



CONNECTGREEN PROJECT AND THE FUTURE OF PLANNING INFRASTRUCTURE CORRIDORS

*Simonović Alfirević Sanja²⁴, Brankov Borjan²⁵, Nenković-Riznić Marina²⁶,
Stojković Milena²⁷*

Abstract

The ConnectGREEN project, conducted from 2018-2021 within the INTERREG Programme (DTP 072-2.3), focused on restoring and managing ecological corridors as green infrastructure in the mountain regions of the Danube basin. The project's primary aim was to develop a methodology for identifying migratory corridors for large mammals such as wolves, lynxes, and bears in the Carpathian region. It involved five countries and 13 institutions, led by WWF Romania. The Republic of Serbia participated as an IPA partner with two institutions: the Institute for Architecture and Urban & Spatial Planning of Serbia and Đerdap National Park. The project established guidelines to mitigate conflicts in these corridors and created a geodatabase on Natura 2000 designated areas and ecological corridors in Serbia. This opened new perspectives in Serbian strategic planning, offering fresh insights and proposals for planning infrastructure corridors. The results could inform new planning practices. This paper highlights the main methodological and strategic improvements in Serbian planning practice, especially for planning infrastructure corridors such as highways, motorways, and railways in nature-protected areas. It also provides guidance to enhance ecological connectivity between natural habitats, particularly within the Natura 2000 network and other protected areas in the Carpathian ecoregion of Serbia.

Key words: *ConnectGREEN, ecological corridors, Serbia, Đerdap National Park, infrastructure planning.*

²⁴ Sanja Simonović Alfirević, PhD, Senior Research Fellow, Institute of Architecture and Urban & Spatial Planning of Serbia, Belgrade, Republic of Serbia, sanjas@iaus.ac.rs

²⁵ Borjan Brankov, MA Arch, Senior Technical Fellow, Institute of Architecture and Urban & Spatial Planning of Serbia, Belgrade, Republic of Serbia, borjan@iaus.ac.rs

²⁶ Marina Nenković-Riznić, PhD, Principal Research Fellow, Academician of IRASA, Institute of Architecture and Urban & Spatial Planning of Serbia, Belgrade, Republic of Serbia, marina@iaus.ac.rs

²⁷ Milena Stojković, PhD, Independent researcher, London, UK



Introduction

The planning and management of green infrastructure and ecological corridors is directly influenced by ecological connectivity, which represents the degree of connection between the various natural environments present within a landscape, in terms of their components, spatial distribution and ecological functions. Over the years, spatial development has altered and fragmented landscapes. To counteract the negative effects of habitat fragmentation, nature conservation experts recommend enhancing connectivity between habitats [1]. Preserving natural corridors between habitats is crucial for sustaining biological diversity in a changing climate and maintaining ecological services for the community.

This is particularly relevant for the migration of wildlife across fragmented areas and their habitats in landscapes that are altered by the human development (settlements, infrastructure corridors, industry, etc.). A landscape denotes a specific area whose character results from the interaction of natural and/or human factors. Preserving and maintaining the significant or characteristic features of a landscape, arising from its natural configuration and/or human activities, is crucial [2, 3].

In recent decades, anthropogenic changes and landscape shaping have been rapid and have had significant cumulative impacts. Decision-making in spatial, urban, and infrastructure planning has often neglected the characteristics and values of landscapes. Biological diversity and character of landscape have frequently been overlooked. The modernization and development of European countries have necessitated the construction of new transportation networks, inevitably increasing the risk of landscape fragmentation, which limits the dispersion and genetic exchange of wildlife species. These artificial and often insurmountable barriers along traditional dispersion paths also increase the risk of vehicle collisions [2, 4, 5].

Ecological connectivity between nature-protected areas is crucial for species that require large habitats, have low population densities, and are sensitive to landscape fragmentation. Wildlife corridors can be a solution to fragmentation, as they are "landscape elements that serve as connections between historically connected habitats." Ecological connectivity not only benefits wildlife populations but also represents an indispensable value for human society and the economy, playing a central role in the functioning of ecosystems and the cohesion of protected area networks [2, 6, 7].

In this context, by defining a methodological approach and strategic guidelines for managing green infrastructure in Serbia, inputs are provided for the safe planning and implementation of transportation infrastructure inspired by nature-based solutions, which reduce animal mortality rates. The primary goal of this paper is to provide guidelines for protection, revitalization, planning and enhancement of ecological corridors to become an integral part of spatial planning and territorial development. Achieving this goal requires the full application of the outlined methodological approach and a set of measures derived from it, focusing on reducing ecological fragmentation and constructing green overpasses for the safe crossing of animals [1].



The research presented here emerges from the results of the project ConnectGREEN (DTP 072-2.3), conducted from 2018-2021 within the INTERREG Programme, focused on restoring and managing ecological corridors as green infrastructure in the mountain regions of the Danube basin. The project's primary aim was to develop a methodology for identifying migratory corridors for large mammals such as wolves, lynxes, and bears in the Carpathian region. It involved five countries and 13 institutions, led by WWF Romania. The Republic of Serbia participated as an IPA partner with two institutions: the Institute for Architecture and Urban & Spatial Planning of Serbia and Đerdap National Park.

The primary objective of this paper is to reference research conducted within the above-mentioned project and, in a general sense, draw conclusion on possibilities to mitigate conflicts in these corridors.

Overview of the theoretical background

In the European Union, green infrastructure management and planning is regulated through the European Commission's Green Infrastructure Strategy [9], which represents a key strategy in European landscape policies. This strategy aims to ensure that the protection, revitalization, creation, and enhancement of green infrastructure become integral parts of spatial planning and territorial development as well as to "preserve, restore and enhance green infrastructure to help stop the loss of biodiversity and enable ecosystems to deliver their services to people". The Green Infrastructure Strategy provides a framework for developing the Trans-European Network for Green Infrastructure (TEN-G) and integrating green infrastructure into sectoral policies such as agriculture, forestry, water management, marine area management, fisheries, regional and cohesion policies, spatial planning, and more. The Natura 2000 network forms the foundation of the EU's green infrastructure. The goal of this network is to ensure the long-term survival of Europe's most important and endangered species and habitats, as listed in The Birds Directive [10] and the Habitats Directive [11].

Increasing the area, connectivity, and integrity of natural ecosystems and habitats is one of the four main long-term goals for 2050 outlined in the first draft of the Global Biodiversity Framework post-2020 [12]. Practical targets for 2030 include the percentage of land area to be covered by spatial plans, maintaining most existing intact areas and wilderness, and enabling the revitalization of a certain percentage of degraded natural ecosystems and their connectivity. By 2030, at least 30% of the planet should be protected by a well-connected and effective system of protected areas and conservation measures. Active management measures should be in place to facilitate the recovery and conservation of wildlife species and reduce conflicts between humans and wildlife.

For comparative purposes with the Republic of Serbia, countries in the Carpathian region facing similar issues in managing ecological corridors and habitat fragmentation for wildlife have been selected: the Czech Republic, Hungary, Slovakia,



and Romania. All these countries use indicator systems to identify ecological networks and corridors, based on methodologies used for recording Natura 2000 sites and the Pan-European Ecological Network. However, indicators vary from country to country, as does their significance. This variation is due to inconsistent data systems in national databases and national legislative frameworks, which hinder adequate data systematization at a broader, transnational level.

Table 1. Problematic issues in managing ecological corridors and habitat fragmentation for wildlife

The Czech Republic	long-standing practice of recording green/ecological corridors along	adequate strategic and legislative framework	- monitors all hydrological and climatic data that may affect corridors - defined a national network of wildlife ecological corridors
Hungary	long tradition of designing green bridges for wildlife crossings	- EU harmonized strategic and legislative framework - national ecological network and Natura 2000 are integrated into spatial planning systems	defined national ecological network based on the Pan-European level
Slovakia	significant conflicts between construction and nature protection	identification of ecologically significant areas is based on criteria such as representativeness, area coverage, degree of conservation, isolation level	defined national strategy that integrates spatial and urban planning with environmental protection (not fully implemented)
Romania	adopt the practice of building green bridges for wildlife crossings	EU harmonized strategic and legislative framework	defined strategy on national level which combines issues of spatial and urban planning with environmental protection

Source [1]

Ecological connectivity in Serbia – between the potential and implementation

The management of ecological corridors in Serbia has not yet been a subject of detailed elaboration within the spatial planning methodology nor withing planning of infrastructure corridors (in adequate manner). Achieving a balance between socioeconomic development (particularly in the area of infrastructure development) and environmental protection requires a coordinated approach based on analysis of different analytical data, documentation, scientific data and methods, along with



responsible spatial planning that considers long-term impacts on environment on a broader scale.

In Serbia, there is no systematic identification of ecological corridor networks at the national level. The Emerald and Natura 2000 networks are recorded as isolated areas, without a defined corridor network. The establishment of an ecological network in Serbia is based on the Regulation on the Ecological Network ("Official Gazette of RS", No. 102/2010).

During the period from 2009 to 2012, an ecological network was established and mapped in the territory of AP Vojvodina, which is available on the website of the Provincial Institute for Nature Protection. This allowed for the definition of network elements in Vojvodina and the integration of the network into spatial plans at both the regional and local levels. This helps in defining and proposing goals of spatial development that take into consideration both protection of natural assets and development of settlements, infrastructure etc.

However, in the rest of the territory of the Republic of Serbia, the ecological network has not yet been officially established and declared, and it has not become functional in an ecological sense. The identification of the ecological network and ecological corridors has been done partially, and detailed mapping has not been carried out.

The lack of an obligation to define and protect ecological corridors leads to further devastation of existing parts of ecological corridors, increasing the costs of their reconstruction in the future, which leads to irreversible changes in the genetics of species and landscapes and prevents the restoration of corridors for future generations. The establishment of a network of ecological corridors is envisaged by legislation in the field of nature protection, but its implementation is greatly obstructed by the lack of cross-sectoral cooperation in the areas of spatial planning, infrastructure planning and environmental protection.

Legislation is still not fully operational, and there is a need to clarify legal uncertainties, while the accompanying strategic documents (strategies and action plans) that would support the resolution of this issue still do not have adequate application. There is also a problem in the implementation of the law, because of the conflict of the activities in other relevant sectors (forestry, agriculture, and water management). As these sectors are responsible for changes in landscape structure, the state needs to harmonize sectoral legislation with international conventions (e.g., the Bern Convention, the Habitats Directive).

Although Serbia has adopted several laws and regulations aligned with the Carpathian Convention, almost no strategy has fully adopted its rules and recommendations. The main deficiency is that the ecological network needs to be identified, assessed, and subsequently proposed for protection measures at the national level – that is, in the national policy/strategy for nature protection and/or biodiversity protection. Only two national strategies actually mention ecological networks in Serbia: the Biodiversity Strategy of the Republic of Serbia for the period 2011 to 2018 ("Official Gazette of RS" No. 13/2011, expired) and the National Strategy for Sustainable Use of Natural Resources and Goods ("Official Gazette of RS" No. 33/2012) and the Nature Protection Program of the Republic of Serbia for the period



2021-2023. However, none of them truly provide recommendations for the integration of ecological networks into other sectors, apart from nature protection.

In Serbia, the identification of the ecological network is based on the precise recognition of existing animal habitats (especially for bears and wolves) and the identification of anthropogenic landscape elements (shelters, canals, embankments, etc.) that function as habitats or ecological corridors, as well as anthropogenic barriers such as settlements, fences, or infrastructure corridors. The most important indicators of the quality of the ecological network are the type and/or structural diversity of habitats or corridors, the presence of protected species, and the estimated permanence (temporal and spatial) of the network element in the landscape. Specific indicators include: habitat types; presence of strictly protected and protected wild species; presence of bird species specified by the Birds Directive; protection zones as areas outside the boundaries of protected areas, and others.

However, despite all the mentioned indicators, the real identification of the ecological network in Serbia has not yet been established to an adequate extent. The main problems in identifying ecological corridors in Serbia are primarily the lack of data (related to the population of wild species - lack of habitat maps and insights into sectoral plans), financial support, expert staff, and the implementation of previously defined measures (through legislative and strategic framework). Since ecological corridors are not clearly defined, they are often not recognized as development constraints in planning documents.

In Serbia, there is a practice of observing and monitoring animal species habitats (which are not necessarily related to the ecological network - brown bears, wolves, Eurasian lynx), but that monitoring is not continuous or implemented on the whole territory of Serbia.

Due to all the mentioned deficiencies in current scientific research and practice in determining ecological corridors as a significant limiting factor for spatial development, it was necessary to define a methodology for identifying ecological corridors for animal species, which is essential for defining green corridors/infrastructure in Serbia.

This methodology is necessary for identifying wild animal migratory corridors, which will contribute to the conservation of species, their populations, and the reduction of wild animal mortality rates resulting from inadequately designed transportation infrastructure. Population reduction often occurs as a result of habitat fragmentation due to the planning and construction of transportation infrastructure that does not consider existing ecological corridors of animal species.

Methodological approach proposed through ConnectGREEN project

Conflicts expressed in the relationship between nature protection and the construction of transport infrastructure represent one of the fundamental challenges of modern spatial planning, not only in Serbia but also worldwide. The construction of high-speed roads necessarily leads to accelerated and increasing fragmentation of ecosystems and habitats of plant and animal species [13, 14]. This is a result of



inadequate spatial planning that did not sufficiently take into account nature protection measures. Consequently, a high degree of genetic changes, population shifts, and mortality of wild animals has been identified along national, regional, and local infrastructure routes, which result from landscape segmentation and the prevention of wildlife migration.

The introduction of the concept of ecological corridors into planning practice is a crucial initiative with great significance for nature conservation, biodiversity preservation, and sustainable development. These corridors represent connected ecological systems that allow the unobstructed movement of plant and animal species between different natural habitats. Green corridors provide vital pathways for animal species, enabling the conservation of ecosystem diversity. These corridors allow populations to sustain and reproduce freely, reducing the risk of extinction for certain species. Biodiversity conservation has far-reaching positive effects on the ecosystem and the entire food chain in an area.

Ensuring the continuity of ecological corridors and their identification and mapping reduce habitat fragmentation. Urbanization and infrastructure development often lead to the fragmentation of natural habitats, which can have serious consequences for biodiversity. Green corridors are a strategy that helps connect different habitat areas, reducing fragmentation and allowing for the unobstructed movement of species. This is essential for preserving ecosystem integrity and the long-term sustainability of natural resources.

In essence, ecological corridors in Serbia play a key role in nature conservation, supporting ecosystem balance, biodiversity preservation, and sustainable community development. This initiative represents a long-term investment in nature conservation and the creation of a balance between people and nature.

Europe has adopted several documents (the Green Infrastructure Strategy, the EU Biodiversity Strategy, the Natura 2000 Network, and others) aimed at improving conditions and increasing ecological connectivity between natural habitats. Increasing the area, connectivity, and integrity of natural ecosystems is one of the four main long-term goals for 2050 included in the first draft of the Post-2020 Global Biodiversity Framework. Practical targets for 2030 include the percentage of land area to be covered by spatial plans, retaining most existing intact areas and wilderness, and enabling the revitalization of a certain percentage of degraded natural ecosystems and their connectivity. By 2030, at least 30 percent of the planet should be protected by a well-connected and effective system of protected areas and measures for areas under protection. There should be active management measures to enable the recovery and conservation of wild fauna and flora species and reduce human-wildlife conflicts.

However, the current state does not favour the implementation of these documents, so it was necessary to define ways to address the problems of accelerated and increasing ecosystem and habitat fragmentation in Europe, as well as to enhance ecological connectivity between natural habitats, especially between Natura 2000 network sites and other categories of protected areas.

Due to all the above, the Carpathian region countries, including Slovakia, the Czech Republic, Romania, Hungary, and Serbia, within the ConnectGREEN project



"Restoring and managing ecological corridors in mountains as green infrastructure in the Danube basin", developed a methodology for identifying ecological corridors in the Carpathian countries using large carnivores (Eurasian lynx, wolf, and brown bear) as flagship species, and defined guidelines for reducing conflicts in corridor areas, along with the CCIBIS database, which is an information system on biodiversity in the Carpathian region (highlighting Natura 2000 areas and the corridors connecting them).

The project was implemented from 2018 to 2021, led by WWF Danube-Carpathian Programme Romania (WWF RO). Twelve institutions from Austria, the Czech Republic, Hungary, Slovakia, and Serbia, specializing in nature conservation and spatial planning, participated in the project.

Given the rapid and increased habitat fragmentation in the Danube region, the project defined guidelines for improving ecological connectivity between natural habitats, especially between areas within Natura 2000 and other categories of protected areas in the Carpathian ecoregion. Increased landscape fragmentation due to land use changes negatively affects the original functions of landscapes and biotopes, such as permeability for migratory species. The species groups most affected by landscape fragmentation are those linked to well-preserved natural environments, those requiring large area ranges, or those whose biological characteristics include regular or occasional migrations. This particularly applies to three large carnivore species living in the Carpathians: the grey wolf, Eurasian lynx, and brown bear. Large carnivores require very similar ecological conditions, as they are usually strictly associated with large forested areas with minimal human disturbance. Additionally, dispersal and long-distance migrations are integral to their development. Landscape fragmentation significantly restricts the movement of these species, threatening their survival. The selected target species of large carnivores have high protection status at both national and international levels.

Ecological corridors were identified at four transnationally relevant locations within the project: 1. Piatra Craiului National Park / Bucegi National Park (Romania), 2. Apuseni Mountains / Southwestern Carpathians (Romania) / Djerdap National Park (Serbia), 3. Western Carpathians (Czech Republic - Slovakia), and 4. Bükk National Park (Hungary) / Cerová vrchovina Protected Landscape Area (Slovakia) using the proposed methodology.

In the project, the Serbian team from the Institute for Architecture and Urbanism of Serbia participated, establishing the methodology for identifying ecological corridors in Serbia and guidelines for developing ecological corridors with accompanying activities of training and educating stakeholders at all management levels, as well as the Djerdap National Park. The methodology serves as an instrument for identifying wildlife migration corridors, migration barriers in the form of linear transport infrastructure, watercourses, heritage, fences, and inadequate biotopes. Based on the recorded elements, habitat suitability models and connectivity divisions are determined. The habitat suitability model is created based on species data and relevant environmental variables (abiotic factors – hypsometry, vertical heterogeneity, slope), habitat factors (type, distance from forests), and anthropogenic factors



(distance from settlements and road density), forming a connectivity model through a defined network of main areas via migration corridors.

The methodology also determines a range of measures to reduce barriers and animal mortality: measures for safe crossing of infrastructure (eco-ducts/green bridges), measures to prevent animals from entering the infrastructure corridor, measures to warn animals of transport infrastructure, and measures to alert drivers of approaching animals or risk sectors. Increased fragmentation is caused by the growth in the number of migration barriers. Migration barriers are one of the main topics when determining wildlife and migration corridors. The large number of barrier types and their diverse impacts on ecological connectivity often prevent the consideration of all possible variations on the ground and hinder the finding of simple solutions with general application methods. The methodology was developed in several phases, involving various stakeholders and interest groups in decision-making processes.

Discussion

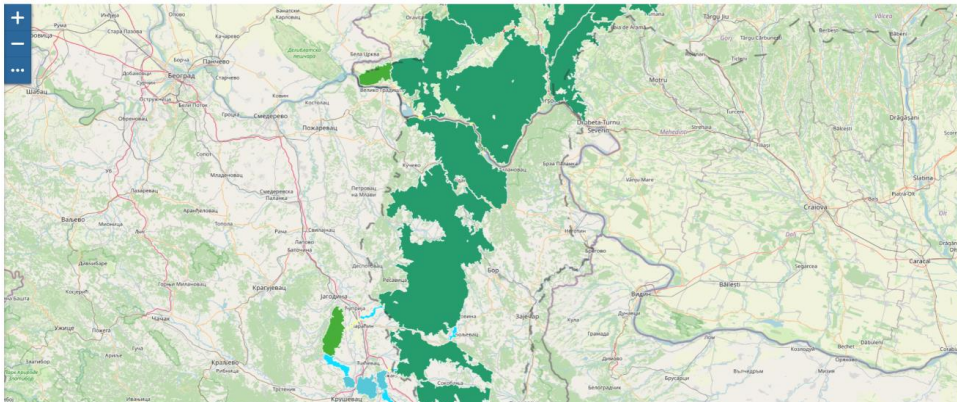
To collect the basic database on the green corridor issues in Serbia, the project organized three national workshops with over 50 participants – representatives from ministries, local governments, public enterprises, institutes, agencies, scientific institutions, interest groups, and NGOs. The workshops aimed to enable expert exchange of opinions in nature conservation, infrastructure planning, and spatial planning through participatory planning processes, and these conclusions served as input for the draft Carpathian methodology for identifying key areas and ecological corridors in Serbia used by large mammals (carnivores). Based on the inputs mentioned, a document titled "Strategy for Identification, Conservation, and Management of Ecological Corridors in the Carpathian Countries" was formed, as well as "Guidelines for Using Planning Instruments in Integrative Management of Ecological Corridors" and decision support tools (DST), databases, and maps of significant areas and ecological corridors of large mammals of transnational importance in the Carpathian ecoregion – CCIBIS (Picture 1), and an Action Plan for Mitigating Threats to Migration Corridors in Djerdap National Park. All the mentioned documents, which resulted from participatory planning, have been published in the form of publications or distributed on the internet.

Those documents have provided several different measures to ensure connectivity and reduce the barrier effect, including: Measures that enable and facilitate safe crossing over infrastructure (wildlife crossings), Measures that prevent animal mortality and human casualties, Measures that prevent animals from accessing the infrastructure, Measures that warn animals about traffic infrastructure or approaching vehicles, Measures that warn drivers about animals approaching or sections where there is a collision risk (warning signs, speed limits, animal detection-based warning systems) [15].

Implementing all these measures can drastically reduce the mortality rate of animal species in a given area.



Thematic Map View: Ecological Corridors



Picture 1. Thematic map within CCIBIS – Ecological corridors in Serbia

Source: [16]

Conclusion

Based on the analysed issues, the application of the Methodology for the Identification of Ecological Corridors of Large Mammals in the Carpathian Countries and the results of its application to the pilot area of the Djerdap National Park, it was possible in the first methodological step of developing the planning document for the Spatial Plan for Special Purpose for the Djerdap National Park to identify preserved and endangered existing ecological corridors and their spatial conflicts with the existing construction areas of tourist complexes and settlements, as well as with the existing state road of Category IV running longitudinally through the entire protected area.

In the next methodological step, it was possible to propose alternative solutions for the conservation and reconstruction of existing and the formation of new ecological corridors concerning other land uses in the protected area. All proposed alternative solutions had the same locations for wildlife overpasses across the state road. To achieve coordination and mitigation of existing and potential conflicts, it was necessary to apply a participatory approach by involving key stakeholders in the protection of natural values and the environment, tourism, and spatial planning at the national and local levels of management, alongside the protected area managers, in the process of considering the offered options and deciding on the most favourable variant.

After several iterations, a compromise solution was chosen to harmonize the planned development of other land uses with the conservation and reconstruction of most existing and the formation of several new ecological corridors and to limit the expansion of construction areas of tourist complexes and settlements relative to the designated corridors.



Considering that the Republic of Serbia includes in its legislative framework the "Regulation on Special Technical-Technological Solutions Enabling Unimpeded and Safe Communication of Wildlife" (Official Gazette of RS, No. 72/10), whose application is insufficient and inadequate, the methodological approach proposed by this paper could serve as a kind of input for updating this document.

This could significantly improve planning practices related to the planning of transportation infrastructure in accordance with the requirements of nature protection.

Acknowledgements

The funds for the research presented in this paper were provided by the Ministry of Science, Technological Development, and Innovation of the Republic of Serbia, registration number: : 451-03-66/2024-03/200006.

References

- [1] Okanikova Z., Rompotl D., Kluchova A., Hlavac V., Strnad M., Vlkova K., Janak M., Kadlecik J., Zyka V., Remus-Papp C., Nenkovic Riznic M. (2021), *Methodology for Identification of Ecological Corridors in the Carpathian Countries by Using Large Carnivores as Umbrella Species*, ConnectGREEN Project "Restoring and managing ecological corridors in mountains as the green infrastructure in the Danube basin", Danube Transnational Programme, DTP2-072-2.3, ISBN 978-80-8184-087-6
- [2] Hilty, A. & Jodi, L. W. (2006). *Corridor Ecology: The Science and Practice of Linking Landscapes for Biodiversity Conservation*. Berkeley: Island Press.
- [3] Spanowicz G.A., Jaeger J. A.G. (2019). Measuring landscape connectivity: On the importance of within-patch connectivity. *Landscape Ecol.*
- [4] Hilty, J., Worboys, G.L., Keeley, A., Woodley, S., Lausche, B., Locke, H., Carr, M., Pulsford I., Pittock, J., White, J.W., Theobald, D.M., Levine, J., Reuling, M., Watson, J.E.M., Ament, R., and Tabor, G.M. (2020). Guidelines for conserving connectivity through ecological networks and corridors. *Best Practice Protected Area Guidelines Series* No. 30. Gland, Switzerland: IUCN.
- [5] Hlaváč, V., Anděl, P., Matoušová, J., Dostál, I., Strnad, M., Immerová, B., Kadlečík, J., Meyer, H., Moť, R., Pavelko, A., Hahn, E. & Georgiadis, L. (2019). *Wildlife and Traffic in the Carpathians. Guidelines how to minimize impact of transport infrastructure development on nature in the Carpathian countries*. Danube Transnational Programme TRANSGREEN Project, The State Nature Conservancy of the Slovak Republic, Banská Bystrica, 2019, 228 pp.
- [6] Brooks, C. (2003). *A scalar analysis of landscape connectivity*. Univ. of North Carolina at Chapel Hill.
- [7] Linnel, J. D. C., Salvatori, V. & Boitani, L. (2007). Guidelines for Population Level Management Plans for Large Carnivores. LCIE and Istituto Ecologia Applicata, Roma. 78.



- [8] Zekovic, Slavka, Vujosevic, Miodrag, Maricic, Tamara, Spatial regularization, planning instruments and urban land market in a post-socialist society: the case of Belgrade, *Habitat International*, 48, (2015), 65–78. <https://doi.org/10.1016/j.habitatint.2015.03.010>
- [9] The European Commission's Green Infrastructure Strategy. https://environment.ec.europa.eu/topics/nature-and-biodiversity/green-infrastructure_en
- [10] The Birds Directive, https://environment.ec.europa.eu/topics/nature-and-biodiversity/birds-directive_en
- [11] The Habitats Directive, https://environment.ec.europa.eu/topics/nature-and-biodiversity/habitats-directive_en
- [12] The first draft of the Global Biodiversity Framework post-2020 https://knowledge4policy.ec.europa.eu/publication/first-draft-post-2020-global-biodiversity-framework_en.
- [13] Debinski, D.M. & Holt, R.D. (2000). A Survey and Overview of Habitat Fragmentation Experiments. *Conservation Biology*, 342-355.
- [14] Bennett, G. & Mulongoy, K.J., (2006). Review of experience with ecological networks, corridors and buffer zones. CBD Secretariat, *Technical Series* No.23.
- [15] Favilli, F., Hoffmann, C., Ravazzoli, E. & Streifeneder, T. (2013). *Advanced tools and methodologies adopted GIS Model Design for deriving ecological corridors*. Bolzano: European Academy of Bolzano.
- [16] Carpathian integrated Biodiversity information system, Thematic map View: Ecological corridors. <https://ccibis.org/thematic-map-01-2-3/>