation/permeability and disturbance, but also other aspects which are relevant for individual plans/projects: influence on wilderness areas, old-growth forests, critical habitats;
- It is recommended that one of the criteria used in the MCA be represented by the economic value of the ecosystem services potentially affected, using the latest methodologies proposed at the national or European level (http://biodiversity.europa.eu/maes);
- As much as possible, the selected criteria should generate significant differences between alternatives.

Ideally, the selected alternative must respond to all identified social, economic, technical and environmental constraints. From the biodiversity point of view, the selected alternative must offer, as compared to the other studied alternatives, at least the following advantages:

- The lowest degree of natural habitats loss (considering also the cumulative impacts);
- Avoiding the intersection of natural protected areas and, where this is not possible, the lowest value of the natural protected area intersection;
- Avoiding the intersection of ecological corridors, and where it is not possible, the lowest degree of intersection, with the possibility of implementing the best solutions for ensuring fauna permeability.

The process of selecting an alternative is not a guarantee that all significant impacts are avoided. The preferred alternative which has been selected should be further assessed for the quantification of impacts and for the identification of appropriate avoidance and mitigation measures.

One of the best examples for adapting transportation projects (mainly roads and railways) to the existing GI is in the case of natural surface water bodies. In line with the requirements of Water Framework Directive, in order to avoid the deterioration of water body status, projects are expected to propose solutions which do not include diverting of water courses, changes in the shores and riparian vegetation, placing bridge piers in the water bodies, placing any physical barriers in the water (e.g. bottom sills) or stream channelization. Viaducts and suspension bridges are ideal solutions for such purposes.

Identification and quantification of effects on ecological corridors

One of the most important tools for identification and quantification of effects on ecological corridors are **the permeability analysis/studies for fauna species**.

- At SEA stage this study will mainly be based on spatial analysis (desk study), integrating data from the literature, data held by stakeholders, and partial data collected from the field (where possible).
- At EIA stage this analysis is based on the results of field investigations, literature data and spatial modelling (GIS) and involves determining the extent to which animal species can move to the territory under study according to land use (habitats suitability) and existing barriers (anthropic or natural). Barriers can be both physical and behavioural (e.g. response of species to the presence of certain disturbing factors: noise, movement, pollutant emissions). The permeability analysis should be done for both the initial conditions (without the project) and the conditions resulting from the implementation of the project. In the last case, the possible evolutions of the characteristics that may influence the degree of permeability must also be considered.

Currently one of the tools for assessing the permeability of existing and proposed road infrastructure is the **Index of Relative Openness** (IO). The index applies for all underpasses, including bridges and viaducts, and can be calculated using the formula IO = [(width x height)/length]. Based on practical experience, minimum and optimal values were proposed in order to assess the efficiency of fauna underpasses, depending on the animals' size and behaviour. According to Anděl & Hlaváč (2002) an IO value of 40 (e.g. 80 m width, 15 m height and 30 m long underpass) is considered to be very good for deer while an IO of 4 – 8 is considered to have an average functionality (e.g. 30 m width, 4 m height and 30 m long underpass) and a value of 4 has a minimal functionality (e.g. 10 m width, 5 m height and 30 m long underpass). A set of recommendations for the density of fauna passes are also available, depending on the landscape suitability for different species.

3

Tunnels represent one of the best options for fauna permeability, particularly when they preserve the land topography and vegetation.

When the permeability of the proposed structures is insufficient to assure the ecological connectivity needed for the existing wild fauna, mitigation measures have to be implemented, consisting mainly in the creation of eco-ducts, green bridges, multifunctional overpasses or different underpasses.

The impact on ecological corridors is not limited to habitat fragmentation and also includes: habitat loss, habitat alteration, disturbance and increased risk of mortality. Other mitigation measures have to be considered in order to reduce the impacts associated with road construction and operation, such as: noise- absorbing panels, fences, anti-collision panels, rehabilitation of temporarily affected areas.

The best solution to preserve the aquatic corridors is to avoid completely any alteration on the surface water bodies, including their riparian areas.

Prediction of impacts and assessment of significant impacts

For biodiversity, EIA should focus on ensuring 'no-net-loss' and avoiding effects from the start, before considering mitigation, with compensation being used as a last resort. (European Commission, 2013)

One of the recommended methods for impact assessment is **BACI – before-after-control-impact** (Figure 6). BACI method (Steward-Oaten, 1986 on Smith et al., 1991, 2002) involves collecting of data from the impact area, as well as from the reference area, several times before and after the occurrence of impacts. Like any other method it has a number of limitations, (e.g. for long linear projects, due to the heterogeneity of site conditions, finding reference sites can be difficult both in terms of number and representativeness), but it has the advantage of a high control of the impacts through a good understanding of what is lost and the possibility of intervening to limit/restore the losses. A simplified scheme of the BACI's method steps is presented in the following figure.

The impact area represents the entire territory where the occurrence of one or more impacts is estimated. Mapping of the impact area (graphic representation on maps) is essential for the assessment. In the case of impacts on biodiversity, must be identified all the areas where changes are going to occur compared to the baseline conditions regarding habitats loss, alteration or fragmentation, disturbance of species activity or the decline of population size due to the mortality, including the long-term and remote impacts. The impact area must also include the cumulative impact, which results from the existence or planning of other possible projects which represent barriers in the area or in the region and which together could drastically limit the permeability at the landscape level. Subsequent to the impact assessment, it is advisable for the impact area to be represented graphically by impact intensity classes.

The prediction of impacts can be achieved through different techniques and methods. Best practices exclude the use of "expert opinion" only (not accompanied by calculations and analyses) or just a qualitative analysis (assessing the occurrence of an impact without quantifying it). Best practices are based on the determination of the spatial extent of impacts using spatial analysis (GIS), modelling and calculations to quantify the magnitude of the changes and their duration, considering also the cumulative impact. Examples of accepted quantitative results include: "Loss of an area of X% of the habitat total area", population reduction by X%", "estimated mortality is X individuals per year" etc.

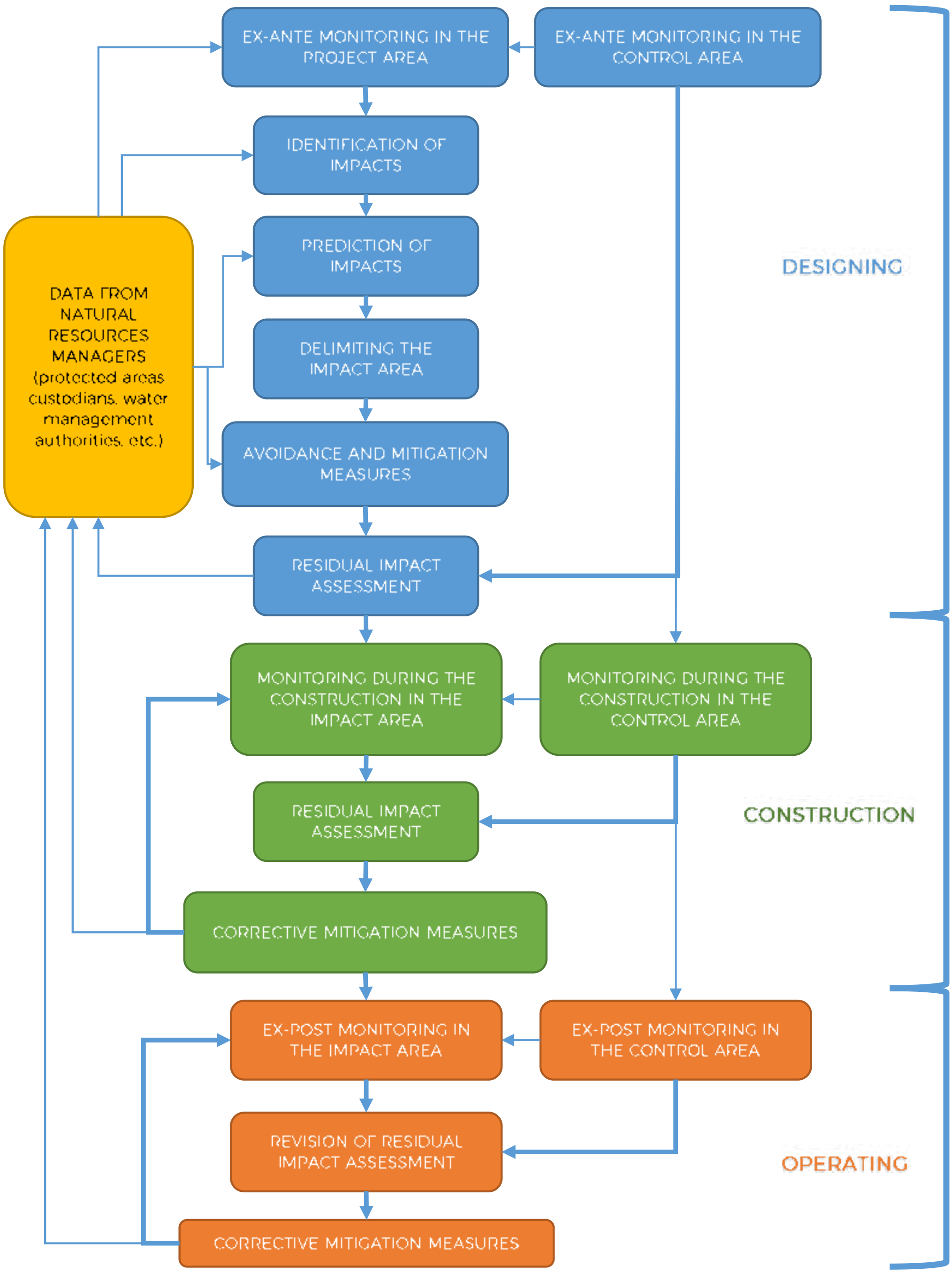

Fig. 8 The main components of the BACI method in impact assessment.

3

The calculation of the quantities of pollutants emitted into the environment as well as their dispersion modelling are essential steps for impact assessment, which should not be missing both in EIA and AA studies. These quantitative assessments are the basis for assessing the magnitude of impacts, including biodiversity. It is not possible to identify the spatial extent of an impact such as habitat alteration or disturbance of species activity without a graphical representation in geographical coordinates of the presence and concentration of different pollutants (atmospheric pollutants, pollutants discharged in water bodies, noise level, etc.).

Determining the significance of impacts can only be done on the basis of their quantitative assessment. According to legal requirements and international practice, it is necessary to determine which of the identified and assessed impacts are significant. For this purpose, based on information from methodological guidelines and the literature, EIA and AA studies' authors should determine the significance thresholds (beyond which limit an impact becomes significant).

Ability to distinguish between magnitude and significance and the use of significance criteria is a crucial element of any environmental assessment. A large magnitude impact may not be significant if the species affected is common, widely distributed and readily able to recover, but a small magnitude impact may be very significant to a highly sensitive or rare species or habitat. Significance criteria can be developed from the existing policy and guidance documents, such as: biodiversity strategies; biodiversity action plans for habitats and species; international, national and local designations: legislation; and/or using an ecosystem-based approach by identifying the valued ecosystem services and how these will be affected by drivers of change over time. (European Commission, 2013)

In any situation where assessments on conservation status for habitats and species are available (e.g. for Natura 2000 sites), they should constitute the basis for assessing the significance of impacts. Significance thresholds (e.g. how much habitat loss can lead to a reclassification into a lower conservation status?) related to conservation statuses are however more difficult to establish and they should be defined based on the dialogue with the interested stakeholders (particularly the administrators/custodians of natural protected areas).

Cumulative effects and impacts

Addressing adequately biodiversity in SEA and EIA poses significant challenges, mainly due to: the long- term and cumulative nature of effects, the complexity of the issues and cause-effect relationships and uncertainty.

The limitations of the current knowledge, as well as the assumptions used in the assessment, need to be acknowledged. The assessment, recommendations and measures have to consider the "precautionary principle". "Worst-case" and, where applicable, "best-case" scenarios have to be included in the analysis. The environmental assessment (SEA, EIA, AA) should be carried out for each proposed plan or project (new infrastructure, rehabilitation, upgrading) in a cumulative manner, taking into account any other existing or proposed plans/projects that lead to/may lead to losses, alterations and fragmentation of habitats or disturbance/mortality of individuals of vulnerable fauna species. The cumulative assessment should address all effects and impacts identified and the plans/projects/activities included in the cumulative analysis should not be limited to the same type of plans/projects/activities. As a general rule, the scale of assessment should be greater than the one used for the plan /project and should include the entire limits of all GI components potentially affected (e.g. if one project generates impacts in a protected area, the cumulative assessment should consider these impacts together with all other existing or foreseen impacts for the entire protected area and to quantify the impact in terms of changes in the conservation status of habitats and species which are subject of conservation in the protected area).

In the case of road infrastructure projects, the impact of the new road on the existing network should also be taken into account in the cumulative impact assessment. The construction of the new road can lead to the transformation of adjacent roads (or even located at greater distances) that are currently permeable in impermeable roads as a result of traffic density changes. In such cases, the measures to reduce habitats fragmentation and ensure wildlife connectivity have to target the entire road network that will undergo changes.

Designing of appropriate mitigation measures

Every environmental assessment must contain impact avoidance and mitigation measures directly addressing all forms of negative impact (and not only significant negative impacts). Measures that do not contribute directly to the avoidance or mitigation of identified impacts should not be taken into account (e.g. implementing a noise monitoring program is not in itself an impact mitigation measure, but only a requirement for assessing the effectiveness of a measure to reduce the noise level such as installation of sound absorbing panels).

Impact avoidance measures are those which, through implementation, ensure that an impact identified in the assessment will no longer occur over the life cycle of the project. Such measures also provide the guarantee that at the stage of the residual impact assessment, the avoided impact can no longer be identified. The best examples of avoidance measures are changing the site (e.g. selecting a route that does not intersect protected natural areas) or changing the technical solution (e.g. choosing a solution that does not lead to fragmentation of the habitat – building a tunnel or which allows maintaining connectivity - building a viaduct).

In practice, the avoidance term is also used for avoiding a significant impact (the impact will occur, but at a lower level). To avoid confusion, it is advisable that measures that do not eliminate the risk of an impact be considered as mitigation measures (not avoidance). For example, installation of panels for reducing the collision of flying animals with traffic will reduce the mortality rate but not eliminate the collision risk. Mitigation measures are those proposals that are strictly related to the proposed project and that address directly the identified impacts and risks. Through implementation these will lead to reduction of anticipated effects and thus contribute to impact mitigation.

To be noted that it is particularly important to have a quantitative, quantifiable measurement for each mitigation measure. The quantitative estimation of the effectiveness of each measure should be performed in the residual impact assessment. Example: Without implementing the “X” reduction measure, promoting the project will result in 20% loss of the favourable habitat of the bear population. The implementation of the “X” reduction measure will result in the loss of only 5% of the favourable habitat of the bear population.

All avoidance and mitigation measures, especially those included in a regulatory act, have to be transposed into the technical solutions described in the Feasibility study. For each of these measures, the advantages and their efficiency have to be described.

When the planning stage is not adequately performed and when the avoidance and mitigation measures cannot achieve an efficiency level which guarantees the significant reduction of the negative impacts, it is necessary to identify compensatory and/or offset measures.

3

Public participation processes

Given the complex contexts, the overlap of rights, responsibilities and interests which are sometimes divergent, and often the wide scale of environmental assessments, a participatory approach is paramount to the success of these procedures.

In addition to its normative arguments, stakeholder involvement and public participation broadly, can provide: an input of knowledge and information from different perspectives, which can contribute to a better understanding of reality and the design of the most suitable mitigation measures, a platform for communication and dialogue, a framework for the development of a supportive social context (i.e. sense of ownership, acceptance, better understanding of the issues at stake, including environmental and conservation issues), as well as an input of additional resources (Ioniță and Stanciu, 2012).

Impact assessment is concerned with (i) information, (ii) participation and (iii) transparency of decision-making. Public involvement consequently is a prerequisite for effective EIA and can take place at different levels: informing (one-way flow of information), consulting (two-way flow of information), or "real" participation (shared analysis and assessment). In all stages of EIA public participation is relevant.

The legal requirements for and the level of participation differ among countries, but it is generally accepted that public consultation at the scoping and review stage are essential; participation during the assessment study is generally acknowledged to enhance the quality of the process. (Secretariat of the Convention on Biological Diversity, Netherlands Commission for Environmental Assessment, 2006).

For participation to deliver its full spectrum of benefits, the quality of the process needs to be considered. Details concerning how participatory approaches can be put in place are available in numerous publications, including Guidelines for Participatory Protected Area Management in the Carpathian Ecoregion https://propark.ro/images/uploads/file/publicatii/%23PG_Romania_web.pdf (Ioniță and Stanciu, 2012).

4 Conclusions

4

Green Infrastructure (GI) represents an interconnected network of green space able to conserve natural ecosystems and processes and provide benefits to nature and human population. In fact, the Green Infrastructure represents the foundation for most of the socio-economic developments. At the same time, GI may also represent an alternative to grey infrastructure as nature can provide solutions for most of the services required by human population (food production, air cleaning, water purification, flood control etc.).

Though connectivity is not a condition for including a natural or semi-natural area into GI, it represents an important factor for maintaining healthy resilient ecosystems able to sustain their natural processes.

SEA and EIA represent important tools for maintaining and developing the GI, particularly for assuring the ecological connectivity when green and grey infrastructures intersect. Both environmental procedures offer the opportunity for reviewing existing pressures and proposed threats and, by involving technical expertise and public participation, for identification of adequate solutions for reducing the pressures on GI and for a better interpenetration of both infrastructures.

SEA and EIA are adaptive processes and therefore they need to be updated permanently in order to cope with the dynamics of anthropic pressures. It is considered that both procedures will become more efficient when the principle of “no-net-loss” of biodiversity and ecosystem services will become fully operational. Tools for assessing the ecological connectivity are available as well as best practices guidelines for construction and operation of permeable transport infrastructure. The key element for both SEA and EIA procedures remains the selection of alternatives which need to be performed as early as possible in the planning process in order to adequately avoid the significant impacts on GI.

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SECTION II: Training Course

The format and overall approach

The training seminar was designed as a 2 days[35] event with a practical focus and an interactive approach, targeting the social actors who can have a real impact in the planning and development of an integrated and green infrastructure. This included both decision-makers (i.e. representatives of the authorities in charge with transport infrastructure development and environmental impact assessment) and experts who are conducting impact assessment studies. The course was designed for a medium-sized group (15-20 participants).

The course approach combined the presentation delivery, facilitated discussions, group work, as well as a field visit in a site where the A8 highway is supposed to be built and camera traps are put in place to monitor the presence of wildlife by Milvus Group Association. Introducing the participants and reviewing the topics discussed in each day have also been allocated time in the training schedule.

Fort further details please see the annexes, as follows:

- **The training agenda** – Annex 1.
- **The training plan** – Annex 2 - presents the general and specific objectives of the training event, the learning objectives (what competences will participants acquire), the target group and includes a detailed training plan (including the activities to be carried out together with the participants, the schedule and timing, the aims, methods and materials which are going to be used by the trainer for each activity).
- The **general PowerPoint presentation** Annex 3
- The **group exercises** are listed in Annexes 4-6.
- The **case studies** are presented in Annex 7-8
- The **feedback and assessment form** for the training session in Annex ß.

The templates for the presentation, the training plan and agenda, as well as the feedback form are regularly used by Propark in the capacity development practice and have been designed in accordance with the national requirements for the delivery of professional qualification activities. The methodology used to assess trainers' performance and courses impact are part of Propark's internal procedures. Both the templates and these methodologies have a guiding role for the future trainers and should ideally be tailored to the context and specific needs from each country.

From our experience, the approach, the contents, the teaching methods are very likely to need change whenever the target group, group' structure or the context changes.

Impact and result assessment

- Measuring the results and the impact of a training event

Measuring the impact of capacity development is, despite its importance, very challenging to put into practice and track over time. However, measuring trainer's performance, participant's experience with the training and, if possible, their (real or perceived) level of competence can provide first-hand information in this sense and should be a regular practice embedded in the process of training delivery.

35 The course event was organised in Praid (Harghita Coounty), on 26th-27th of November 2018.

For each course a training form can be developed and used to collect fresh information from the participants. The form currently used by Propark (Annex 8) focuses on both the learning process and participant's overall experience of being on the course (including the logistic aspects). All the participants are asked to fill it in at the very end of the training event. The form is anonymous and the results are centralised in an Excel file which is shared with the trainer(s), thus enabling them to improve on the topics on which they have lower scores.

The online training of trainers' course

To develop a pool of trainers in the project target area, thus contributing to raising the capacity of practitioners and decision-makers throughout the region, an online short training was delivered to a selected group of practitioners. The webinar was organised by WWF CEE and aimed at introducing the participants to the model of training course which was developed and tested in Romania, and to provide clarifications on how this can be replicated or adapted to participants' contexts.

This session included:

- A brief presentation with an overview of how can a course build individual capacity on the topic of EIA and Green Infrastructure (Manual, Curricula, approach) – approx. 1,5 hours ppt presentation focused on learning objectives and key contents to be delivered to trainees
- A session of questions and answers and open interaction with the trainers – about 1 hour.

The session was provided by Marius Nistorescu (EPC Consulting and trainer for Propark Foundation), Alina Ioniță (Propark Foundation – Capacity Building Programme Coordinator).

The training session aimed to:

- Provide a set of guiding tools for the development of training courses on the use of EIA for the development of green infrastructure in the Region.
- Provide an opportunity to debate and clarify some possible approaches to capacity building on the topic.
- Bring a possible regional future network of trainers together.

The power point presentation which was provided on this occasion is attached to this report as a separate file.

Annex 1: The training agenda

Keeping Nature Connected - EIA for Integrate Green Infrastructure Planning

Day 1		
Start time	End Time	Main topics / activities
09:00	09:15	*Welcome and presentation of participants*
09:15	09:30	*Team building Exercise*
09:30	09:45	*Training Overview and Objectives*
09:45	10:30	What is Green Infrastructure?
10:30	10:45	*Coffee break*
10:45	11:30	What is ecological connectivity?
11:30	12:15	Means to preserve, enhance and restore ecological connectivity
12:15	13:15	*Lunch break*
13:15	14:00	Legal framework for SEA/EIA/AA
14:00	14:45	Why is SEA & EIA essential for maintaining ecological connectivity?
14:45	15:00	*Coffee break*
15:00	15:45	Grey infrastructure permeability assessment
15:45	16:30	Permeability assessment exercise
16:30	16:45	*Coffee break*
16:45	17:30	What is a significant impact?
17:30	18:00	How to avoid and reduce significant impacts on habitat fragmentation

Day 2		
Start time	End Time	Main topics / activities
09:00	09:45	Review of first day topics
09:45	10:30	Quality review of Environmental Reports (SEA/EIA/AA)
10:30	10:45	*Coffee break*
10:45	11:30	Best practices in data collection for ecological connectivity
11:30	12:15	Best practices in mitigation measures for maintaing, enhancing and restore ecological connectivity
12:15	13:15	*Lunch break*
13:15	17:00	Field visit
17:00	18:00	Conclusions and assessing the training event

Annex 2: The training plan

KEEPING NATURE CONNECTED - EIA FOR INTEGRATE GREEN INFRASTRUCTURE PLANNING

Training course

This course aims at presenting some specific aspects that need to be applied in identifying and assessing the environmental impact generated by infrastructure projects so as to ensure that the best measures to avoid, reduce and mitigate impacts are taken into account in the design, construction and operation of these projects.

II.

Target group: representatives of the national road and rail infrastructure companies, representatives of the Ministry of Transport, environmental consultants involved in the elaboration of environmental impact assessment studies and appropriate assessment studies for transport infrastructure projects, NGOs with activity in environmental protection and transport infrastructure.

Duration: 16 hours during two consecutive days

Main objective: Participants understand and adopt good working practices presented in the field of environmental impact assessment and management of green infrastructure so as to ensure the quality of impact assessments and their contribution to the improvement of transport infrastructure projects.

Participants will aquire:

- **Knowledge:** understanding the role, structure and functionality of the green infrastructure and the means by which the development of transport infrastructure can ensure the maintenance of ecosystem services and ecological connectivity;
- **Competences:** capacity to implement the adequate avoidance and mitigation measures which assures the sustainability of green infrastructure and its main functionality;
- **Attitude:** understanding of the best practices in data collection, environmental report elaboration and identification of appropriate mitigation measures. Involvement of the participants in the recognition of high and low quality Environmental Reports.

Reference objectives:

- Development of the capacity for understanding the role, structure and functionality of green infrastructure;
- Development of the capacity for understanding the means by which the development of transport infrastructure can ensure the maintenance of ecosystem services and ecological connectivity;
- Understanding of the legal framework in the context of the management of green infrastructure;
- Understanding of the integration of grey infrastructure and green infrastructure;
- Development of the capacity for understanding the concept of impact significance thresholds and what constitutes a significant impact;
- Measures for the avoidance and reduction of significant impacts on habitat fragmentation;
- Development of the capacity for the assessment of quality of the Environmental Reports;
- Understanding of the best practices involved in data collection, elaboration of Environmental Reports and identification of appropriate measures.

Training methods: conversation, demonstration, exercises, lectures, debate, problem solving, discussions, case studies, field visit on the location of the proposed route of a motorway.

Training means: projector, laptop, PowerPoint slides, Excel exercises, flipcharts

Evaluation methods:

Initial evaluation: self-evaluation by participants

- Aim: adaptation of the training program to the participants needs
- Methods: large group discussions, self-presentations
- Evaluation scale: low level, medium level, high level

Ongoing evaluation

- Frequency: for each training exercise
- Methods: group exercises

The following themes will be approached:

1. What are Green Infrastructure and ecological connectivity?
2. Means to preserve, enhance and restore ecological connectivity;
3. Legal framework for SEA/EIA/AA and why is SEA and EIA essential for maintaining ecological connectivity?
4. Grey infrastructure permeability assessment;
5. What is a significant impact and how to avoid and reduce significant impacts on habitat fragmentation;
6. Quality review of Environmental Reports (SEA/EIA/AA);
7. Best practices in data collection for ecological connectivity and in the identification of maintaing, enhancing and restore ecological connectivity.

Minimum requirements – it is recommended that the participants:

- have experience in the implementation of infrastructure projects (motorways, roads, railways, etc.);
- have been previously involved in environmental permitting procedures.

COURSE PLAN

Title	Keeping Nature Connected - EIA for Integrate Green Infrastructure Planning
Group	15 – 20
Duration	2 days
General objective	Participants understand and adopt good working practices presented in the field of environmental impact assessment and management of green infrastructure so as to ensure the quality of impact assessments and their contribution to the improvement of transport infrastructure projects.
Results	Knowledge: understanding the role, structure and functionality of the green infrastructure and the means by which the development of transport infrastructure can ensure the maintenance of ecosystem services and ecological connectivity; Competences: capacity to implement the adequate avoidance and mitigation measures which assures the sustainability of green infrastructure and its main functionality; Attitude: understanding of the best practices in data collection, environmental report elaboration and identification of appropriate mitigation measures. Involvement of the participants in the recognition of high and low quality Environmental Reports.
Standard	Finishing the assignments and solving the exercises during the training seminar.

Day 1: Arrival of participants, Green Infrasturcture and ecological connectivity, legal framework and significance of impacts			
Activity/Topic	Timing	Details	Duration
Welcome and presentation of participants (30 Minutes)	09.15 – 09.45	Aim: creating a relaxed atmosphere, mutual meeting of the trainers and participants, presentation of the training overview and objectives. Method: Introductions of participants, team building exercise	
Activity 0.1		Welcome and presentation of participants. Acquaintance with the participants. Go around the room for introductions.	15
Activity 0.2		Team building exercise	15
Activity 0.3		Training overview and objectives The training overview and objectives are presented in detail to the participants.	15
Activity 1 What is Green Infrastructure? (45 Minutes)	09.45 – 10.30	Aim: understanding the concept of Green Infrastructure, including its role, structure and functionality. Details for implementation: The presentation is done through lecture and large group discussions. Materials: PowerPoint slides + Flipchart for writing	45

Coffee break (15 Minutes)	10.30 – 10.45		15
Activity 2.1 What is ecological connectivity? (45 Minutes)	10.45 – 11.30	**Aim:** Understanding the concept of ecological connectivity and how linear infrastructure can affect it. **Details for implementation:** The presentation is done through lecture and large group discussions. **Materials**: PowerPoint slides + Flipchart for writing	45
Activity 2.2 Means to preserve, enhance and restore ecological connectivity (45 Minutes)	11:30 – 12:15	**Details for implementation:** The implementation is done through an exercise on how to connect habitats. Small groups work toghether and then present the results to the group at large. **Materials**: Flipchart for presenting the results of the exercise.	45
Lunch break	12.15 – 13.15		60
Activity 3.1 Legal framework for SEA/EIA/AA (45 Minutes)	13.15 – 14.00	**Aim:** understanding of the legal framework for the Strategic Environmental Assessment, Environmental Impact Assessment and Appropriate Assessment, as well as the differences between them. **Details for implementation:** the presentation is done through lecture and large group discussions. **Materials**: PowerPoint slides + Flipchart for writing	45
Activity 3.2 Why is SEA & EIA essential for maintaining ecological connectivity? (45 Minutes)	14.00 – 14.45	**Aim:** understanding of the main principles of using SEA and EIA to warrant ecological connectivity as well as the characteristics of each procedure in the implementation of grey infrastructure. **Details for implementation:** the presentation is done through lecture and large group discussions. **Materials**: PowerPoint slides + Flipchart for writing	45
Coffee break (15 Minutes)	14.45 – 15.00		15
Activity 4.1 Grey infrastructure permeability assessment (45 Minutes)	15.00 – 15.45	**Aim**: understainding of the characteristics of grey infrastructure in the context of permeability for wild fauna and of the methods for its assessment. **Details for implementation:** the implementation is done through case studies presentation and large group discussion. **Materials**: PowerPoint slides + Flipchart for writing	45
Activity 4.2 Permeability assessment exercise	15.45 – 16.30	**Details for implementation:** the implementation is done through an exercise on the calculation of road permeability for a given example. The participants	45

(45 Minutes)		work in small groups and then present the results to the room at large. Materials: PowerPoint slides for the initial presentation + Excel file for the exercise data and calculations + Flipchart for presenting the results of the exercise	
Coffee break (15 Minutes)	16.30 – 16.45		15
Activity 5.1 What is a significant impact? (45 Minutes)	16.45 – 17.30	Aim: understanding of the different forms of impacts, their assessment process and the thresholds needed to be considered in the case of each. Details for implementation: the presentation is done through lecture and large group discussions. Materials: PowerPoint slides + Flipchart for writing	45
Activity 5.2 How to avoid and reduce significant impacts on habitat fragmentation (45 Minutes)	17.30 – 18.00	Details for implementation: the implementation is done through an exercise which involves the elaboration of avoidance and mitigation measures. The participants work in small groups and then present the results to the room at large. Materials: PowerPoint slides for the initial presentation + Excel file for the exercise data and calculations + Flipchart for presenting the results of the exercise.	30
Day 2: Quality review of Environmental Reports and the best practices for their elaboration			
Activity/Topic	Timing	Details	Duration
Activity 6.1 Review of first day topics (45 Minutes)	09.00 – 09.45	General discussion on the previous day's topics with the room at large. Answering of questions regaring any topics approached in the previous day.	45
Activity 6.2 Quality review of Environmental Reports (SEA/EIA/AA) (45 Minutes)	09.45 – 10.30	Aim: understanding of the standards required (e.g. analysis of project alternatives, field data collection, quantification of impacts, analysis of cumulative impacts, etc.) to be met by Environmental Reports in order to be considered high quality. Details for implementation: the presentation is done through lecture and large group discussions. Materials: PowerPoint slides + Flipchart for writing	45
Coffee break (15 Minutes)	10.30 – 10.45		15
Activity 7.1 Best practices in data collection for	10.45 – 11.30	Aim: understanding of the stages of field data collection (including literature review and stakeholder consultations) and of the requirements in regards to the appropriate standards for data	45

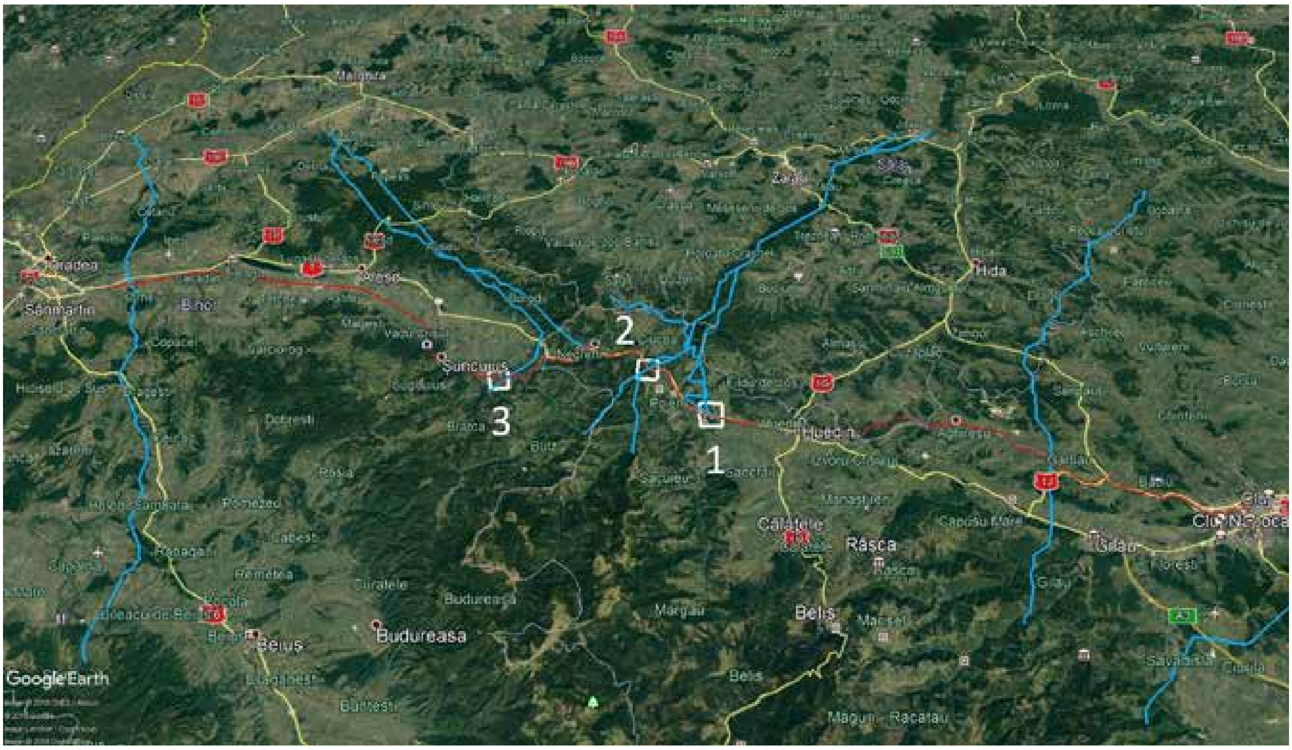
ecological connectivity (45 Minutes)		collection (methods and guidelines for field data collection). **Details for implementation:** the presentation is done through lecture and large group discussions. **Materials**: PowerPoint slides + Flipchart for writing	
Activity 7.2 **Best practices in mitigation measures for maintaing, enhancing and restore ecological connectivity** (45 Minutes)	11.30 – 12.15	**Aim**: understanding of the different types of methods presented in an Environmental Report (avoidance, mitigation or compensation measures) and of the existing solutions used in international experience for enhancing and restoring ecological connectivity. **Details for implementation:** the presentation is done through lecture and large group discussions. **Materials**: PowerPoint slides + Flipchart for writing	45
Lunch break	12.15 – 13.15		60
Field visit	13.15 – 17.00	Field visit on locations within the proposed route of the Târgu Mureş – Iaşi motorway. **Materials**: vehicles	225
Conclusions: Did the training have a "significant impact" on participants?	17.00 – 18.00	Large group discussion regarding the course, the training objectives and the achievments of the participants in aquiring the set knowledge, competences and attitude.	60

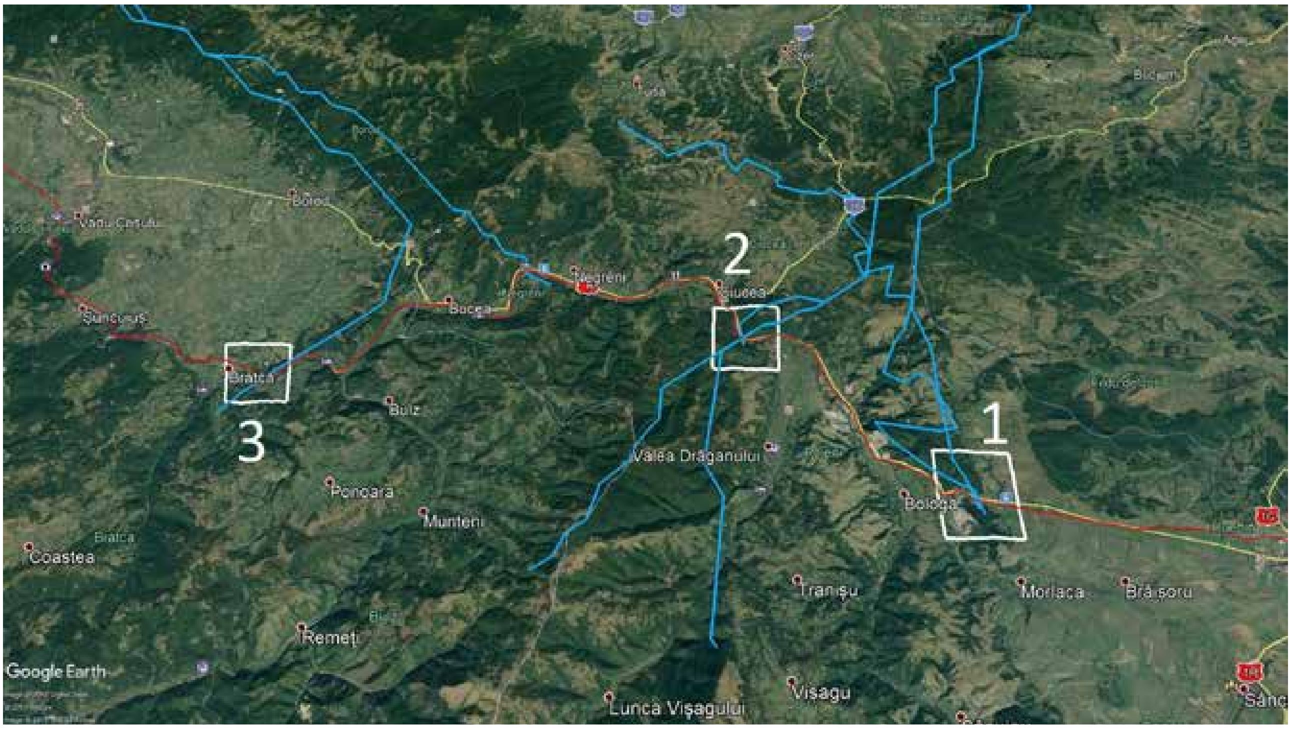
General PowerPoint Presentation

Visit the web: http://www.interreg-danube.eu/approved-projects/transgreen/outputs

Exercise 1 – The identification of suitable areas for the placement of eco-ducts, where multiple barriers for wildlife connectivity are present

Working in teams, please identify multiple, different solutions for the placement of eco-ducts, considering the natural and anthropic characteristics of the area and the known favourable passage areas for wildlife. Provide appropriate arguments for the chosen placement solutions and explain them to the other participants. The best proposed solutions will be chosen based on the voting of all the participants.

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Poicoara
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Valea Draganului
Bologa
Coastea
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Tranișu
Morlaca
Brăișoru
Vișagu
Lunca Vișagului
Suncuiuș
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Borod
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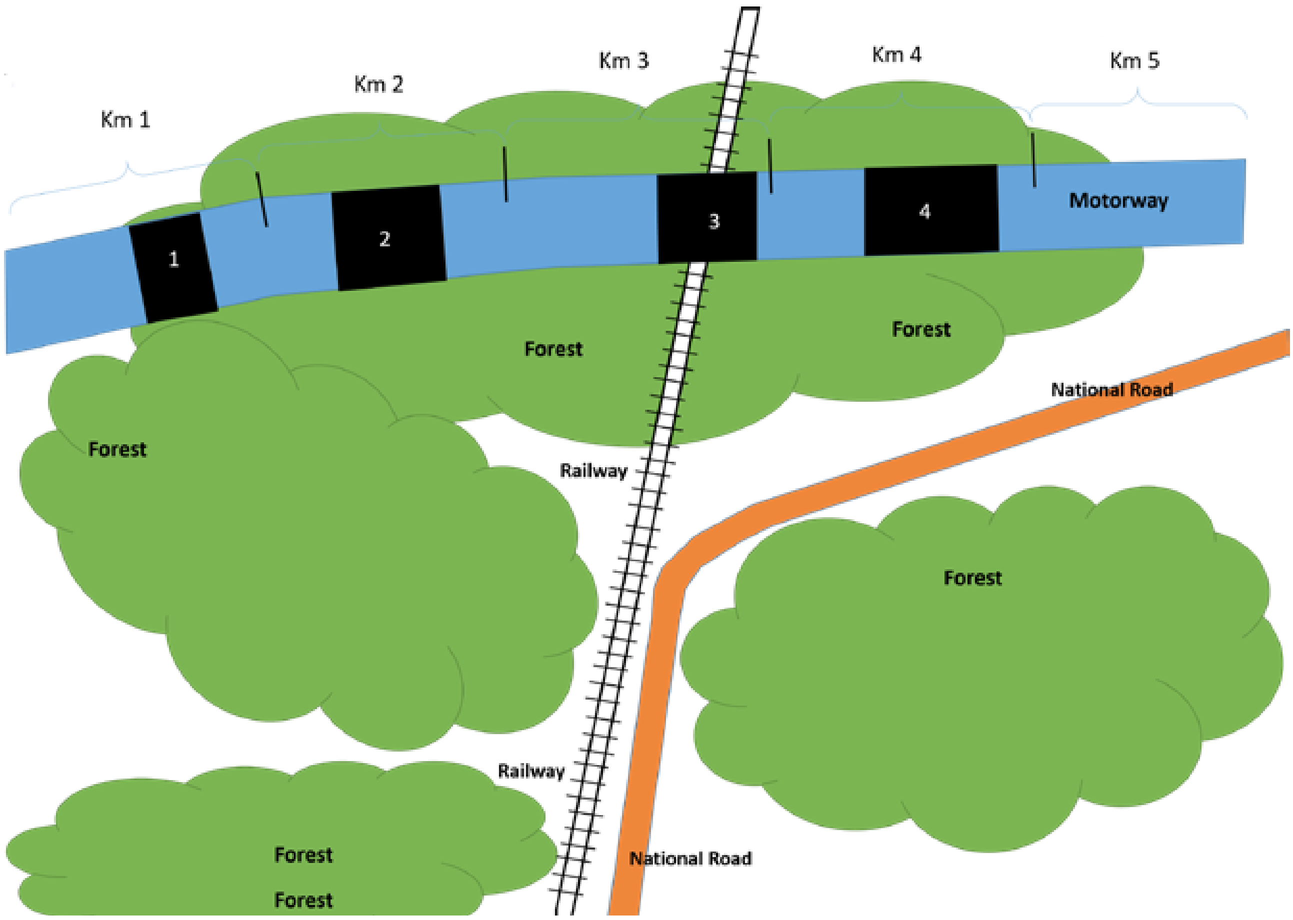
Google Earth

II.

Exercise 2 – Permeability



Structure	Length (m)	Height (m)	Width (m)	Openness (IO)	Functionality for			Distance form the last structure (km)	Distance to the next structure (km)	Structure frequency (km)	Fulfilment of conditions regarding the structure frequency (Yes / No)		
					Large mammals	Medium mammals	Small mammals				Large mammals	Medium mammals	Small mammals
Bridge 1	100	1.5	28					800	200				
Bridge 2	300	3	28						1200				
Bridge 3	250	5	28						500				
Bridge 4	450	10	28						1050				

Where

IO = Length * Height / Width (referring to each structure)

Minimum IO values

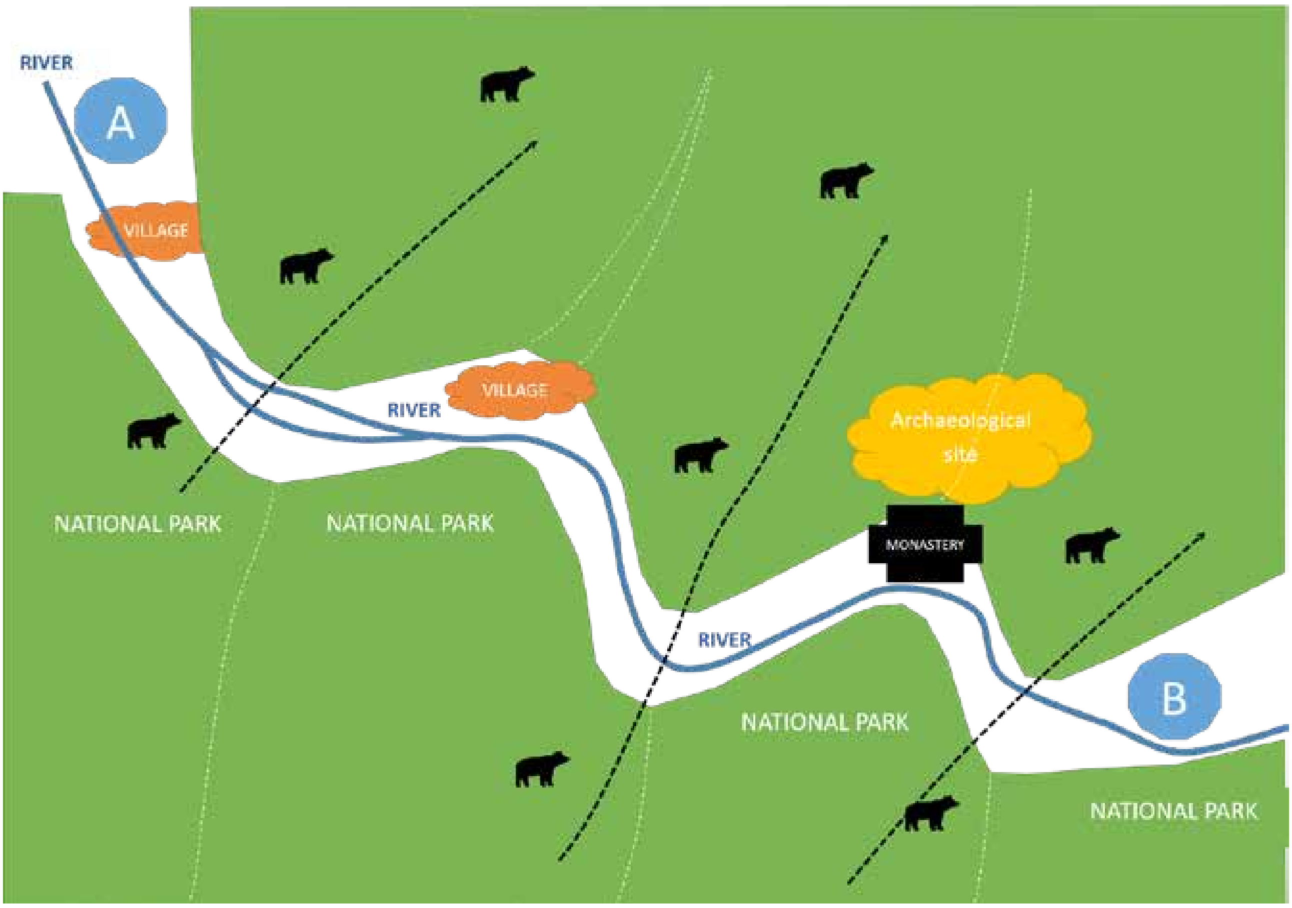
		Large mammals	Medium mammals	Small mammals
Functionality	No functionality	0	0	0
	Minimal	1.7	0.65	0.09
	Medium	4	1.5	0.2
	High	8	7	0.96
	Very high	40	30	4.15

Structure frequency

	Maximum values for the "very high" sensitivity category	
Large mammals	3 - 5	km
Medium mammals	1.5 - 2.5	km
Small mammals	1	km

Exercise 3 - Measures

Propose a motorway route, starting from point A to point B, keeping into consideration the obstacles found on the river valley as well as the known movement patterns of large mammals through the valley. Identify where structures (tunnels, bridges, viaducts, embankments, cuttings, etc.) should be placed on the proposed route.



Study Case 1: Proposed ecoduct in Cozia National Park

II.

Sibiu – Piteşti Motorway project is part of the Pan-European Corridor IV, one of the few missing connections which would allow the integration of the transportation corridor. Within the process of obtaining the environmental permit for this project, an appropriate assessment was conducted. The assessment of impact on Natura 2000 network included one year of field surveys and one year of desk work. Ecological corridors were identified based on existing literature, GIS analyses and consultation with relevant stakeholders. Identified ecological corridors were considered as crucial elements to maintain the conservation status for large mammals in the existing Natura 2000 sites.

The critical sector of the project is represented by the mountain area, the project being constrained to follow the Olt Valley, an area where mammal's permeability is already highly affected by multiple barriers (a national road, railway and hydrotechnical works).

Sibiu – Pitesti motorway was designed with a good degree of permeability. Numerous tunnels, bridges and viaducts were proposed in all key areas identified for mammal's connectivity. However, the permeability assessment, conducted for post-project situation, indicated that independently of the motorway good permeability, the connectivity of the ecological corridors cannot be restored without defragmentation measures to address existing barriers (national road, railway and Olt river) which will remain in the same condition even after the construction of the motorway. As a consequence, two ecoducts were proposed, one (Călineşti ecoduct) inside Cozia National Park (to connect the southern ridges of Carpathians) and one (Lazaret ecoduct) between two large Natura 2000 sites: Făgăraş Mountains and Frumoasa (to connect the central ridges of Carpathians). The two locations were selected following a multicriteria analysis conducted on nine alternative locations.

An ecoduct is a defragmentation measure and therefore it needs to be placed as close as possible to a critical point along the ecological corridor. Critical points are usually represented by wildlife favourable habitats fragmented by one or more anthropic barriers, sometimes associated with high number of collision victims. The Călineşti ecoduct was placed in the most suitable area of the ecological corridor where, despite the difficult topography, it can easily connect the favourable habitats of the large mammals. It's 200 m length and 100 m width will assure safe passage of wild fauna over the existing barriers. The large structures of the proposed motorway will assure the permeability on the north and east side of the National Park avoiding the interruption of ecological corridor.

It is expected that the Calinesti ecoduct will contribute not only to reducing the impact of the transport infrastructure on the regional ecological corridor in the area of the Cozia National Park but also to maintain and improve the conservation status of the mammals living here.

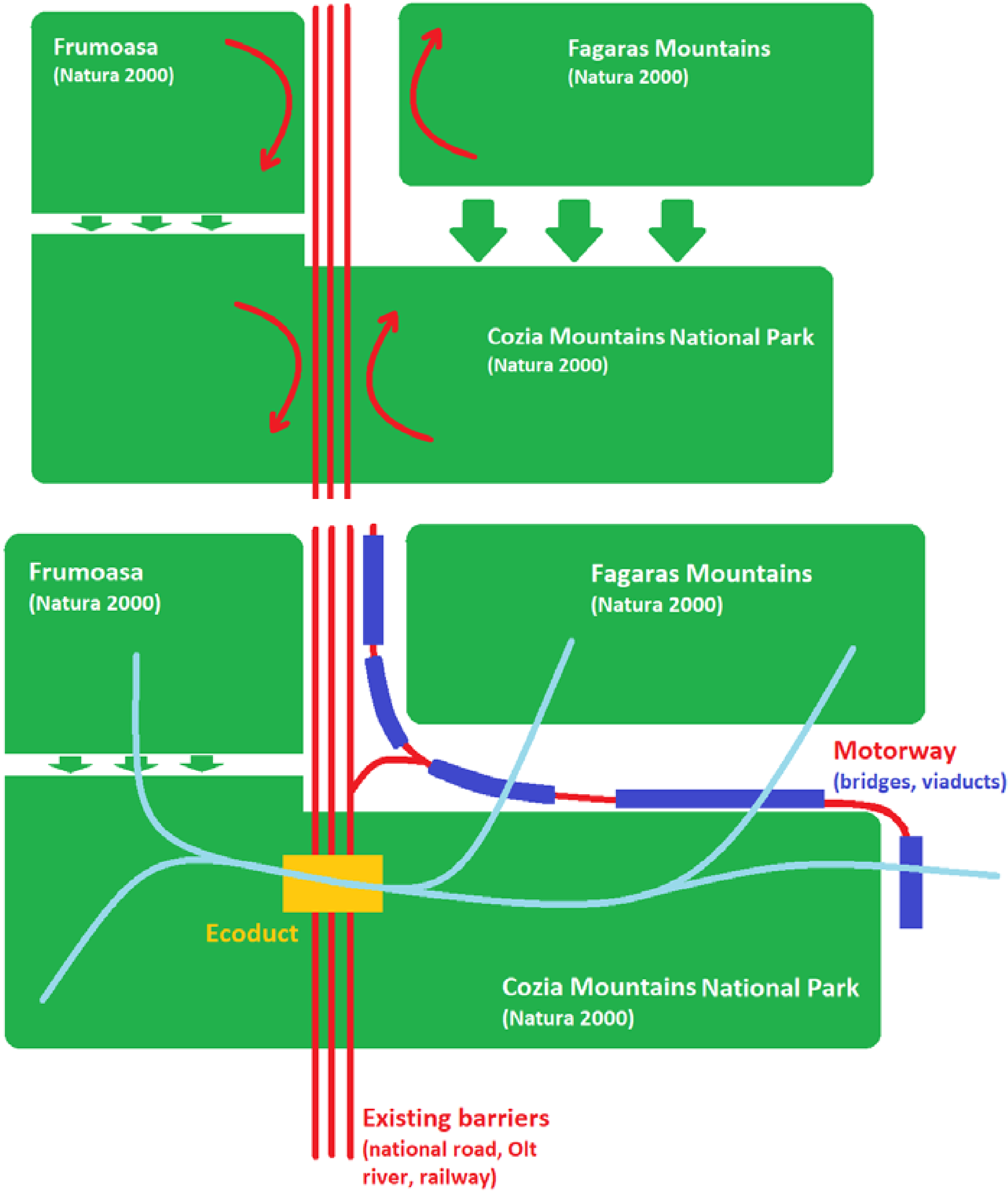


Fig. 9 Schematic representation for ecoduct proposal in Cozia National Park. Up - the baseline conditions where the existing barriers severely limit the connectivity in the Olt Valley Down - the ecoduct along with the highway underpasses (proposed structures) can ensure the ecological corridor connectivity.

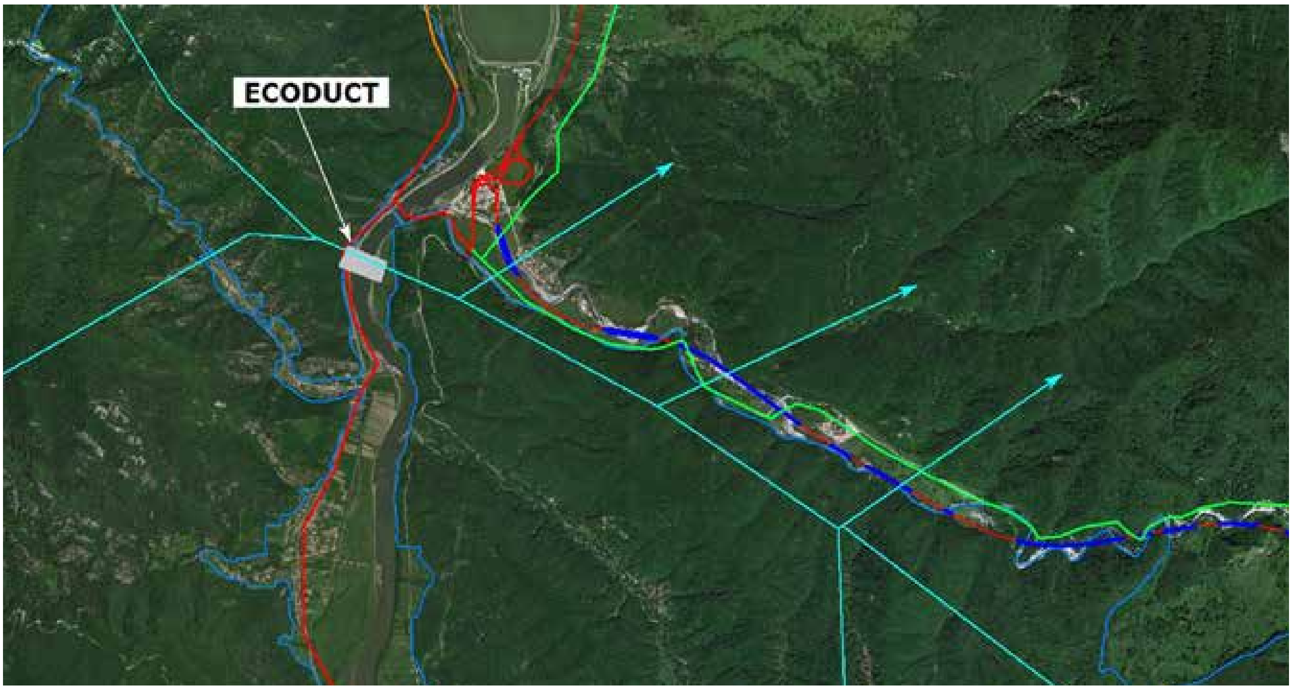


Fig. 10 Călineşti ecoduct on Google earth images. Red lines represent impermeable road infrastructure, green – permeable roads and blue – motorway's bridges and viaducts.

Study Case 2: Defragmentation opportunities in railways rehabilitation projects

II.

Railways are linear transportation infrastructures which inherently intersect terrestrial and aquatic ecological corridors. When intersecting stream and rivers, railways are always provided with bridges. In many cases, the bridges are accompanied by hydrotechnical works designed to protect them.

In Romania, many such constructions, particularly the one build before the adoption of Water Framework Directive, led to a severe water body fragmentation. One such example is presented here. The railway is located in the north-western part of Romania and it has a length of approximately 160 km. The railway was built between the years 1866 and 1870, with further developments after this period. The railway crosses a rich hydrographic network formed by streams and rivers flowing in the north-south and south-north directions.

The hydrotechnical works that were performed to protect the railway bridges represent in some cases important barriers for the aquatic fauna. Such an example is presented in the next figure. The natural river bed and river banks were replaced with a thick layer of concrete which single purpose is to protect the infrastructure at high flows. The engineering solution was so poorly designed and built that the river continued to flow, but under the concrete slab. The fragmentation primarily affects the fish species.

For this railway a rehabilitation project was initiated, being now in the phase of the Feasibility study elaboration. This is a good opportunity to address several fragmentation issues, mainly:

- removing the concrete slab, restoring the river bed and adopting a solution (natural materials for banks protection and no sills) that does not hinder circulation of fish species;
- enlarging the bridge in order to allow partial rehabilitation of riparian vegetation;
- restoration of terrestrial connectivity for wildlife along the riparian areas.

II.

Fig. 11 Fragmentation of the blue infrastructure on an existing railway

Feedback form for the face to face training events

FEEDBACK AND ASSESSMENT FORM FOR THE TRAINING EVENT

„Using EIA in developing a sustainable and environmentally friendly transport network"

II.

1. The training course was relevant for my professional activity:

1	2	3	4	5	6	7	8	9	10

Not at all → **Very much**

2. The objectives of the course were achieved:

1	2	3	4	5	6	7	8	9	10

Not at all → **Completely**

3. The contents of the training course was well structured and presented in an intelligible manner:

Please rate each topic.

a) What does green infrastructure mean

1	2	3	4	5	6	7	8	9	10

Not at all → **Excellent**

b) What ecological connectivity is? Means to conserve, improve and restore ecological connectivity

1	2	3	4	5	6	7	8	9	10

Not at all → **Excellent**

c) The legal framework for EIA/SEA. Why are EIA/SEA essential in maintaining ecological connectivity?

1	2	3	4	5	6	7	8	9	10

Not at all → **Excellent**

d) Assessing the permeability

1	2	3	4	5	6	7	8	9	10

Not at all → **Excellent**

e) What does significant impact mean?

1	2	3	4	5	6	7	8	9	10

Not at all → **Excellent**

f) Revising the quality of EIA/SEA reports

1	2	3	4	5	6	7	8	9	10

Not at all → **Excellent**

g) Best practice case studies

1	2	3	4	5	6	7	8	9	10

Not at all → **Excellent**

II.

h) The field visit

i) 1	2	3	4	5	6	7	8	9	10

Not at all → **Excellent**

4. Overall, trainer's performance was:

1	2	3	4	5	6	7	8	9	10

Very poor → **Excellent**

5. The trainers were open to respond to participant's questions and to provide clarifications:

1	2	3	4	5	6	7	8	9	10

Not at all → **Very much**

6. The discussions held throughout the training sessions were useful:

1	2	3	4	5	6	7	8	9	10

Not at all → **Very useful**

7. The theory, practice and case studies have been well balanced:

1	2	3	4	5	6	7	8	9	10

Not at all → **Very well**

8. Beside the course background materials and contents, other relevant resources (books, websites, reports, scientific papers, apps, etc) have been introduced/recommended to the participants to allow for a deeper understanding:

1	2	3	4	5	6	7	8	9	10

No → **Yes**

9. Overall, I rate the course as:

1	2	3	4	5	6	7	8	9	10

Unsuccessful → **Excellent**

10. From what I have learned on the course, in my professional activity I will use:

____

11. I liked the course because...

____

12. I didn't like the course because...

____

13. The accommodation and meals were:

1	2	3	4	5	6	7	8	9	10

Inadequate → **Excellent**

14. The logistics arrangements and the preparation were:

1	2	3	4	5	6	7	8	9	10

Inadequate → **Excellent**

Please add any other comments or recommendations here:

____

THANK YOU FOR YOUR TIME AND INPUT TO THE COURSE!
Your feedback will help us improve our future trainings and keep the quality of our training events at high standards.

Project Partners

Austria – WWF Central and Eastern Europe (former WWF DCP, project lead)
Czech Republic – Friends of the Earth Czech Republic – branch Olomouc, Nature Conservation Agency, Transport Research Centre
Hungary – CEEweb for Biodiversity
Romania – Association "Milvus Group", WWF Romania
Slovakia – National Motorway Company, State Nature Conservancy of the Slovak Republic, SPECTRA – Centre of Excellence of EU – Slovak University of Technology in Bratislava

Associated Strategic Partners

Austria – Ministry for Transport, Innovation and Technology
Czech Republic – Ministry of the Environment
Hungary – National Infrastructure Developing Private Company Ltd.
Poland – Ministry of Infrastructure and Construction
Romania – Ministry of the Environment, Ministry of Transport
Slovenia – Ministry of Infrastructure
Ukraine – Ministry of Ecology and Natural Resources, Transcarpathian Regional State Administration – Department of Ecology and Natural Resources

www.interreg-danube.eu/transgreen

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