



TRANSGREEN Policy Recommendations on integrated road and rail transportation planning in the Carpathians

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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”

Danube Transnational Programme, DTP1-187-3.1

April 2019

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Acknowledgement

This publication was elaborated as part of Output 3.2 Planning Toolkit of the TRANSGREEN “Integrated Transport and Green Infrastructure Planning in the Danube Carpathian Region for the Benefit of People and Nature” project (DTP1-187-3.1, January 2017 – June 2019) funded by the Danube Transnational Programme through European Regional Development Funds.

Authors gratefully acknowledge the efforts of all TRANSGREEN project partners and stakeholders within the frame of the Carpathian Convention and trust that they will benefit from the result.

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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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INTRODUCTION

In the Carpathian countries – as elsewhere in the world – transport is regarded as one of the key factors driving the economic development. The resulting increase in traffic flows and infrastructure often leads to fragmentation of habitats and barriers for wildlife. This is of particular concern as the Carpathian mountain range is still harbouring species and habitats that are close to extinction in other parts of Europe. Loss of biodiversity due to unsustainable transport infrastructure is thus an unacceptable loss for all of Europe and hinders the attainment of the CBD Aichi Biodiversity Targets, the UN Sustainable Development Goals (SDGs) and the objectives of the EU cohesion policy and the 2020 Strategy for Biodiversity. Reducing this risk is possible but hampered by a range of factors:

- National transport master plans are not treating biodiversity conservation as an integral objective of transport planning.
- In some of the Carpathian countries, there is little tradition of and appreciation for spatial plans. This hampers integrated and forward-looking planning approaches.
- Wise terrestrial infrastructure planning aiming to reduce threats to biodiversity requires interdisciplinary and interagency cooperation for which there are few methodologies in place and little experience to date.
- Strategic Environmental Assessments are too general while Environmental Impact Assessments come at a later stage when plans are finalized and consequently are often regarded as an administrative burden rather than as key instruments for spotting the impact on biodiversity and identifying the best environmental options. Also, they often fail to capture the cumulative impacts.
- Ecological data such as the way that large mammals move and use the habitats, or the ecosystem services have not been systematically collected per country and region. This information, although crucial, is unavailable during the planning-stage of a new transport route.
- Project design usually does not include proper impact monitoring to allow for lessons to learn and adaptive management.
- Cost-benefit analyses rarely integrate environmental costs and benefits. The loss of biodiversity thus is not captured, nor the benefits for the society of investing in proper mitigation. Therefore, the incentive for impact reduction remains low.
- Systematic and effective stakeholder involvement for conflict reduction is not a standard procedure in the Carpathian region.
- The impact of climate change is rarely considered.

TRANSGREEN seeks to address these challenges by developing concrete environmentally-friendly road and rail transport solutions and by facilitating the experience and knowledge sharing of planners, economists, engineers, ecologists and landscape architects. **TRANSGREEN also formulates these Policy Recommendations for countries working together under the Carpathian Convention. The proposed Recommendations aim at facilitating and promoting the implementation of the Carpathian Convention Protocol on Sustainable Transport.** They are targeted at policy makers, politicians, ministries, and institutes and consultancies, who work on planning issues linked to the transport and environment nexus at both national and regional level. The Recommendations are based on a literature review^{1,2,3,4,5} and documents developed during the project implementation phase of TRANSGREEN:

- Wildlife and Traffic in the Carpathians – Guidelines on how to minimize the impact of transport infrastructure development on nature in the Carpathian countries
- 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 Infrastructure Planning – Training package
- Scheme for stakeholder participation related to transport infrastructure development
- Tool for registering animal-vehicle collisions
- Carpathian Countries Integrated Biodiversity Information System (CCIBIS, www.ccibis.org)
- Catalogues of measures for the TRANSGREEN pilot areas including the In-depth analysis of the pilot area
- Draft Strategic Action Plan for implementation of the Protocol on Sustainable Transport

All publications are available at www.interreg-danube.eu/transgreen.

They are aligned with the Protocol on Sustainable Transport to the Carpathian Convention (Table 1).

- 1 Georgiadis, L., Adelsköld, T., Autret, Y., Bekker, H., Böttcher, M., Hahn, E., Rosell, C., Sangwine, T., Seiler, A. & Sjölund, A. 2018. Joining Ecology and Transportation for 20 years. History review of Infra Eco Network Europe. IENE. Linköping, Sweden.
- 2 CBD/SBSTTA/21/INF/11 “Biodiversity and Infrastructure: A better nexus? Policy Paper on mainstreaming biodiversity conservation into the infrastructure sector”, prepared by the World Wide Fund for Nature (WWF) and the International Institute for Sustainable Development (IISD), <https://www.cbd.int/doc/c/8375/39f2/f3e248b-d79a657a3f08e10c1/sbstta-21-inf-11-en.pdf>
- 3 Luell et al. (eds) 2003. Wildlife and Traffic: A European Handbook for Identifying Conflicts and Designing Solutions. KNNV Publishers
- 4 Ament, R., R. Callahan, M. McClure, M. Reuling & G. Tabor. 2014. Wildlife Connectivity: Fundamentals for conservation action. Centre for Large Landscape Conservation: Bozeman, Montana.
- 5 Collins, M., Williams, S. 2017. Rethinking Roadways: A new Standard of Excellence in Road Network Planning. Centre for Large Landscape Conservation. Bozeman, Montana.

Table 1

Main Articles of the Carpathian Convention Protocol on Sustainable Transport.

Art. 4: Integration of the objectives of sustainable transport and transport infrastructure development in the Carpathians.
Art. 5: Participation of regional and local authorities, and other stakeholders.
Art. 6: International cooperation.
Art. 7: General transport-policies and strategies.
Art. 8: Transport infrastructure networks and their connectivity.
Art. 9: Road transport.
Art. 10: Rail transport.
Art. 11: Water transport.
Art. 12: Air Transport.
Art. 13: Non-motorised transport.
Art. 14: Traffic management systems.
Art. 15: Safety standards.

The Recommendations are grouped as follows:

- I. Recommendations towards the implementation of the Protocol on Sustainable Transport
- II. Detailed Recommendations for all the levels of development of transportation projects from policy and planning to operation and monitoring
- III. Principles for the Sustainable Development of Linear Transport Infrastructure of IENE (Infrastructure and Ecology Network of Europe)

I. RECOMMENDATIONS TOWARDS THE IMPLEMENTATION OF THE PROTOCOL ON SUSTAINABLE TRANSPORT

Based on the detailed recommendations below, the Carpathian Convention Protocol on Sustainable Transport can best be implemented by taking the following actions:

- 1. Ratify the Protocol** on Sustainable Transport by all the Carpathian states and transpose it into the national legal and institutional systems.
- 2. Define a common development strategy** for the Carpathians including transport and biodiversity aspects and analyse national development policies, e.g. on tourism with respect to their impact on transport development, then set up mechanisms for reducing impact on wildlife corridors and other biodiversity objectives. The common development strategy for the Carpathians should be reflected in the comprehensive national development strategies including transport master plans.
- 3. Enable sustainable linear transport planning by amending, where necessary, relevant policies and laws, in particular those related to nature conservation and spatial planning**, e.g. on identifying and ensuring the functionality of ecological corridors.
- 4. Upgrade laws and policies** on public procurement, public-private partnerships, power purchase agreements and concession agreements to seek best results according to the three dimensions of sustainability across the infrastructure life cycle.
- 5. Amend infrastructure planning legislation** so as to systematically require that technical feasibility studies, costs and revenue forecasts (conducted in the project planning phase) **consider mitigation measures**. This is particularly important for the coherence of protected areas and landscapes outside of the protected areas that provide critical ecosystem services, especially under current climate change effects.
- 6. Amend legislation on infrastructure planning and project preparation to make consultation of national biodiversity action plans** and similar policies mandatory early in the infrastructure planning process.
- 7. Periodically monitor and assess the impact of transport master plan implementation.**
- 8. Amend legislation to ensure that the national biodiversity plans** highlight opportunities to use natural and nature-based infrastructure as a part of the overall biodiversity conservation strategy to encourage planners, scientists, and nature conservation stakeholders to jointly determine the biodiversity value of different options and thus to identify the best trade-off.
- 9. Amend national climate change adaptation and mitigation plans** to integrate aspects of transport infrastructure, urban development and national biodiversity plans to make climate reliance an integral part of infrastructure plans and projects.
- 10. Set up a pool of experts and professionals** and secure funding specialized on sustainable transport planning, research and expertise, especially for those who can be drawn in for solving conflicts between transport, transport plans and nature conservation objectives.

11. Set up interdisciplinary and interagency Working Groups – including internationally – for sharing information, methodological developments, analysis of results and trade-off discussions; ensure that relevant staff is tasked to participate regularly, and meetings are prepared and moderated effectively.

12. Collect and share data on biodiversity and ecosystem services on an inter-ministerial platform in order to promote the mainstreaming of biodiversity conservation in infrastructure deployment.

13. Define common international / Carpathian guidelines for data collection, including proper legal and institutional arrangement of the obligation to make the data on transport, biodiversity and ecosystem services, collected from public funding, publicly accessible.

14. Define common international / Carpathian guidelines for the cost-benefit analysis of transport programmes and projects, which fully reflect environmental costs and benefits.

15. Design and finance capacity building measures to empower stakeholders to participate effectively in transport planning processes. Further, design and finance capacity-building measures for infrastructure planners and policy-makers on how to properly design the Terms of Reference (TOR) of the impact assessments, supervise the development and conclude on results such as adapting the siting and design of infrastructure.

16. Review the development and implementation of TEN-T⁶ policies and plans: Planned connections have not rigorously applied the mitigation hierarchy, nor involved the public thoroughly. This is why mitigation measures are now more costly and difficult to implement. Future TEN-T plans and policies should assess and integrate the impact on the ecological connectivity and especially on Natura 2000 network and other protected areas and their coherence⁷ upfront in a transparent manner.

17. Strengthen the integrated approach in the EU Strategy for the Danube Region: the EUSDR review processes provide an excellent opportunity for promoting integrative initiatives by enhancing a) cross-sectorial exchange and cooperation among relevant Priority Areas PA6 and PA 1b, b) cooperation and exchange of information between the Carpathian Convention relevant Working Groups (Biodiversity and Sustainable Transport) and PA6 and PA 1b Coordinators, c) the use of the knowledge base developed under the TRANSGREEN and ConnectGREEN projects, d) the cooperation with other EU Initiatives and international processes for data sharing, mediation and resolution of environmental conflicts, while ensuring easy public access to data and information, both concerning the biodiversity and the transport aspects and plans, e) the use of existing data platforms like CCIBIS, developed and updated thanks to several EU Projects (e.g. SEE BioREGIO Carpathians, DTP TRANSGREEN, DTP ConnectGREEN), f) interagency / inter-ministerial / inter-sectoral dialogue.

18. Introduce the objective of conserving habitats of selected protected large mammal species and of ecological corridors to the spatial planning procedures (transport/urban planning, etc.) of the **Via Carpathia** highway network.

19. Provide and activate adequate financial resources for implementation of integrative sustainable transport and green infrastructure development approach. In the public investment policies, including the EU structural funds, it is necessary to prioritise integrated approaches aiming at balanced development, harmonising the interests of environmental protection and better transport connectivity.

⁶ The Trans-European Transport Network (TEN-T) is a European Commission policy directed towards the implementation and development of a Europe-wide transport infrastructure network. The objective of TEN-T is to close gaps, remove bottlenecks and eliminate technical barriers that exist between the transport networks of EU Member States.

⁷ According to Article 10 of the Habitat Directive.

II. DETAILED RECOMMENDATIONS FOR ALL THE LEVELS OF DEVELOPMENT OF TRANSPORTATION PROJECTS FROM POLICY AND PLANNING TO OPERATION AND MONITORING

A. Interdisciplinary approach and participation

Multi-stakeholder involvement right from the beginning in transport planning improves public trust and credibility and ensures that the existing knowledge is being captured and put to use in the best way possible. It is one of the central pillars of successful, ecologically informed transport planning and overall project efficacy. To this end, integrated discussions between the scientific community, conservation practitioners, and decision makers should be facilitated and encouraged.

This plurality of stakeholders should also be mirrored in the composition of project teams. The Terms of Reference (TOR) for project plans and implementation should therefore require **multi-disciplinary project teams** of engineers and environmental professionals. As some solutions for conflict minimisation only evolve during project planning, the TOR and overall planning timeline should allow for sufficient flexibility for incorporating these adjustments.

In addition, **proper public participation procedures**, such as public consultations on feasibility studies or environmental impact assessments, must be adhered to. This requires making all relevant data and information easily accessible to the public in due time, inviting for consultations in a visible manner, capturing all comments in a systematic way and responding to them transparently and diligently. These public consultation procedures should also be used as a means to inform people about the Carpathian Convention Protocol to raise awareness and support.

It is also advisable to establish **a national platform with key experts** from all relevant fields (spatial planning, transport, biodiversity conservation, river basin management etc.) with the task to analyse transport projects and issuing specific and targeted recommendations on how to minimize the impact of linear infrastructure on biodiversity, in particular wildlife corridors. Alternatively, landscape-level conservation partnerships can ensure connectivity protection.

B. Interagency and international coordination

For the **systematic policy integration of biodiversity and transport objectives**, the conclusion of a framework agreement (e.g. Memorandum of Understanding) between transport, spatial planning and environmental ministries and/or respectively their agencies is recommended, setting out a common approach to integrated planning from a master plan to a detailed design and on data collection and sharing, e.g. on traffic fauna mortality.

For wildlife corridors crossing the national borders, international cooperation is beneficial and often required in line with the ESPOO convention.

C. Data, information, knowledge

Good planning requires high-quality data, information and knowledge. These enable conservationists, infrastructure planners, scientists and politicians to work together in a constructive manner and to determine the most acceptable trade-offs for sustainable development.

Therefore, it is important to make sure that natural resource managers, planners and decision makers **have access** to topical and relevant research and monitoring results on ecological connectivity, wildlife corridors, as well as to the management plans of the protected areas. This can be achieved by investing resources in workshops and trainings, or by strategic cooperation with relevant institutions, key research institutes and universities. Public institutions should also invest in facilitating the sharing of knowledge and methods for landscape connectivity and corridor conservation gained during applied practice.

Furthermore, a greater allocation of funds is recommended for **filling data gaps and establishing an accessible database** (see box). The necessary financial means should either be ensured by increasing the budget of environmental authorities or by allocating sufficient funds in the budget of transport projects or plans.

In order to ensure a sound knowledge base, new data should be generated, stored and tagged following the same methodology (e.g. taxon name, GPS position, sex, age, etc.) and made freely available for download on a public portal, or at least made accessible to all involved public institutions and relevant stakeholders. Datasets should be regularly updated, e.g. maps every 5-10 years, as changing structures of settlements, agricultural methods, and water- and forest management measures can modify the habitat use and migratory habits of animals.

To reduce the transaction costs associated with sustainable infrastructure planning, stakeholders should look into the use of **block-chain technologies** to record, update and share the wide range of multidisciplinary data for effective due diligence. They can help bring efficiency and transparency to record keeping, market predictions, simulations on environmental and biodiversity change, governance, smart contracts, auditing in infrastructure projects across their life cycle, etc.

Project teams should form an accessible common database with the following data and information:

- Geo-referenced data on existing and planned transport infrastructure
- Geo-referenced data on existing and planned other types of infrastructure and expected changes in land use
- Key data on demographics and patterns of urbanization, and forecasts of industrial development
- Data on infrastructure projects under construction, including financing arrangements
- Data on key green infrastructure landscape elements that are prioritized by national authorities (in the national Prioritized Action Framework) for connecting the Natura 2000 and other networks or by the European Committee as part of a future Green Infrastructure EU wide network
- Migration corridors and functional corridors for key species that allow populations to adjust to climate change
- Important and umbrella species' Action Plans
- Natura 2000 sites, Emerald sites, other protected areas and conservation measures
- Climate change scenarios and data
- Roadless and wilderness areas that should remain free of human development
- Site-specific species movement data, including barriers to movement
- Areas for future investment in crossing structures and other mitigation measures
- Studies on behavioural ecology of large mammals in relation to traffic infrastructure, including those involving GPS telemetry to identify important wildlife routes.
- Animal mortality on roads and railways
- Traffic accidents caused by animals (wild or domestic)
- Results of high-quality, systematic scientific research on underrepresented species and habitats

D. Spatial planning approaches

The only approach that can prevent progressive isolation of wildlife populations consists of anchoring the migration corridors in the relevant legislation and ensuring proper protection/management through spatial planning to avoid the construction of settlements and industrial facilities in those areas. Dedicated wilderness and roadless areas critical for wildlife dispersal should be shielded from new infrastructure and settlement projects. This is not only beneficial for nature but can also prevent human-wildlife conflicts. In cases where the relevant legislation does not foresee the implementation of restoration measures in areas where connectivity has been hampered by past interventions, amendments should be considered.

In addition, reliable information about the future development in a given area has to be taken into account in the planning; otherwise solutions that work today might become obsolete in the near future. Similarly, predicted habitat changes induced by climate change should be considered in integrated planning at landscape level.

Mitigation planning must take into consideration the national and international spatial planning strategies, the development of the whole infrastructure network and wider land use issues such as increasing settlement and industrial areas triggered by new transport infrastructure. The measures must consider adjacent land use and planned development as this may severely reduce the efficacy of any mitigation or compensatory measure.

Protection of delimited corridors in spatial plans is a fundamental task and a matter of inter-sectoral cooperation, requiring legislative procedures. Where these are not in place yet, respective amendments should be considered.

E. Impact assessments

Strategic environmental assessments (SEA) should be done early in the planning stage, are crucial to avoiding negative impacts and are thus a precondition for holistic infrastructure planning. **Environmental impact assessments (EIA)** provide the opportunity for more specific on-site assessments of biodiversity ensuring that the siting, design and construction of infrastructure can be adjusted to minimize interference with species and populations.

Both types of assessments should include (a) **climate vulnerability** considerations, indicating the likelihood that climate change will considerably affect the plan or project area, as well as comprehensive reviews on (b) **cumulative effects** of doubling transport infrastructure (roads, railways and other infrastructure).

New transport infrastructure can increase accessibility to previously undisturbed and therefore biodiversity-rich areas. Other types of infrastructure, such as settlements or sport facilities, start to sprout. This secondary impact should also be assessed and considered in the planning phase, in particular in the context of SEAs.

Environmental Impact Assessments should be conducted at different levels:

- **National** Strategies and Master Plans (SEA process)
- **Regional** Strategies and Master Plans in which the potential routes are first developed in relation to topography, geology, terrain and drainage, as well as the existing infrastructure and settlement patterns. At this level, the total impact of the transport infrastructure network as well as individual plans is considered (SEA process).
- At the **landscape level**, where the routes of individual segments are planned to avoid serious conflicts. At this level, land use, landscape, nature, culture and other interests are also taken into account. Landscape structure and the amount and spatial pattern of existing habitats will determine the impact of infrastructure developments (EIA process).
- At the **site level**, where specific engineering solutions are designated to meet the requirements of fitting the road to the terrain to minimise the potential impact. Physical and engineering constraints set the parameters for the design (EIA process).

Upgrading and repairing of existing roads and railways is an opportunity to reduce the degree of fragmentation by improving the permeability to wildlife while upgrading the existing roads. Upgrading roads and railways also requires a comprehensive EIA similar to that used in the planning of new roads and railways, adopting an overall defragmentation approach.

F. The mitigation hierarchy

The basic **philosophy of the Mitigation Hierarchy** is that prevention is better than cure – avoiding the negative effects of habitat fragmentation is better than repairing or lowering the damage. Where avoidance is impossible/impractical, mitigation measures have to be designed as an integral part of the scheme. Where mitigation is insufficient or significant residual impacts remain, then the compensation measures are needed as the last resort. These principles should be applied to existing roads or railways where repair and maintenance, relationships with other fragmentation sources and the use of existing engineering works should be examined. Where there is no legal obligation to rigidly apply this hierarchy, legislative amendments are to be considered.

Impact avoidance involves the selection of the least damaging route alignment – respecting the existing landform – combined with design that minimises environmental risks. Avoidance is particularly important for irreplaceable nature values such as virgin forests or natural rivers, which have become extremely rare in Europe. Nevertheless, route selection is always a compromise between the different interests. If full avoidance is impossible, **mitigation** measures kick in to minimise the extent of habitat deterioration and to maintain connectivity through the use of structures that ensure habitat continuity and careful planning of earthworks. Mitigation structures need to be maintained and the surrounding landscape and land use properly managed. If monitoring of the effectiveness of measures shows negative results, they need to be adjusted. As some of these issues go beyond the mandate and responsibility of infrastructure owners, inter-agency agreements are needed. The acquisition of land and/or procedures concerning the use of land set aside for the implementation of mitigation measures must be an option. Roadway management should also contribute to the efficiency of mitigation.

For some negative impacts of transport infrastructure development on biodiversity inside or outside protected areas, mitigation is impossible. In those cases, ecological losses have to **be compensated** through better management or restoration of a comparable habitat in the vicinity. Where a new or improved road or railway affects a site of international importance (i. e. designated under the EU Birds or Habitats Directives, the Bern Convention Emerald network site, Ramsar Site, etc.), land to support a

compensatory habitat will also have to be secured, developed and managed appropriately. However, ecological compensation is either mandatory (see below) or a “last resort” solution and should never be a standard “payment” for issuing planning permits as such forms of biodiversity offsets are not able to fully compensate environmental degradation and biodiversity loss.

According to the Birds and Habitats Directives, compensatory measures should be implemented before the start of infrastructure development and have to be taken if a development project is expected to significantly impact areas a) that are protected by the EU Birds and Habitat Directives, other international obligations, or by national regulations, and b) that are of high conservation value and subject to a non-legislative compensation policy.

Evaluation of possible fragmentation or barrier effects at a very early phase of the planning process can significantly save costs. Mitigation measures are more likely to be effective if integrated at an early stage of planning. They are also cheaper than measures built after infrastructure development.

G. Financial aspects

A thorough cost-benefit analysis is the basis for well-informed decision-making in any plan. It should include the costs to avoid or mitigate impacts and show the “additionality” of a plan not only in economic terms but also the net social and economic benefits that the project will bring. This is why cost-benefit analyses have to reflect ecosystem service values and other environmental costs and benefits to allow a realistic and future-oriented assessment of transport projects. This will help to justify the investment in mitigation measures such as green bridges or tunnels and allow the identification of projects that prove to be unfeasible when all three dimensions of sustainability are applied. For this to be possible, the values of natural capital and ecosystem services have to be assessed and integrated into calculations of plans, thereby identifying locations and measures that minimize mitigation costs and maximize benefits to people and nature. If in doubt, the Precautionary Principle should be applied.

Thorough cost-benefit analyses should also look at projected trends in urbanization and industrial development, future demand for infrastructure, the ability and willingness of users to contribute towards operating costs, and cumulative impacts on the environment.

Payments for Ecosystem Services (PES) involve rewarding natural resource (e.g. land) owners for a guaranteed flow of ecosystem services or certain actions likely to enhance their provision over and above what would otherwise be provided in the absence of payment. Such payment schemes can contribute to covering costs of nature-friendly solutions and improve the cost-benefit ratio.

Protecting connectivity on private lands requires its own set of policy tools and methods at national and/or sub-national level. Land trusts and state funding for private land management can provide incentives for maintaining and enhancing ecological connectivity on such lands.

Public investment policies including EU structural funds have to prioritise integrated approaches aiming at balanced development harmonising the interests of environmental protection and better transport connectivity.

The environmental dimension including wildlife protection should be a horizontal priority across all five investment priorities of the programming period 2021-2027. Strategic transport networks should be developed hand in hand with the support of greener and carbon free transport modes and use of smart innovations in transport infrastructure and means. Financial support should be preconditioned by the decisions on transport infrastructure development built in the place and evidence-based transport policies incorporated into the comprehensive locally-led sustainable development strategies designed in broad participative processes.

H. Monitoring and evaluation

Monitoring is a mechanism that allows planners to assess the effectiveness of measures applied to reduce the impact of infrastructure on habitat fragmentation, in order to adjust existing structures or management schemes and better design mitigation measures in the future, both in the SEA and EIA processes.

A basic monitoring framework has to be included in the preparation of any transport infrastructure construction or modernization project. A monitoring programme should be part of the EIA process and should always include monitoring the state of biota in the defined territory, performed before construction, during construction and after putting the infrastructure into operation.

III. IENE Principles for the Sustainable Development of Linear Transport Infrastructure

I. Strong legal framework: Establishment and strengthening of a legal framework for sustainable linear infrastructure development.

II. Sustainable strategic planning: Sustainable strategic planning for development of any major transportation infrastructure project based on the hierarchy of priorities: avoidance – mitigation – compensation.

III. Ecosystem approach: Ecosystem approach to crossing points of grey and green infrastructure, knowing the values of natural capital and ecosystem services in combination with the 'precautionary' principle.

IV. Any case, a unique case: Establishment of the 'any case, a unique case' approach, taking any problem as a unique problem and always properly evaluating the use of existing solution.

V. Multi-disciplinary cooperation: Establishment of multi-disciplinary cooperation among different professionals such as engineers and environmentalists.

VI. Civil society involvement: Involvement of civil engineer society in the planning phase of linear infrastructure projects.

VII. Polluter pays principle: Implementation of the 'polluter pays' principle, after clarifying the ethical and transparency concerns, by including particular mitigation measures right from the beginning of the planning phase until the tendering and contracting of the building and operating phases.

VIII. Long life effective maintenance: Inclusion of maintenance of mitigation measures in the budget of the ordinary program for maintenance of the infrastructures under operation.

IX. Environmental supervision: Inclusion of environmental supervision of technical features of the infrastructure and monitoring of the habitat and wildlife populations' status at all phases of the projects from design to full operation.

X. Culture of learning: Establishment of a culture of learning to build up and support continuous evaluation and exchange of knowledge and experience among the interested, relevant and authorized organizations and state services.

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Project co-funded by the European Regional Development Fund (ERDF)

Overall Budget: 2.481.321,16 Euro **ERDF Contribution:** 2.109.122,95 Euro

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