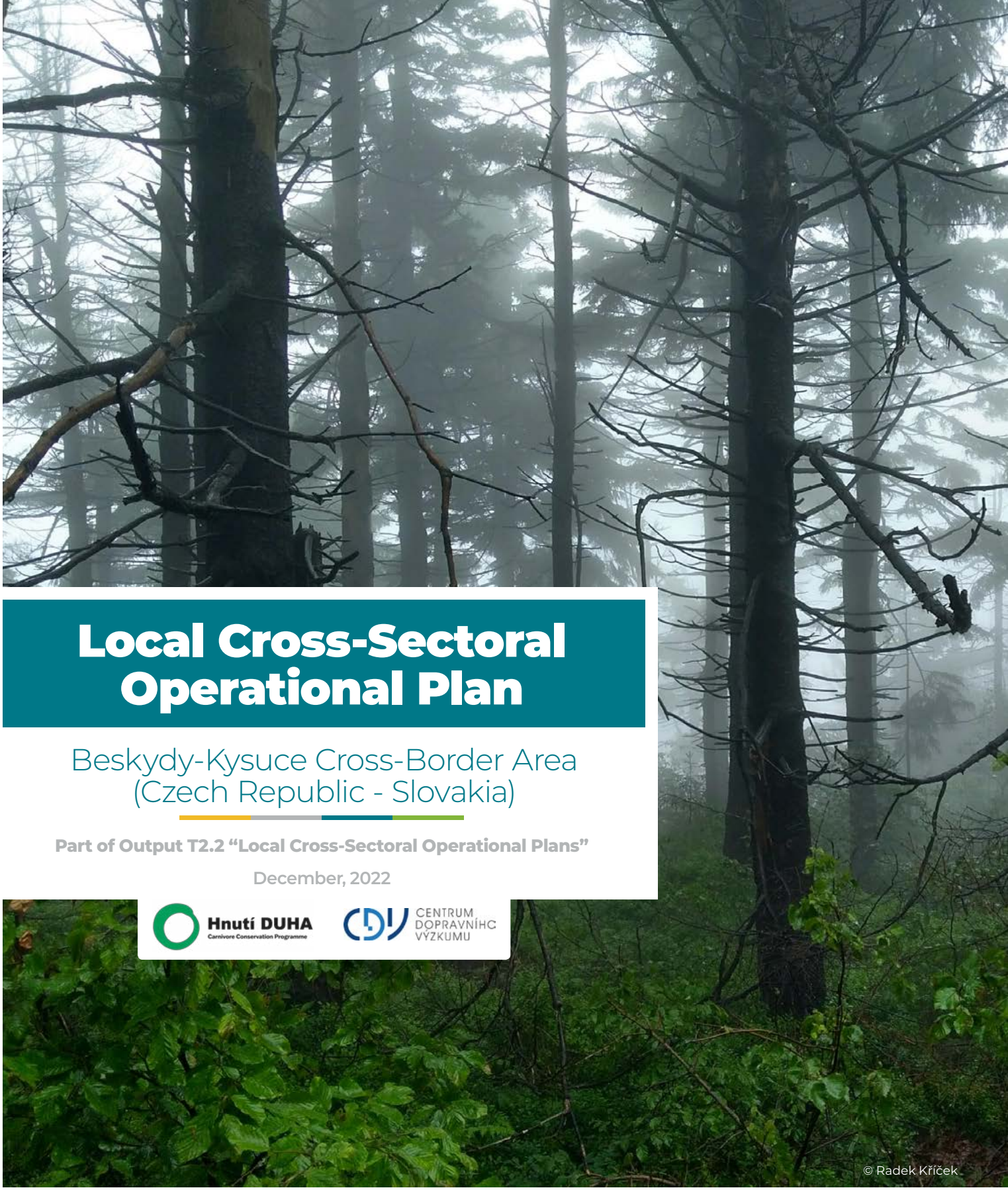

Local Cross-Sectoral Operational Plan

Beskydy-Kysuce Cross-Border Area (Czech Republic - Slovakia)

Part of Output T2.2 "Local Cross-Sectoral Operational Plans"

December, 2022

Hnutí DUHA
Carnivore Conservation Programme

CENTRUM DOPRAVNÍHO VÝZKUMU

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Interreg
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SaveGREEN

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Disclaimer:
The content of this publication is the sole responsibility of the authors and does not express views of any single participating organisation, or the views of one individual, nor the positions of the European Union.

Local Cross-Sectoral Operation Plan

Beskydy-Kysuce Czech Republic-Slovakia Cross-Border Area

Part of Output T2.2 "Local Cross-Sectoral Operational Plans"

SaveGREEN "Safeguarding the functionality of transnationally important ecological corridors in the Danube basin"

Danube Transnational Programme, DTP3-314-2.3

October 2022


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About SaveGREEN

The SaveGREEN project, funded by the Interreg Danube Transnational Programme is focused on the identification, collection, and promotion of the best solutions for safeguarding ecological corridors in the Carpathians and further mountain ranges in the Danube region. Currently, ecological corridors in the region are under threat due to the lack of adequate planning of economic development initiatives. Therefore, basing its work on integrated planning, SaveGREEN will monitor the impact of mitigation measures in 8 pilot areas and derive proper recommendations for follow-up actions and policy design.

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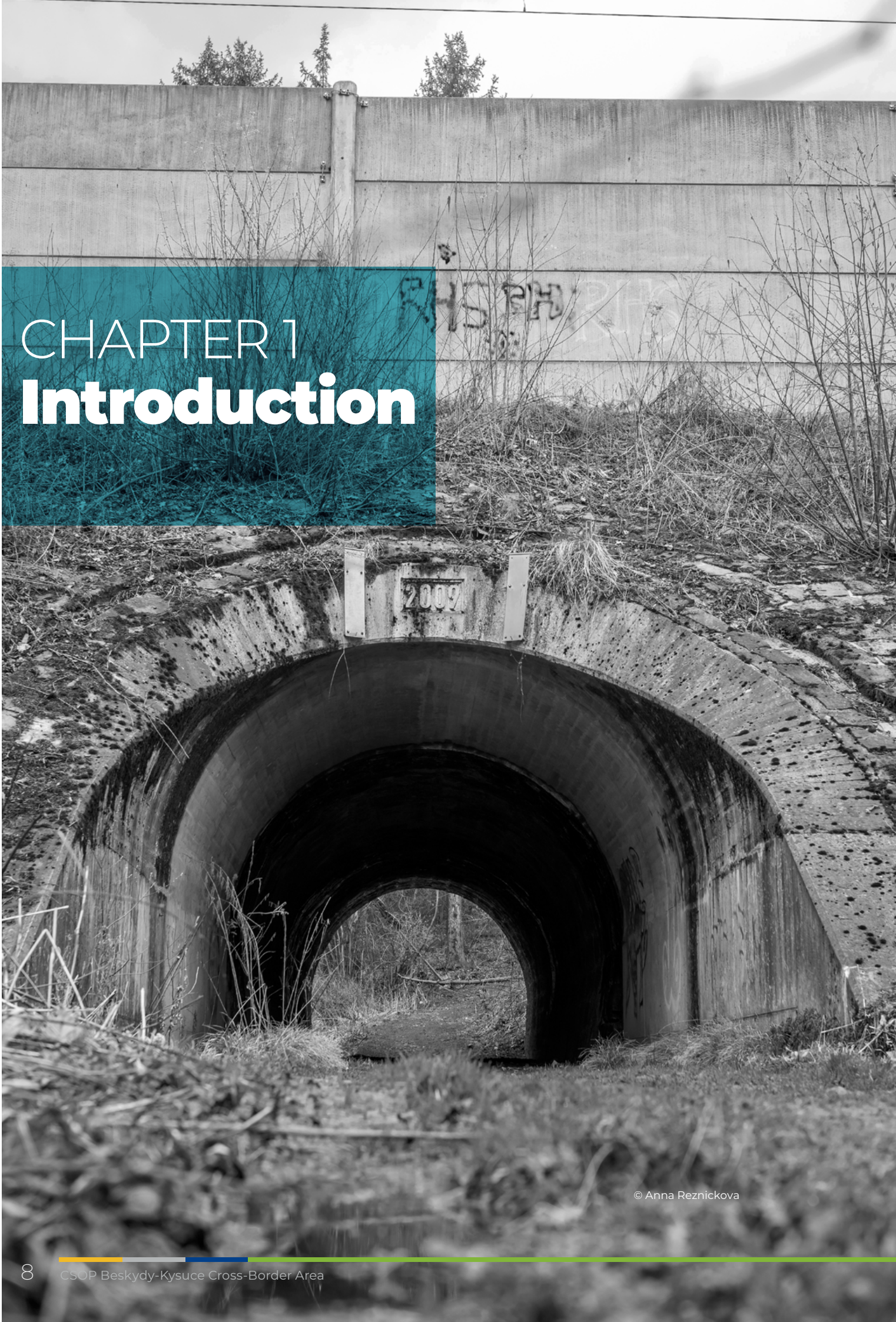
CHAPTER 1
Introduction



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1.1 Short description of the Pilot Area

The trans-boundary pilot area Beskydy-Kysuce is located in the westernmost part of the Carpathians at the Czech-Slovak Republic border. The region is acknowledged for its natural treasures including all three large carnivores (brown bear, grey wolf, and Eurasian lynx). Only here in the Czech Republic, all three carnivores live together. At the same time, they are considered as umbrella species for a large group of species whose migration needs are similar or lower.

However, the local populations of large carnivores are dependent on migrations from the central Carpathians while the connectivity is threatened by anthropogenic development. The area itself suffers from different levels of fragmentation, the main sources of which are new linear infrastructure projects (motorways, road upgrades, in the near future possibly also high speed railways), urban development (increasing settlement in mountain valleys, industrial sites and tourism) and land use (vast monocultures in forestry and agriculture, fencing).

The PA includes 10 Natura 2000 areas. Large carnivores belong to the protected species. Moreover, the habitat of large mammals including large carnivores was recently officially established in the Czech Republic. To protect the Natura 2000 network, all threats to the habitat must be evaluated accordingly. In the Slovak Republic, migration corridors for large

mammals have been identified in certain projects, but do not yet experience a corresponding legal protective action.

The SaveGREEN project was built on the foundations of the previous projects, namely TRANSGREEN and ConnectGREEN. It broadened their scope and added new recommendations for connectivity in general, as described in this CSOP. The proposed measures have partially been implemented (see Preparatory Actions). Still, the implementation of the needed interventions remains the main challenge for the future.

1.2 Pilot area stakeholders

An overview of stakeholders from both the Czech and Slovak Republic relevant for each sector was created during the project (Stakeholder Analysis Report, Annex 2). A number of stakeholders were contacted during the period and some representatives decided to become members of the local working group. The group was held active in the project activities, such as participation in the CSOP development. It is intended to keep the group an important future communication and implementation platform in the field of landscape connectivity in the PA.

In the transportation sector, the main investors and stewards include The Road and Motorway Directorate of the Czech Republic and Správa železnic (CZ) and The National Motorway Company, The Slovak Road Administration and The Railways of the Slovak Republic (SK). The sector is supervised by the Ministry of Transport of the Czech Republic and the Ministry of Transport and Construction of the Slovak Republic.

In the area of spatial planning and development, all the levels are involved including municipalities, districts (in Slovakia), regions and national governments. The regions concerned are the Moravian-Silesian, Olomouc and South Moravian regions in Czechia and Žilina and Trenčín regions in Slovakia. The agenda mainly falls within the competence of The Ministry of Regional Development of the Czech Republic and The Ministry of Investments, Regional Development and Informatization of the Slovak Republic.

In agriculture, forestry and nature protection, we should mention The Forests of the Czech Republic, The National Forest Centre (SK), The Nature Conservation Agency of the Czech Republic, The State Nature Conservancy of the Slovak Republic and The Ministry of Agriculture of the Czech Republic, The Ministry of Environment of the Czech Republic, The Ministry of Agriculture and Rural Development of the Slovak Republic, and The Ministry of Environment of the Slovak Republic.

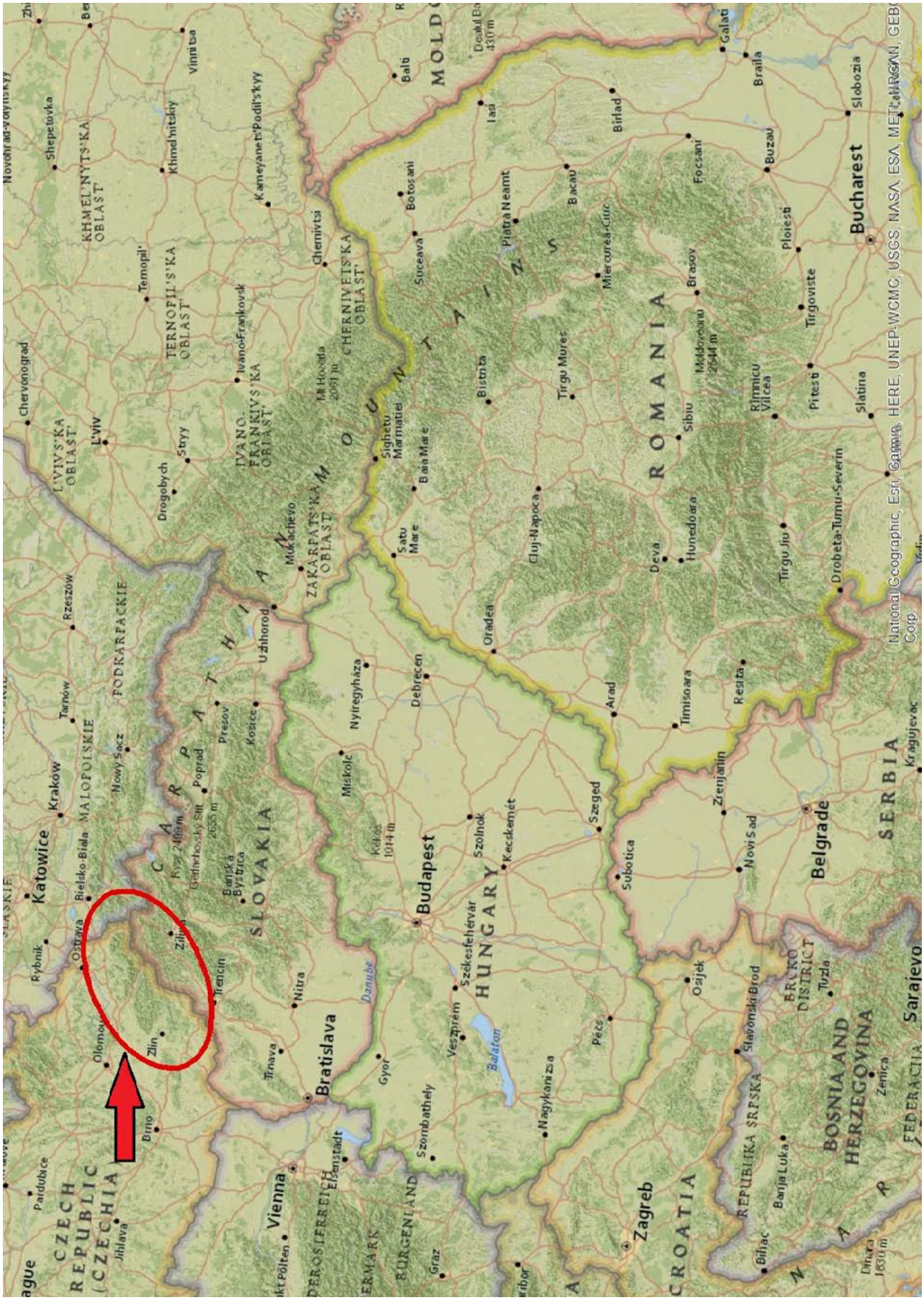

Figure 1. Map of the location of the Beskydy-Kysuce pilot area in the Carpathians range.

CHAPTER 2
Logframe

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Table 2 Logframe

THREAT/ PRESSURE *What do we want to address?*	GENERAL OBJECTIVES *What do we want to achieve?*	Problems	Measures
1. Increased barrier effect of new Transport and other Linear Infrastructure (TLI) projects	**01. Provide supporting data for new infrastructure projects**	Planned and projected roads: D48, D49, I/35, I/57, I/58.	1. Collect available data on wildlife migration.
			2. Monitor the planning of new infrastructure.
		HSR projects as a potential problem for landscape permeability, cumulative effects.	3. Independent migration study for HSR.
	02. Support SEA/EIA/AA processes and procedures with relevant data and examples of good practice	Lack of awareness or activity of authorities in protecting landscape permeability (using existing legislation, CZ).	1. Increase the awareness of regional authorities.
		No binding regulation (SK) to control the quality of migration studies.	2. Create technical conditions (TC) for lower-class roads and railway lines in the SR.
	03. Support designs, technical details and constructive solutions with examples of good practice	Examples of good practice do not reach relevant stakeholders.	1. Inform stakeholders about examples of good practice
	1. Maximize the functionality of underpasses (all fauna passages)	In the initial stages of preparation, the functionality of underpasses is not obvious.	1. Cooperate with ŘSD CZ and NDS to ensure the functionality of underpasses in new local transport infrastructure projects.
		I/35 and the adjacent section of D48 intersect wildlife corridors.	2. Ensure the permeability of I/35 (Lešná – Palačov).
		I/57 intersects wildlife corridors.	3. Ensure the permeability of I/57 (Jarcová – Bystřička, jih; Semetín – Bystřička, stage II).
		I/58 intersects wildlife corridors.	4. Ensure the permeability of I/58 (Frenštát pod Radhoštěm – Vlčovice).
		D48 is adjacent to the habitat of selected and specially protected species of large mammals.	5. Ensure the permeability of D48.

Actions
a. Collect data on large carnivore migration recording occurrence signs, camera-trapping and telemetry data. b. Improve monitoring of large carnivores and other species using new methods (see relevant general objectives and actions in this document). c. Provide the data to project evaluators and government authorities in the simplest possible form, together with an explanation of the legal obligation to protect ecological corridors and identified problem areas.
a. Systematically monitor the planning of new linear infrastructure (strategic documents, websites of construction companies, SEA and EIA procedures).
a. As the protection of large mammal habitats is not always required by regional authorities (e.g., as part of SEA and EIA processes, see Measure 1.02.1.) and the approach varies between the regions, it is strongly recommended that an independent migration study be carried out for the scope of entire project, including an assessment of potential cumulative effects.
a. The Ministry of Environment holds regular meetings with representatives of regional authorities. The MoE CZ should be urged to raise the topic of habitat protection in these meetings. b. To map what documents are available to the regional authorities in terms of spatial planning. c. Provide the regional authorities with any lacking methodology and other easy-to-use documents for spatial planning.
a. Adopt updated TC. b. Develop TC for migration studies.
a. Establish long-term cooperation between the members of the local working group. b. Collect examples of good practice available to members of the local working group.
a. Cooperation between nature conservation bodies (government, NGOs) and ŘSD CZ or NDS from the initial stages of specific road construction projects.
a. Ensure that the recommendations resulting from the EIA process be respected and that the technical details of fauna passages be maintained (authorities, construction supervision). b. Initiate negotiations with landowners to plant guiding vegetation. c. Propose the land lease or purchase by the state administration for the planting of guiding vegetation.
ŘSD CZ was asked to ensure the road permeability already within the SaveGREEN project. The situation needs further monitoring and the migration study evaluating once completed. As the road threatens the population of the protected species scilla bifolia in the northern part of the Semetín – Bystřička section, it is necessary to ensure that the contractor has a valid exemption.
The EIA process must be monitored to ensure that landscape connectivity is maintained.
Monitor the effectiveness of existing fauna passages and other connectivity measures on D48. The data should be used to propose the measures for other existing and planned motorway sections.

THREAT/ PRESSURE *What do we want to address?*	GENERAL OBJECTIVES *What do we want to achieve?*	Problems	Measures
	2. Maximize the functionality of overpasses (all fauna passages)	Fauna passages on motorways are not properly maintained after the post-project monitoring (SK).	1. Maintenance and repairs of fauna passages after the monitoring period (SK).
	3. Assign a legal status and create regulations for all infrastructure that can function as fauna passages	Not relevant	
	4. Increase the permeability of embankments (whenever and wherever fencing is not mandatory)	Not relevant	
2. Barrier effect of existing Transport and Other Linear Infrastructure (TLI) (including increasing barrier effect caused by structural interventions: maintenance or upgrading within the same category/class of roads, railways, navigable channels, waterways, canals, power lines, and pipelines)	**1. Safeguard the permeability of existing transport infrastructure** (including a rise in the permeability of existing infrastructure where possible)	Existing infrastructure was not built while respecting the needs of wild animals.	1. Continuously improve the permeability of existing roads of all classes.
		Demand to build green bridges, either too narrow or needlessly wide.	2. Respect expert recommendations regarding the parameters of fauna passages.
		D1 (SK) needs to be provided with green bridges to improve the inadequate permeability.	3. Build green bridges on D1 in Slovakia.
		New noise barriers are a major problem for landscape permeability.	4. Ensure the permeability of railway lines in Kysuce (SK).
		Missing green bridges (e.g., E75 Třinec – Jablunkov section of Class I road I/11 in CZ, near Jablunkov).	5. Build the missing green bridge on E75.
	2. Safeguard the transverse permeability of river banks (including a rise in the permeability of existing infrastructure, where possible)	In some places, river banks are not permeable for some categories of animals.	1. Ensure the permeability of Váh and Bečva river banks.
	3. Safeguard the longitudinal permeability of rivers (including a rise in the permeability of existing infrastructure, where possible)	Transverse barriers prevent the migration of aquatic species along the watercourse.	1. Design solutions for specific transverse barriers.

	Actions
	a. Provide the organization and financing to improve the ecological functions of fauna passages. b. Evaluate appropriate interventions for specific migration objects, considering the experience from other countries.
	a. Systematically perform an environmental audit of existing communications – always (without exception) as a basis for the project documentation for road reconstructions. b. Systematically perform an environmental audit of existing communications – periodically every several years for busy sections.
	a. Create a list of the most important parameters of fauna passages. b. Enforce these parameters into legislation.
	a. Ensure systematic monitoring (see also 7.1). b. Implement the recommendations of the TRANSGREEN project (catalogue of measures).
	a. Carry out a detailed migration study. b. Compare the current state with the situation before the construction of noise barriers. c. Make suggestions for mitigating measures.
	a. After obtaining the necessary permits, proceed with the construction.
	a. Map the most problematic sections of the watercourses. b. Prepare pilot projects to remove or adapt the existing barriers.
	a. Map transverse barriers on watercourses. b. Prepare pilot projects to remove or adapt the existing barriers and build fish crossings.

THREAT/ PRESSURE *What do we want to address?*	GENERAL OBJECTIVES *What do we want to achieve?*	Problems	Measures
3. Linear transport infrastructure (including electric power lines) causing wildlife mortalities	**1. Implement an adequate fencing system on motorways and high-speed railways, including escape gates**	Fenced sections of infrastructure with no fauna passages are planned in ecological corridors.	1. Prevent fenced sections of roads and railways without fauna passages.
	2. Direct animals towards functional crossings	Guiding vegetation is not planned in some cases despite the recommendations of migration studies.	1. Ensure the planting of guiding vegetation.
	3. Warning drivers in high accident/road-kill areas	Migrating animals, including protected species, are at risk in inadequately marked sections of transport infrastructure	1. Install a warning system in the area Lužná/Lidečko – Lomensko.
	4. Warning train drivers in high accident/road-kill areas	Insufficient data.	1. Map the mortality on railways.
		Accidents involving large carnivores were documented.	2. Install warning systems on railways.
	5. Prevent collisions with mammals in railway tunnels and on long bridges	Not relevant	
	6. Increase visibility for drivers/train drivers	Insufficient data.	1. Identify sections with poor visibility.
	7. Implement special measures to prevent bird mortality (impact of power lines, noise barriers)	Inadequate implementation of bird mortality data in practice.	1. Use bird mortality data to improve species conservation.
	8. Implement special measures to prevent bat mortality (light pollution)	Different data sources should be consolidated.	1. Evaluate bat mortality.
	9. Implement special measures to prevent amphibian and reptile mortality	Further actions should be planned in coordination with the existing initiatives.	1. Evaluate amphibian and reptile mortality.
	10. Collect and process the data to identify the critical sections of roads, motorways and railways	Missing data (SK).	1. Identification and documentation of critical points
	11. Establish and train special teams to deal with wildlife-related incidents on roads, motorways, and railway lines E.g., bear in a motorway/railway tunnel	Lack of coordination between the NCA and MoE CZ.	1. Clarify the procedure and competences for the provision of veterinary care and handling of carcasses.

	Actions
	a. Monitor the preparation of fenced sections. b. Plan fauna passages in fenced sections. c. Ban fenced sections of roads in ecological corridors without fauna passages.
	a. Facilitate discussion on systematic solutions for guiding vegetation along linear infrastructure b. Ensure the implementation of guiding vegetation where recommended by migration studies.
	a. Install warning signs for drivers b. Install an intelligent warning system c. Install reflective markings. d. Monitor the pilot installation of an intelligent warning system as part of the construction of the green bridge near Svrčinovec.
	a. Review existing data on wildlife mortality on railways. b. Install warning signs on identified problematic sections.
	a. Investigate the possibilities of installing warning signs along the main railway corridors (could be done as part of ETCS implementation) b. Install warning signs on problematic sections of regional lines.
	a. Map railway sections with poor visibility.
	a. In cooperation with experts and NGOs, propose measures based on observed mortality distribution.
	a. Consult the existing data with NCA, Czech Bat Conservation Society, and Czech Astronomical Society to identify problematic areas and species of bats affected. b. Monitor the construction of D3 in Slovakia and gather relevant data from the barriers in bat flight corridors.
	a. Consult existing data with NCA, local NGOs, and Czech Union for Nature Conservation. b. Propose site-specific measures in accordance with the methodology Transport and Wildlife Protection in the Czech Republic. c. Evaluate the effectiveness of the implemented measures.
	a. Complete the records of critical points in other areas – e.g., White Carpathians, Kysuce. b. Consult the existing catalogues of critical points with the NCA, nature conservation and spatial planning authorities.
	a. Prepare a summary of incidents dealt with so far. b. In cooperation with the NCA and MoE CZ, determine the competences of individual authorities. c. Create a contact list of veterinarians in all regions who can provide immediate assistance. d. Establish rehabilitation centres for wild animals including large carnivores, and ensure their financing by the state. e. Add established procedures to protected species management plans where needed.

THREAT/ PRESSURE *What do we want to address?*	GENERAL OBJECTIVES *What do we want to achieve?*	Problems	Measures
	12. Develop and use an integrated database as a decision-support tool for dealing with traffic accidents (for implementing/ adapting measures to prevent wildlife mortality/property damage/human casualties)	There is no central international database of wildlife-related traffic accidents.	1. Collect available data on wildlife-related traffic accidents.
4. Reduced landscape permeability caused by changes in land-use	**1. Prevent changes in land use towards less permeable categories** (including compensatory measures in terms of connectivity)	The existing spatial planning strategies and plans (ZÚR, ÚPD) often do not consider migration corridors.	1. Respect the existence of migration corridors in spatial planning documentation.
		Land-use changes contribute to reduced landscape permeability in the Jablunkov region.	1. Ensure ecological connectivity in the Jablunkov region.
		The recommendations of the TRANSGREEN and ConnectGREEN projects have not been fully implemented.	2. Implement measures resulting from the TRANSGREEN and ConnectGREEN projects.
		A catalogue of measures has not been developed for the White Carpathians (Bílé/Biele Karpaty PLA).	3. Catalogue of measures for Bílé/ Biele Karpaty.
		The emergence of new barriers in ecological corridors is not always detected in time.	4. Monitoring the development of barriers at critical points
		Recreational areas are steadily increasing development in large carnivore habitats.	5. Monitoring the expansion of built-up recreational areas.
	2. Facilitate/support land-use changes toward more permeable categories through agricultural subsidies	Discussed further in 5a.2.1	
5a. Reduced landscape permeability caused by land management – fencing	**1. Fencing regulations and promoting unfenced areas**	In some cases, fencing can significantly reduce the permeability in ecological corridors. In the Czech Republic, this is often related to preventive measures against attacks of large carnivores on livestock. In Slovakia, fencing is installed to protect crops against herbivores.	1. Promote practices to reduce the use of agricultural fencing
	2. Develop guidelines and conditions concerning fencing for agriculture/ forestry subsidies or specific programmes	Subsidy rules do not sufficiently consider the preservation of landscape permeability. There is no consistency in the approach of the nature conservation authorities in different areas.	1. Introduce targeted subsidy titles that would reduce the use of fencing

Actions
a. Setting up an official procedure for comprehensive data collection (online system at the srazenazver.cz website has been prepared for this purpose); gathering records from nature conservationists, hunting associations, drivers and other citizens, in addition to police records. b. Sharing data on critical points to open up possibilities for incorporating time-specific alerts into car navigation systems.
a. Create Strategic Migration Studies (SMS) as part of the prepared spatial plans and strategies. b. Systematically request the assessment of connectivity under all the proposed changes in spatial plans of all levels.
a. Initiate negotiations with the Jablunkov political leadership and other local stakeholders. b. Implement recommendations from the TRANSGREEN and ConnectGREEN projects. c. Expand the guiding vegetation to other land sections.
a. Implement the proposed measures. b. Update land-use data.
a Create a catalogue of measures for Bílé/Biele Karpaty. b. Present and discuss the document with local stakeholders c. Adjust proposed measures according to the stakeholders' suggestions.
a. Establish a long-term programme for systematic monitoring of the emerging migration barriers in the territory at critical points.
a. Carry out systematic monitoring of EIA procedures. b. Ensure that landscape connectivity is maintained near recreation areas.
a. Educate farmers – field trips; an advisory team competent to propose specific measures depending on local conditions in the grazing area, farmers´ preferences, herd characteristics, and landscape permeability requirements. b. Participate in EIA processes. c. Identify procedures to address the problem of agricultural fencing in Slovakia.
a. Set rules of agricultural subsidies (both European and national) to preserve landscape permeability for all categories of animals. b. In the subsidy titles, describe as precisely as possible the rules according to which the nature conservation authority should assess the impact of the project on the habitat of the selected specially protected species of large mammals. Set requirements for pastures to remain passable when not used for grazing (e.g., open gates). c. Educate nature conservation officers to ensure a consistent approach in different areas.

THREAT/ PRESSURE *What do we want to address?*	GENERAL OBJECTIVES *What do we want to achieve?*	Problems	Measures
5b. Reduced landscape permeability caused by land management – changes in vegetation or crop type/ category	**1. Prevent large-scale monocultures and/or facilitate and promote mosaic cultivation**	Large-scale monocultures hinder long-distance animal migration.	1. Set up agricultural subsidies to promote mosaic farming.
	2. Support adequate management of natural and marginal habitats	TBD	
	3. Support and promote the development of examples of good agricultural, water management, and forestry practices sensitive to landscape permeability	Declining biodiversity and abundance among small animals such as birds, bats, amphibians, reptiles and invertebrates.	1. Stop the declining trend in biodiversity resulting from chemical contamination (prevent the use of pesticides in agriculture and forestry).
5c. Reduced landscape permeability caused by land management – degradation of natural habitats	**1. Prevent/control the spread of invasive plant and animal species and restore invaded/degraded habitats**	TBD	
	2. Prevent wildfires/enforce fire protection legislation	Not relevant	
	3. Prevent changes to water bodies, restore hydrologic regime and support wetland restoration	TBD	
5d. Reduced landscape permeability caused by land management – mineral extraction	**1. Develop management plans and apply EIA/AA procedures** for impact avoidance-mitigation-compensation and site restoration	Not relevant	
6a. Reduced landscape permeability caused by other anthropogenic activities – game management	**1. Develop game management plans and apply EIA/AA procedures** for impact avoidance-mitigation-compensation	Not relevant	
	2. Facilitate data collection on key species	Not relevant	
	3. Harmonize game management with the objectives of Natura 2000 and landscape permeability	Hunting activities sometimes take place in ecological corridors causing stress for migrating animals and increasing the risk of poaching.	1. Cooperation with local hunting associations.

	Actions
	a. Strengthen the support for practices that create mosaic landscapes in national agricultural subsidy rules.
	a. Include the problem of chemical contamination into the methodology of complex monitoring of the area (see 7.1.1.). b. Increase the public awareness of the impact of pesticides on the landscape. c. Support practical changes in the management of agricultural land.
	a. Establish a group or think tank to formulate best practices for regulating hunting in ecological corridors and cooperate with hunting associations.

THREAT/ PRESSURE *What do we want to address?*	GENERAL OBJECTIVES *What do we want to achieve?*	Problems	Measures
	4. Implement poaching prevention and control	Poaching is a significant cause of mortality of large mammals and other species. Poaching rates are influenced by the public opinion.	1. Work with the general public.
		Poaching is not sufficiently penalized in the concerned countries, despite it being a widespread problem.	2. Support the authorities in the fight against poaching.
6b. Reduced landscape permeability caused by other anthropogenic activities – human-wildlife conflicts	**1. Facilitate the implementation of legislation on damage compensation**	Some farmers are slow in reporting the damage caused by large carnivores.	1. Informing farmers about damage compensation procedures.
	2. Facilitate traditional livestock farming practices	Traditional livestock farming (shepherding) largely disappeared during the 20th century. The return of large carnivores was accompanied by significant damage due to the abandonment of traditional protection methods.	1. Informing farmers about traditional shepherding methods.
	3. Facilitate the implementation of modern prevention methods	Livestock damage reduces the tolerance of large carnivores among farmers and the public.	1. Inform and support farmers in introducing modern preventive methods.
	4. Facilitate increased subsidies for the conservation of large carnivores	The complicated bureaucratic process of applying for European funding to implement preventative measures can only be managed by many farmers with the help of NGOs.	1. Facilitate the subsidy application process for modern prevention methods
	5. Regulate other anthropogenic activities that could increase the risk of conflicts (waste management, unsustainable development and tourism, etc.)	Information about potentially attractive tourist locations spreads on the internet and social media, which can increase the disturbance of protected species and their core habitats.	1. Limit publishing information about sensitive locations online.
		Some individual bears may approach human settlements in search of food. These situations are usually caused by irresponsible human behaviour and can be prevented. Otherwise, they often lead to lower acceptance and spreading of myths.	2. Eliminate the risk of bear synanthropization.
	6. Facilitate early interventions in special wildlife-related situations	There is a lack of capacity to deal with wolf-related emergencies (sick, injured, bold wolves).	1. Create a response team.

Actions
a. Carry out field monitoring aimed at poaching prevention. b. Educate the general public about large carnivores and poaching (awareness-raising events, media, social media).
a. Coordinate anti-poaching measures between nature conservation authorities, police and border guard.
a. Awareness-raising events aimed at farmers.
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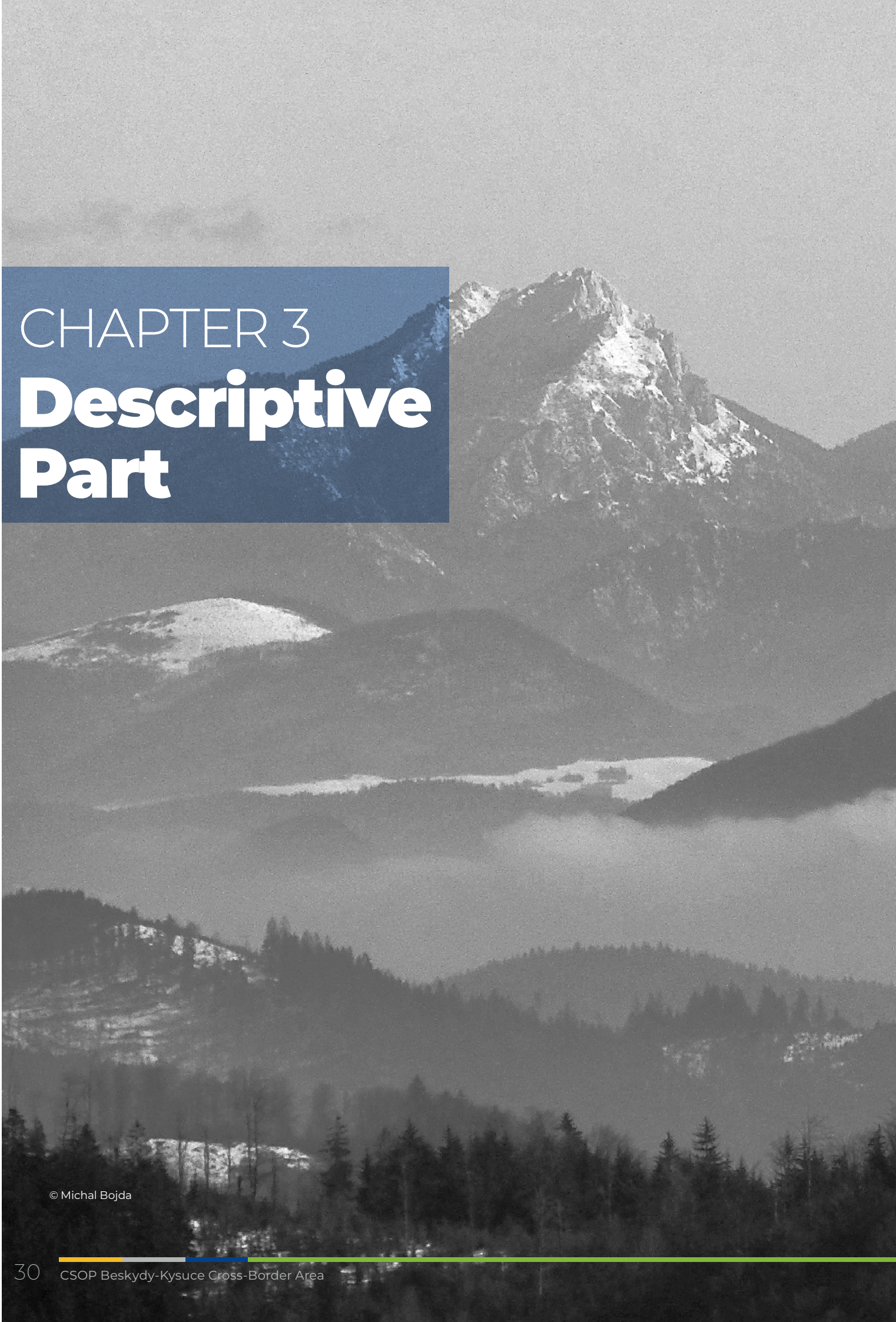
a. Assist farmers in applying for subsidies for preventive measures. b. Introduce easy-to-administer state-funded subsidies for preventive measures.
a. Agreement on a systematic solution with major web portals such as mapy.cz.
a. Install and maintain bear-proof containers. b. Educate the locals and visitors about the correct behaviour in areas with the presence of bears. c. Limiting the number of ungulates moving into the agricultural landscape to forage.
a. Compile an inventory of responses to situations involving bold large carnivores abroad. b. Create a special response team to deal with situations involving bold large carnivores.

THREAT/ PRESSURE *What do we want to address?*	GENERAL OBJECTIVES *What do we want to achieve?*	Problems	Measures
7. Lack of coherent monitoring at landscape level and adaptation of solutions	**1. Facilitate the implementation of an integrated monitoring programme – procedures, databases, indicators, assessment**	There is a lack of systematic evaluation of the state and changes in connectivity of the area.	1. Long term general monitoring of connectivity at the landscape level.
		The monitoring of transport infrastructure required by migration studies is not always implemented and data are not systematically collected. There is no central database in the Czech Republic or Slovakia.	1. Monitoring the effectiveness of existing fauna passages and landscape permeability in general.
		It is not clear how systematic and detailed are the existing data on railway mortality. However, it is unlikely that detailed coordinates and other information are collected.	2. Monitoring of railway mortality.
		There is no binding instrument for the protection of large mammal corridors in the Slovak Republic.	3. Identification and protection of ecological corridors in the Slovak Republic.
		Monitoring of traffic accidents does not necessarily identify critical points of ecological corridors.	4. Reduce the selection bias in monitoring.
		New threats to landscape permeability continue to emerge. Continuous monitoring of projects and SEA and EIA processes and participation in administrative procedures is needed.	5. Monitoring of SEA and EIA processes.
8. Reduced support from stakeholders at landscape level for an integrated ecosystem approach	**1. Facilitate collaboration and create a shared platform and database**	Lack of communication leads to problems (e.g. misunderstandings about legal aspects of protecting ecological corridors).	1. Create a platform for information and knowledge exchange between stakeholders.
	2. Facilitate the spread of information, awareness, education, communication	The issue of landscape permeability is still not well-known among the general public.	1. Increase awareness among the general public.
		Lack of awareness or activity of authorities in protecting landscape permeability (using existing legislation, CZ).	2. Increase awareness of authorities.

	Actions
	a. Create a unified methodology to monitor general landscape connectivity. b. Secure organisational and financial resources for the monitoring.
	a. Develop and implement a monitoring plan. b. Long-term monitoring of fauna passages and their surroundings beyond the minimum period specified by migration studies. c. Establish a central database and systematically archive the collected data, drawing conclusions for future construction projects.
	a. Involve the Railway Administration (Správa železnic) staff in the monitoring. b. Develop and implement a monitoring plan.
	a. Encourage authorities to use the ConnectGREEN project outputs in their decision-making process. b. Develop and implement a monitoring plan.
	a. Include appropriate measures in capacity building. b. Develop and implement a monitoring plan.
	a. Continuous monitoring of policies and plans evaluated in SEA and EIA. b. Develop and implement a monitoring plan.
	a. Establish a local working group and ensure its long-term functioning after the end of the project. b. Set up an information system for municipalities focusing on the protection of ecological corridors in spatial planning (methodologies, link to a map of ecological corridors, etc.).
	a. Continue species-specific web and social media communications, including the topic of landscape permeability. b. Organize lectures, debates and information days for the general public.
	a. Increase awareness of regional authorities (see section 1.02.1.). b. Identify municipalities with territory extending into ecological corridors of large mammals. c. Provide background information on large mammal corridors to municipal authorities.

THREAT/ PRESSURE *What do we want to address?*	GENERAL OBJECTIVES *What do we want to achieve?*	Problems	Measures
	3. Support the research and studies on landscape connectivity; facilitate cross-sectoral capacity building activities and the development of new career opportunities (integrating biodiversity into other fields)	The measures to support landscape permeability require further research.	1. Engage students and universities.
	4. Facilitate the development of regional identity and promote the region – nature, culture, services (landscape permeability as one of the subject matters)	Not relevant	
	5. Facilitate the development and integration of local strategies into the regional sectoral strategy (landscape permeability as one of the subject matters)	Strategic documents should guarantee a sufficient level of landscape permeability. Some tend to be overly vague or not ambitious enough.	1. Development plans to contain general principles for the protection of landscape permeability.
	6. Facilitate and support complementary initiatives (landscape permeability as one of the subject matters)	Not relevant	

	Actions
	a. Initiate collaboration with universities to offer students thesis topics related to landscape connectivity.
	a. Monitor ongoing SEA processes and participate in commenting. b. Incorporate permeability issues into strategic documents at all levels.



CHAPTER 3
Descriptive Part

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Threat/Pressure 1:
Increased barrier effect of new Transport and other Linear Infrastructure (TLI) projects.

Pilot area description:
The Beskydy – Kysuce pilot area is an important link not only between the Czech Republic and Slovakia but also between the two countries and Poland. There are several new infrastructure projects in various stages of development. Most of the linear infrastructure is planned to go around the core mountain areas, but some projects should intersect the mountain ranges. Both types of projects can be problematic in terms of landscape connectivity. The infrastructure built in the surrounding lowlands will contribute to isolation from the neighbouring areas (Jeseníky, Kysucké Beskydy) while the infrastructure leading through the pilot area will cause further fragmentation of its core parts.

What needs to be achieved:

- Some projects are planned without sufficient data on the impact on habitat connectivity for different animal groups. All available data should be reviewed, collected, and made available to decision-makers.

- Unlike most other EU countries, the Czech Republic has a binding habitat layer for selected specially protected species of

large mammals. However, as this is a relatively new tool, it is not always properly considered in decision-making processes. To achieve an adequate level of habitat protection, it is necessary to increase public awareness and ensure the willingness of stakeholders to use the layer. A similar tool should be created in Slovakia.

» Technical parameters of fauna passages are not legally enforceable in the Czech Republic or Slovakia. These parameters should be set as mandatory. The function of fauna passages is sometimes reduced by inappropriate land-use in the adjacent areas. Guiding vegetation is often not planted due to complicated ownership relations. It is necessary to improve the use of land adjacent to fauna passages.

General objectives set outto address the threats are:

01. Provide supporting data for new infrastructure projects

02. Support SEA/EIA/AA processes and procedures with relevant data and examples of good practice

03. Support designs, technical details and constructive solutions with examples of good practice

1.1. Maximize the functionality of underpasses (all fauna passages)

1.2. Maximize the functionality of overpasses (all fauna passages)

1.3. Assign a legal status and create regulations for all infrastructure systems that can function as fauna passages

1.4. Increase permeability of embankments (whenever and wherever fencing is not mandatory)

Measures proposed for each objective are described below with the list of required/ proposed actions:

Objective 1.01 Provide supporting data for new infrastructure projects

Measure 1.01.1 Collect available data on wildlife migration

Examples of identified problems:
Robust monitoring in the area will contribute to mapping the presence and migration of protected species, including large carnivores, and allow informed decisions to be made when planning the construction of critical infrastructure. The monitoring methodology is discussed in more detail in the appendix of the CSOP Monitoring Plan.

For example, the new R49 road between the Czech Republic and Slovakia is planned through the Vizovické vrchy Nature Park. The project would intersect several ecological corridors of large mammals and divide the Beskydy and Kysuce protected landscape areas on one side and the Bílé Karpaty and Biele Karpaty on the other. As in the case of other infrastructure projects, no systematic monitoring of wildlife migration has been carried out so far. However, the occurrence of large carnivores has long been confirmed in the area and the impact of the road on their dispersal and spatial activity may be highly negative.

Available sources:
National Nature Conservation Database (NDOP) as a source of data on large carnivores and other species

SUDOP Praha, 2015: TES Rychlostní silnice R49 Hulín – Fryšták – Lípa – hranice ČR/SR

The EIA process and the decision of the Ministry of Environment regarding R49:

https://portal.cenia.cz/eiasea/detail/EIA_MZP272

Actions required:
a. Collect data on large carnivore migration recording occurrence signs, camera-trapping and telemetry data.

Figure 1: A brown bear footprint in the proposed D49 motorway corridor (spring 2021) © Michal Bojda.

Figure 2: A brown bear footprint in the proposed D49 motorway corridor (spring 2021) © Michal Bojda.

b. Improve monitoring of large carnivores and other species using new methods (see relevant general objectives and actions in this document).

c. Provide the data to project evaluators and government authorities in the simplest form possible and with an explanation of the legal obligation to protect ecological corridors and identified problem areas.

Measure 1.01.2 Monitor the planning of new infrastructure

Examples of identified problems:
New infrastructure projects are not always planned according to the best solutions in terms of landscape connectivity. In the Czech Republic, the authorities do not systematically require respect for the habitat of large mammals. In some cases, an assessment of the connectivity of large carnivore populations has been required, but the documentation has been done with respect to older map layers instead of the new habitat. Therefore, it is necessary to monitor the planning of new infrastructure – especially the relocations of class I roads and high-speed railways in the Czech Republic (see in more detail, e.g., sections 1.01.3, 1.1.2. – 1.1.5.), and the D3 motorway in Slovakia.

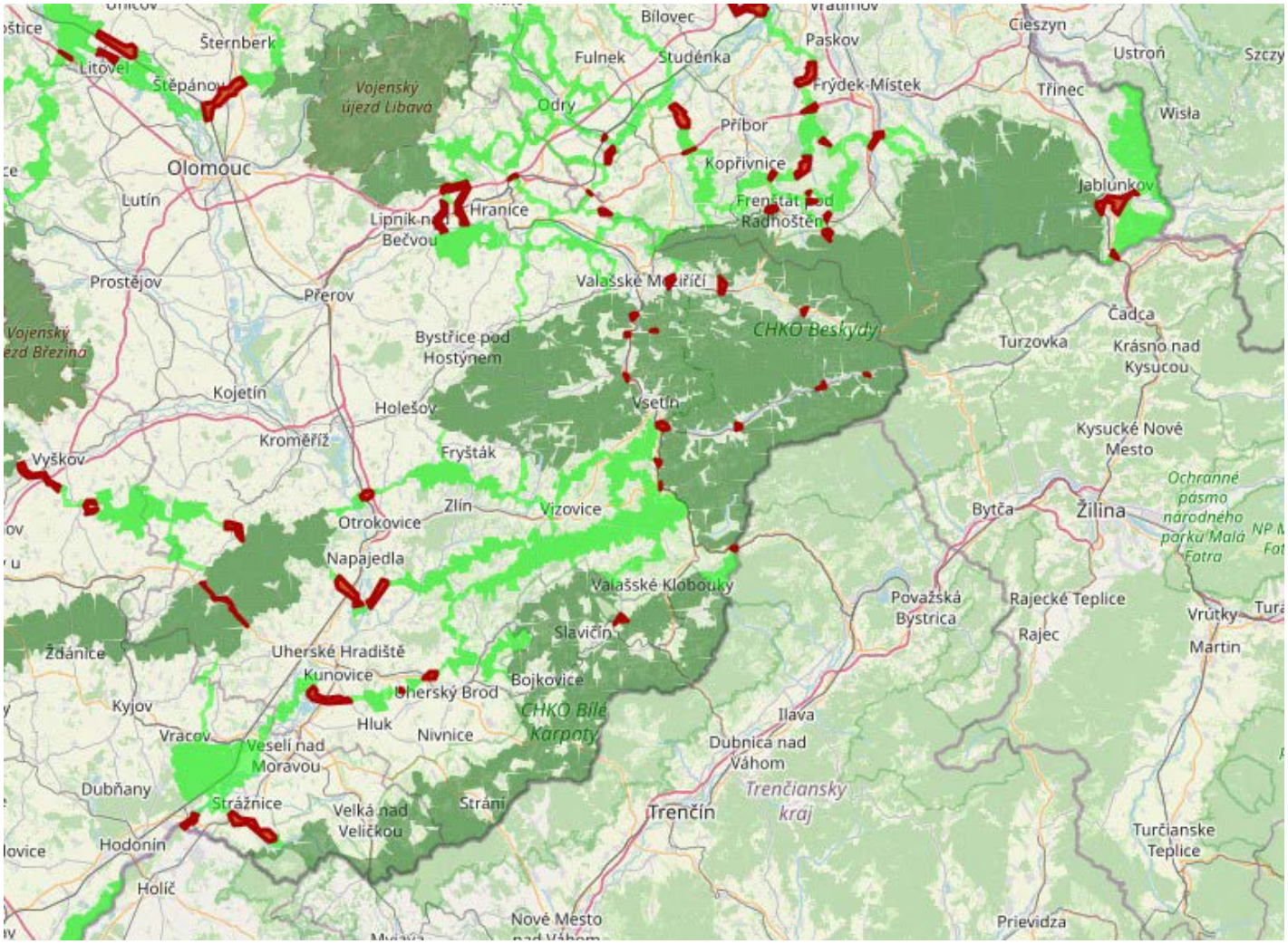

Figure 3: Map layer of the habitat of selected specially protected species of large mammals in the Czech part of the pilot area. © AOPK ČR, selmy.cz.

Available sources:

NCA (2022) Territorial analytical documents: https://aopkcr.maps.arcgis.com/apps/webappviewer/index.html?id=e07f48c384534f038cd837f7eb00d569 (accessed: 2022-10-12)

Documentation for D48 Bělotín – Rybí, Phase II

EIA for I/35 Lešná – Palačov

Information brochure for I/57 Jarcová – Bystřička, jih; open letter of FoE CZ to ŘSD CZ including data on the Lynx lynx migration routes

Documentation for I/58 Frenštát pod Radhoštěm – Vlčovice

Methodology Doprava a ochrana fauny v České republice (Transport and Wildlife Protection in the Czech Republic)

High-speed railways in the Czech Republic on the website of the Railway Administration: *https://www.spravazeleznic.cz/vrt*

Documentation for several segments of D3 in Slovakia. The segments are in various stages of preparation or operation. Three main planned segments will be evaluated as part of the EIA after the expiry of the previous assessments. Feasibility studies will also be carried out: https://www.enviroportal.sk/sk/eia?search%5Bname%5D=dia%C4%BEnica+D3&search%5Bico%5D=&search%5Bact%5D=&search%5Bactivity%5D=&search%5Bcountry%5D=&search%5B-

district%5D=&search%5Bstate%5D=&-search%5Bcrossborder_country%5D=&-search%5Bkeyword%5D=&search%5Bact_sub-%5D=&search%5Bpublish_date_from%5D=&-search%5Bpublish_date_to%5D=&search%5B_token%5D=3dMcjB-3zfeUkZibZmZMbB-cU-Whe12Ti7ztsFF_kYxc

Actions required:
a. Systematically monitor the planning of new linear infrastructure – strategic documents, websites of construction companies, EIA and SEA procedures.

Measure 1.01.3 Independent migration study for HSR

Examples of identified problems:
The planned high-speed rail between Přerov and Ostrava represents a potential barrier that would divide the Beskydy and Jeseníky Mountains. Its impact will be amplified by the cumulative effect of the parallel infrastructure – D1 and D48 motorways.

Available sources:
The high-speed rail network is part of the National Development Strategy of the Czech Republic, especially its 4th update. This includes the proposed corridor ŽD5 Prosenice – Ostrava – CZ/PL border. Changes in the Principles of Territorial Development for the concerned regions (Olomoucký, Moravskoslezský) are underway.

Actions required:
a. As the protection of large mammal habitats is not always required by regional authorities (e.g. as part of SEA and EIA processes, see measure 1.02.1.) and the

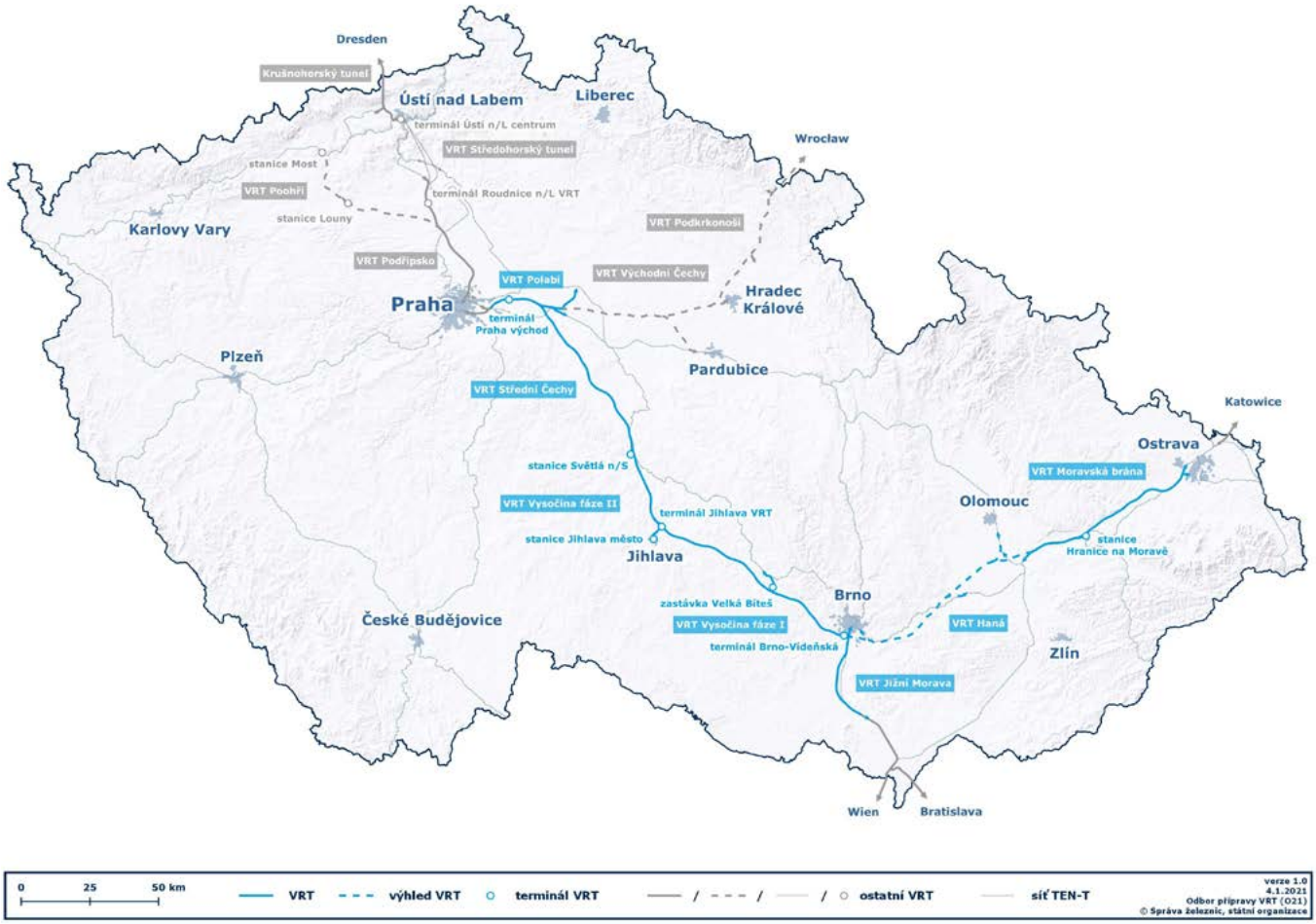

Figure 4: Planned HSR Prague – Brno – Ostrava and Brno – Breclav © Správa železnic, státní organizace.

approach varies between the regions, it is strongly recommended that an independent migration study be carried out for the entire project, including an assessment of potential cumulative effects.

Objective 1.02 Support SEA/EIA/ AA processes and procedures with relevant data and examples of good practice

Measure 1.02.1 Increase awareness of regional authorities

Examples of identified problems:
The main gap in the awareness of regional authorities concerning their role in protecting landscape connectivity relates to the habitat of selected specially protected species of large mammals. Despite the expert opinion of the National Conservation Agency, the author of the layer, the whole layer is not always considered as a habitat by regional authorities. This discrepancy is reflected in the decision-making process. For most regional projects, the request for an EIA must be submitted by the regional authority. The landscape connectivity impact assessment does not always include an evaluation of impacts on habitats. For example, in order to modernize the I/58 road (Frenštát pod Radhoštěm – Vlčovice), the regional authority requested such an assessment only after a public round of comments on the documentation where the issue was raised by several stakeholders.

Available sources:
Methodology Ochrana biotopu vybraných zvláště chráněných druhů v územním plánování (Habitat protection of selected specially protected species in spatial planning)

Documentation for I/58 Frenštát pod Radhoštěm – Vlčovice; Závěr zjišťovacího řízení (Conclusion of the examination procedure)

Actions required:
a. The Ministry of Environment holds regular meetings with representatives of regional authorities. The MoE CZ should be urged to raise the topic of habitat protection in these meetings.

b. To map what documents are available to the regional authorities in terms of spatial planning.

c. Provide the regional authorities with any lacking methodologies and other easy-to-use documents for spatial planning.

Measure 1.02.2 Create technical conditions for lower-class roads and railway lines in SR

Examples of identified problems:
In Slovakia, the quality of migration studies carried out as part of EIA is not subject to any binding technical regulations (such as technical conditions, TC applicable in the Czech Republic). In 2020, corresponding material was prepared for the Slovak Ministry of Transport, but this was not translated into the preparation of binding technical regulations. The Slovak Road Administration (Slovenská správa ciest) did not agree with the proposal. However, the engineering and consulting company HBH Projekt is proposing an update of Slovak TCs for migration studies. HBH Projekt has also developed an internal regulation for the Slovak motorway administrator (NDS), describing the methodology for the preparation of migration studies, which is used in the procurement and control of projects and is binding for NDS contractors. This can be used as an example of good practice. There are also TCs to monitor the environmental impact of road infrastructure and TCs for fauna passages. In 2022, the proposed standard TP 067 on fauna passages, including the control mechanisms for migration studies, was submitted for public comment.

Available sources:
Existing TCs:
https://www.ssc.sk/sk/technicke-predpisy-rezortu/zoznam-tp.ssc

Actions required:
a. Adopt updated TCs.

b. Develop TCs for migration studies.

Objective 1.03 Support designs, technical details and constructive solutions with examples of good practice

Measure 1.02.1 Inform stakeholders about examples of good practice

Examples of identified problems:
Examples of good practice exist but are not easily accessible to stakeholders from different sectors. They should be available in one place where stakeholders will have regular access to them. The continuation of the SaveGREEN local working group is proposed as a solution.

Available sources:
Outputs of the TRANSGREEN and ConnectGREEN projects

SaveGREEN Working Group, Local CSOP

Actions required:
a. Establish long-term cooperation between the members of the local working group.

b. Collect examples of good practices available to members of the local working group.

Objective 1.1 Maximize the functionality of underpasses (all fauna passages)

Measure 1.1.1 Cooperate with ŘSD CZ and NDS to ensure the functionality of underpasses in new local transport infrastructure projects

Examples of identified problems:
Specific examples related to local projects are listed under the following measures. Several problems were identified in the Czech part of the pilot area. Newly proposed roads in some cases cross large mammal habitats, which is not always sufficiently considered in migration studies (see also measure 1.02.1). The preparation of other projects is not

Figure 5: Underpass under the D1 motorway near Suchdol nad Odrou. © Hnutí DUHA Šelmy, Mořic Jurečka.

sufficiently advanced for detailed information to be publicly available. However, road permeability at these critical points should be acknowledged from the very beginning of project preparation. Only then can new projects be planned efficiently and without the risk of future conflicts. Therefore, the best way is to cooperate with the contracting authority (Road and Motorway Directorate, ŘSD CZ). Initial correspondence has been exchanged with the ŘSD CZ Director General, which should be followed up if necessary. Similar attention should be paid to the D3 motorway under construction by NDS in Slovakia.

Available sources:
Documentation for D48 Bělotín – Rybí, Phase II

EIA for I/35 Lešná – Palačov

Information brochure for I/57 Jarcová – Bystřička, jih; an open letter of FoE CZ to ŘSD CZ including data on the Lynx lynx migration routes

Documentation for I/58 Frenštát pod Radhoštěm – Vlčovice

Methodology Doprava a ochrana fauny v České republice (Transport and Wildlife Protection in the Czech Republic)

Documentation for several segments of D3 in Slovakia

Actions required:
a. Cooperation between nature conservation bodies (government, NGOs) and ŘSD CZ or NDS from the initial stages of specific road construction projects.

Measure 1.1.2 Ensure the permeability of I/35 (Lešná – Palačov)

Examples of identified problems:
The project includes the planned construction of a new first-class road and an adjacent section of the D48 motorway. Both sections cross the habitat of selected specially protected species of large mammals. Several underpasses will be constructed, although outside the designated habitat only. The migration study considers these measures to be sufficient and suggests re-routing the ecological corridors. In addition, the planting of guiding vegetation is recommended. This suggestion has not been enforced by the authorities due to anticipated issues related to the ownership of the surrounding land.

Available sources:
Documentation and migration study, the decision of the Ministry

Actions required:
a. Ensure that the recommendations resulting from the EIA process are respected and that the technical details of fauna passages are maintained (authorities, construction supervision).

b. Initiate negotiations with landowners to plant guiding vegetation.

c. Propose the land lease or purchase by the state administration for the planting of guiding vegetation.

Measure 1.1.3 Ensure the permeability of I/57 (Jarcová – Bystřička, jih; Semetín – Bystřička, Stage 2)

Examples of identified problems:
Road relocation of I/57 is routed through the mountain valley of Vsetínská Bečva. Both sections cross the habitat of selected specially protected species of large mammals near its core area. A technical study has been prepared for the section Jarcová – Bystřička, jih, which has not yet been published. Most likely, the lynx monitored by a telemetry tracking collar as part of the SaveGREEN project crossed the valley at two critical points of the planned route. This underlines the importance of ensuring road permeability. According to the migration study, one of the sites should lose its function and be replaced by a bridge over the river further south in the section Semetín – Bystřička, Stage II. A construction permit

Figure 6: The valley of Vsetínská Bečva near Pržno. © Radek Kříček.

has already been issued for this section even though the specially protected plant species Scilla bifolia is threatened by the project.

Available sources:
Documentation and migration study, the decision of the Ministry

Actions required:
ŘSD CZ was already asked to ensure road permeability within the SaveGREEN project. The situation needs to be monitored further and the migration study evaluated once completed. As the road threatens the population of the protected species scilla bifolia in the northern part of the Semetín – Bystřička section, it is necessary to ensure that the contractor has a valid exemption.

Measure 1.1.4 Ensure the permeability of I/58 (Frenštát pod Radhoštěm – Vlčovice)

Examples of identified problems:
The modernisation and relocation of the I/58 first-class road is an example of a transport project where a migration study was carried out. Nevertheless, it lacked any assessment of the impact on the habitat of selected specially protected species of large mammals. The regional authority only requested this assessment following the comments from several stakeholders regarding the environmental impact assessment. The EIA procedure was initiated and the authority obliged the investor to complete the habitat impact assessment.

Available sources:
Documentation and migration study, the decision of the regional authority

Actions required:
The EIA process must be monitored to ensure that landscape connectivity is maintained.

Measure 1.1.5 Ensure the permeability of D48

Examples of identified problems:
One fauna passage in the identified large mammal corridor is part of the I/35 Lešná – Palačov project (see Measure 1.1.2.). Another section under preparation is Bělotín – Rybí, Phase II. The planned road crosses an ecological corridor at this point; however, in the adjacent (already existing) section it is joined by an underpass under a 270-metre-long bridge. The road will be fenced to prevent wildlife mortality.

Available sources:
Documentation and migration studies

Actions required:
Monitor the effectiveness of existing fauna passages and other connectivity measures on D48. The data should be used to propose measures for other existing and planned motorway sections.

Measure 1.2.1 Maintenance and repairs of fauna passages after the monitoring period (SK)

Figure 7: The green bridge over the A1 motorway in Romania is an example of a fauna passage whose functionality for different categories of animals can be significantly enhanced by simple low-cost measures (e.g. planting green islands protected from grazing). © Radek Kříček.

Examples of identified problems:
Fauna passages on motorways are not maintained properly after the period of post-project monitoring. The responsibility for maintenance lies with the NDS, which prioritises the technical condition inspections and does not have the resources to maintain and improve the ecological functions. These functions could be improved though, with the help of NGOs as one of the possibilities. The individual fauna passages are specific in terms of their structure, integration into the landscape and the existing habitats and species of plants and animals that are occurring. Functionality can thus be enhanced by targeted the planning and implementation of relatively inexpensive measures such as promoting or reducing vegetation, creating small landscape features, etc.

A similar lack of support for ecological functions is also a problem for many fauna passages in the Czech Republic.

Available sources:
Examples of good practices from pilot areas in other countries (e.g. the activities of the Zarand Association in Romania)

Actions required:
a. Provide organization and financing to improve the ecological functions of fauna passages.

b. Evaluate appropriate interventions for specific migration objects, considering the experience from other countries.
Actions required:

a. Provide organization and financing to improve the ecological functions of fauna passages.

b. Evaluate appropriate interventions for specific migration objects, considering the experience from other countries.

Threat/Pressure 2:
Barrier effect of existing Transport and other Linear Infrastructure (TLI) (including increasing barrier effect caused by structural interventions

Maintenance or upgrading within the same category/class of roads, railways, navigable channels, waterways, canals, power lines, and pipelines)

Pilot area description:
Human activity has shaped the face of Beskydy and Kysuce for centuries. Traditional transport routes have turned into the current network of roads, railways and other linear infrastructure. The situation progressed to a point that the region has become particularly vulnerable to any reduction in landscape permeability. At the same time, several first-class roads are undergoing maintenance or upgrades to motorways.

What needs to be achieved:
- Measures to improve landscape connectivity at selected critical points in the pilot area were proposed as part of the TRANSGREEN and ConnectGREEN projects. These measures largely concern linear infrastructure and will need to be implemented. Critical points in the White Carpathians should also be mapped and described.

- New fauna passages are to be built in existing transport corridors, mostly as part of road modernisations. The long-awaited green bridge near Mosty u Jablunkova is

also closer to completion after many years of delays. Road contractors, construction authorities and NGOs must ensure that these passages have adequate parameters for the migration of all relevant groups of species.

» Attention must also be paid to rivers and railway corridors – long sections of railways have recently been fitted with noise barriers.

» Thorough monitoring should be put in place for all the above measures. The data will not only serve to evaluate the effectiveness of individual measures but also provide an important basis for future interventions.

General objectives set out to address the threats are:

2.1. Safeguard the permeability of existing transport infrastructure (including a rise in the permeability of existing infrastructure where possible)

2.2. Safeguard the transverse permeability of river banks (including a rise in the permeability of existing infrastructure, where possible)

2.3. Safeguard the longitudinal permeability of rivers (including a rise in the permeability of existing infrastructure, where possible)

Measures proposed for each objective are described below with the list of required/ proposed actions:

Objective 2.1 Safeguard the permeability of existing transport infrastructure (including a rise in the permeability of existing infrastructure where possible)

Measure 2.1.1 Continuously improve the permeability of existing roads of all classes.

Examples of identified problems:
The construction of the existing communications in the past failed to respect the needs of wild living animals. The situation only started to improve after the introduction of the obligatory EIA assessment. There also exists a range of minor adjustments decreasing the barrier effect for different classes of animals, which can be implemented during reconstruction or even during a routine technical maintenance.

From the methodological viewpoint, the Methodology for environmental audit of transport infrastructure (EADI), created by the Transport research centre and approved by the Czech Ministry of Transport (Dostál et al., 2021) can be used. The methodology covers the basic aspects of barrier effect solutions (migration corridors, migration objects, fences, vegetation management etc.) as well as the linked issues of water bodies related to transport infrastructure. The reconstructions of bridges are crucial for the improvement of permeability on current infrastructure. The dozens of reconstructions performed per year should be used to improve the situation. A reconstruction of just a meaningless bridge can significantly lower the mortality of small animals in a given section if a “dry passage” is established.

Available sources:
DOSTÁL, I., ANDĚL, P., JEDLIČKA, J., GORČICOVÁ, I., HAVLÍČEK, M., SVOBODA, J. (2021). Methodology for environmental audit of transport infrastructure. Brno: Transport research centre, 68 p. Approved by the Ministry of Transport of the Czech Republic, December 10, 2021, č.j. MD-634/2021-710/18.

Actions required:
a. Systematically perform an environmental audit of existing communications – always (without exception) as a basis for the project documentation for road reconstructions.

b. Systematically perform an environmental audit of existing communications – periodically every several years for busy sections.

Measure 2.1.2 Respect expert recommendations regarding the parameters of fauna passages.

Examples of identified problems:
The problem exists in both the Czech Republic and Slovakia. There is pressure for green bridges to be built in a narrower fashion than would be consistent with expert recommendations based on scientific knowledge. According to the NCA methodology, the mean width of a green bridge should be 40 metres, whereas in the Carpathians, where brown bears migration can be expected, a width of 60 metres is recommended. However, for the crucial green bridge between the Beskydy Mountains and the Central Carpathians (Mosty u Jablunkova), a mean width of 47 metres is proposed. On the other hand, significantly wider bridges have been proposed on the Slovak D1 motorway (see also Measure 2.1.3.). The green bridge should always be designed in a way to have the most effective width to meet its ecological and economic sense. Recommendations regarding the number of fauna passages per unit length of the road are often not followed.

Available sources:
Methodology Doprava a ochrana fauny v České republice (Transport and Wildlife Protection in the Czech Republic)

I/11 Mosty u Jablunkova,a green bridge. The current progress of the construction of the green bridge

The record of the public hearing for "The Assessment of impacts on Natura 2000 sites" on the D1 motorway in the section Turany – Hubová which took place on 15 August 2012 at 16 p.m. at the Municipal Office in Kraľovany:

https://www.mindop.sk/ministerstvo-1/zalezitosti-eu-a-medzinarodnych-vztahov-14/fondy-eu/eurofondy-2007-2013/strategicke-environmentalne-hodnotenie/slovenska-verzia/verejne-prerokovanie-zaverecnej-spravy-hodnotenie-vplyvu-dialnice-d1-turany-hubova-na-uzemia-sustavy-natusa-2000

Parameters of the structure of green bridges near Svrčinovec regarding the Information Portal of the Ministry of Environment of the Slovak Republic:

https://www.enviroportal.sk/sk/eia/detail/d3-zeleny-most-svrcinovec-ekodukt-nad-cestou-i-11

Actions required:
a. Create a list of the most important parameters of fauna passages.

b. Enforce these parameters into legislation.

Measure 2.1.3 Build green bridges on D1 in Slovakia

Examples of identified problems:
The D1 motorway is the main linear barrier separating mountain ranges in Slovakia. Its effect is multiplied by the nearby settlements, transport infrastructure, the Váh River, an artificial water channel with weirs, and other structures. Numerous collisions with wildlife have been recorded, but there exists no systematic monitoring. The construction of a sufficient number of green bridges would improve both wildlife protection and driver safety. However, green bridges must be built according to expert recommendations. In the past, needlessly wide green bridges have been designed, leading to a waste of funds and opposition to their construction. This will not increase the benefits in terms of landscape connectivity. An analysis of ecological connectivity, a draft of solutions, and a prioritisation plan have been developed by the Slovak company of NDS, but have not been implemented yet.

Available sources:
Migration study of selected animal species on operational sections of motorways, expressways and selected Class I roads, HBH Project of 2017

Catalogue of measures (TRANSGREEN)

Figure 8: The Váh River valley is a major cumulative migration barrier separating the Moravian-Slovak border area from the central Carpathians. In addition to the D1 motorway, the valley is also intersected by a railway and a navigable river. © Radek Kříček.

Actions required:
a. Ensure systematic monitoring (see also 7.1).

b. Implement the recommendations of the TRANSGREEN project (Catalogue of measures).

Measure 2.1.4 Ensure the permeability of railway lines in Kysuce (SR)

Examples of identified problems:
Dozens of kilometres of noise barriers were built as part of the modernisation of railway lines in the Kysuce region and along the Váh River (Slovak part of the pilot area). This has significantly reduced the landscape permeability.

Available sources:
Railway modernisation assessment report: https://www.enviroportal.sk/sk/eia/detail/zsr-modernizacia-zeleznicnej-trate-puchov-zilina-pre-rychlost-do-160-k-1

Actions required:
a. Carry out a detailed migration study.

b. Compare the current state with the situation before the construction of noise barriers.

c. Make suggestions for mitigating measures.

Measure 2.1.5 Build the missing green bridge on E75

Examples of identified problems:
The area around Jablunkov and Mosty u Jablunkova is one of the last remaining corridors connecting Beskydy with the rest of the Carpathians. The Beskydy Mountains are home to lynx, wolf and brown bear. It is the only area in the Czech Republic with a presence of bears. The valley is intersected by the E75 European route. Since 2010, traffic has increased significantly due to the opening of the car factory in Nošovice. The Czech government pledged to compensate for the increased pressure on wildlife by building a green bridge. This commitment has not been fulfilled yet. However, a multinational working group has been established to find

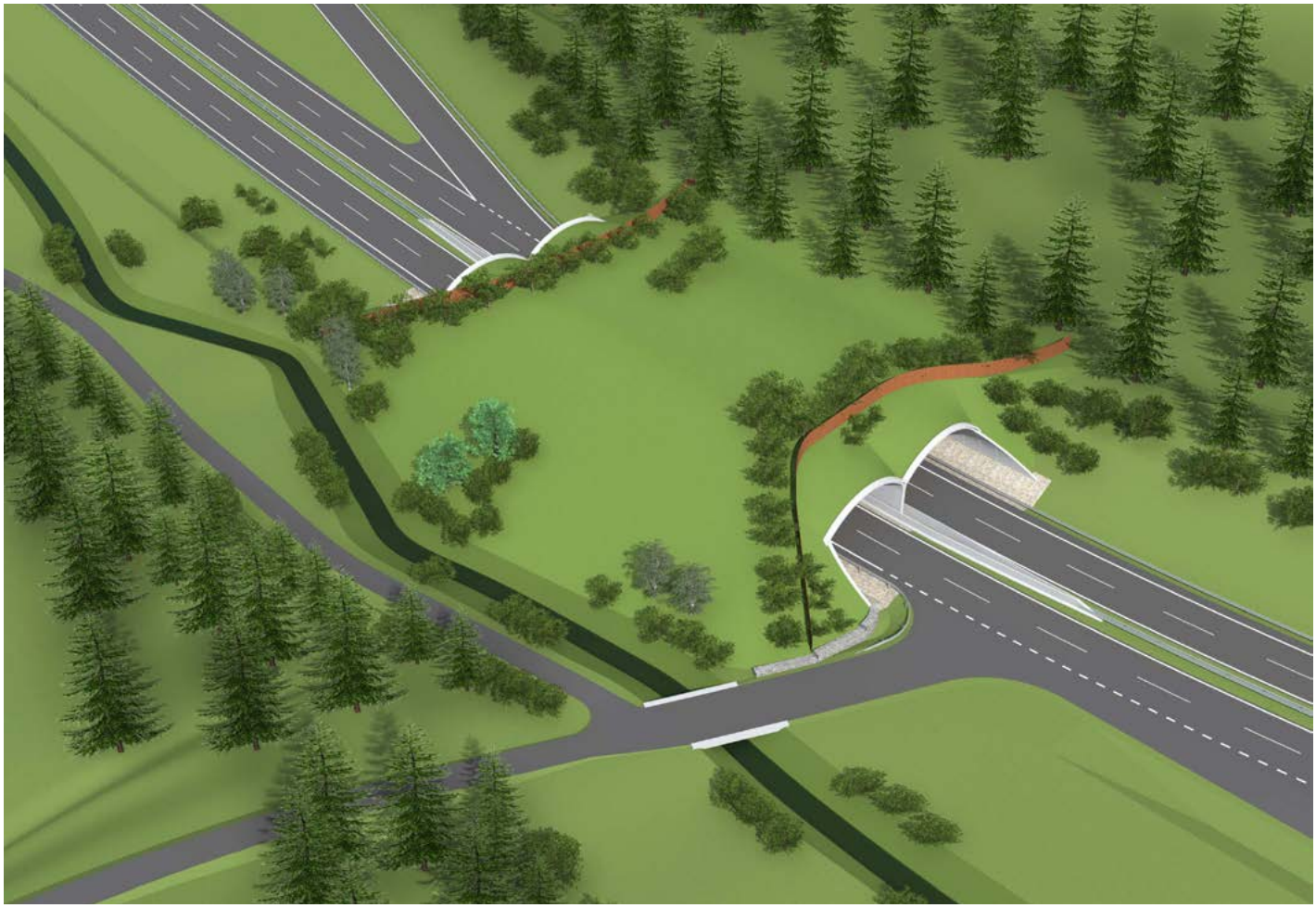

Figure 9: Visualisation of the Mosty u Jablunkova green bridge. © Ředitelství silnic a dálnic ČR.

solutions to the problems associated with the construction of the D3 motorway in the adjacent areas of the Kysuce Mountains. Recently, the decision was made to start the construction of a green bridge at Mosty u Jablunkova. The migration of several large carnivore individuals has been documented in the area between the two mountain ranges (see Available sources).

Available sources:
Male lynx migrating through the concerned area:

http://www.carnivores.cz/articles/the-first-eurasian-lynx-to-cross-from-silesian-to-moravian-silesian-beskydy/

A wolf migrating through the concerned area (p. 50):

A study with recommendations for the management of large carnivores in the Slovak-Czech cross-border region

A Resolution of the Government of the Czech Republic regarding the provision of funds for the construction of a green bridge near Jablunkov:

A Resolution of the Government of the Czech Republic of 10 May 2006 No. 550

I/11 Mosty u Jablunkova, a green bridge. The current progress of the construction of the green bridge

Actions required:
a. After obtaining the necessary permits, proceed with the construction.

Objective 2.2 Safeguard the transverse permeability of river banks (including a rise in the permeability of existing infrastructure, where possible)

Measure 2.2.1 Ensure the permeability of Váh and Bečva river banks

Examples of identified problems:
In some locations, river banks are not permeable for certain groups of species. This problem is particularly pressing in the case of Váh (SK) and Vsetínská Bečva (CZ). The permeability of rivers can be impaired, for example, by steep banks, unsuitable or missing vegetation on the banks, or by straightening of the river beds and faster water flow. Therefore, possible remedies include both bank modifications and the restoration of smaller rivers within their original river beds.

In case of Vsetínská Bečva, the most problematic sections are between Ústí and Vsetín (along the double railway line), between Jablůnka and Bystřička and between Bystřička and Jarcová (river, road and railway).

Figure 10: An example of a technically modified flow – the Váh waterway. © Ivo Dostál.

Actions required:
a. Map the most problematic parts of the watercourses.

b. Prepare pilot projects to remove or adapt existing barriers.

Objective 2.3 Safeguard the longitudinal permeability of rivers (including a rise in the permeability of existing infrastructure, where possible)

Measure 2.3.1 Design solutions for specific transverse barriers

Examples of identified problems:
Transverse barriers such as weirs and dams present an obstacle to migrating aquatic animals. Fish crossings may be a solution for some species; however, on smaller streams, removal of transverse barriers is the best solution.

Actions required:
a. Map transverse barriers on watercourses.

b. Prepare pilot projects to remove or adapt existing barriers and build fish crossings.

Figure 11: On the streams in the Moravian-Silesian Beskydy we often find transverse barriers insurmountable for many aquatic species (the village of Zděchov). © Radek Kříček.

Threat/Pressure 3: Linear transport infrastructure (including electric power lines) causing wildlife mortalities

Pilot area description:
The dense network of linear infrastructure in the area of Beskydy and Kysuce is a significant cause of wildlife mortality. Traffic collisions involving large carnivores have been recorded repeatedly. It is not clear at this time how significant this type of mortality is for other groups of species such as birds, bats, reptiles or amphibians. This is another reason why the problem should be given sufficient attention.

What needs to be achieved:

- A comprehensive review of existing data. The extent to which wildlife mortality is recorded differs in the Czech Republic and Slovakia, in different parts of the pilot area and for different groups of species. It is assumed that the problem exists for most groups of species. However, we lack clear data.

- Reduction of mortality by specific measures for different groups of animals. Establishment of a special team to deal with emergencies. Increase awareness of train drivers and conductors. After an initial review of data, critical sections of roads and railway lines should be equipped with warning signs and intelligent warning systems.

General objectives set out to address the threats are:

3.1. Implement an adequate fencing system on motorways and high-speed railways, including escape gates

3.2. Direct animals towards functional crossings

3.3. Warning drivers in areas with high accidents/road-kills

3.4. Warning train drivers in areas with high accidents/road-kills

3.5. Prevent collisions with mammals in railway tunnels and on long bridges

3.6. Increase visibility for drivers/train drivers

3.7. Implement special measures to prevent bird mortality (impact of power lines, noise barriers)

3.8. Implement special measures to prevent bat mortality (light pollution)

3.9. Implement special measures to prevent amphibian and reptile mortality

3.10. Collect and process data to identify the critical sections of roads, motorways and railways

3.11. Establish and train special teams to deal with wildlife-related incidents on roads, motorways, and railway lines, e.g. bear in a motorway/railway tunnel

3.12. Develop and use an integrated database as a decision-support tool for dealing with traffic accidents (for implementing/adapting measures to prevent wildlife mortality/property damage/human casualties)

Measures proposed for each objective are described below with the list of required/ proposed actions:

Objective 3.1 Implement an adequate fencing system on motorways and high-speed railways, including escape gates

Measure 3.1.1 Prevent fenced sections of roads and railways without fauna passages

Examples of identified problems:
In some cases, linear structures planned across large mammal ecological corridors are designed to be fenced without the essential fauna passages. An example is Section II of the I/49 – R49 project near Zlín where, according to the EIA documentation, it is not possible to ensure permeability due to the terrain configuration and the routing of the road. However, in this case, the structure would pose a significant negative impact on the habitat of protected large carnivores. Such situations should be prevented: either the necessary fauna passages should be built or structures obstructing the corridors should be avoided.

Available sources:
II/490: Zlín, connection D49 – I/49, Section II. Documentation of the project in the scope of Annex 4 of Act No. 100/2001 Sb., on environmental impact assessment.

Methodology Doprava a ochrana fauny v České republice (Transport and Wildlife Protection in the Czech Republic)

Actions required:
a. Monitor the preparation of fenced sections.

b. Plan fauna passages in fenced sections.

c. Ban fenced sections of roads in ecological corridors without fauna passages.

Figure 12: Illustration photo – highway fencing © Ivo Dostál.

Objective 3.2 Direct animals towards functional crossings

Measure 3.2.1 Ensure to plant some guiding vegetation

Examples of identified problems:
In some cases, the requirement to plant guiding vegetation is not followed. One such example is described in Measure 1.1.2. However, this is a more general problem and the associated difficulties are described, as in the ŘSD CZ correspondence with FoE CZ. The main obstacle is often property ownership since the owners of the land adjacent to fauna passages cannot be forced to plant any vegetation. Nevertheless, it would be advisable to negotiate with the local land owners and plant the greenery based on a mutual agreement. FoE CZ has already managed to plant guiding vegetation on municipal land near Jablunkov.

State compensation to land owners or purchase or lease of land by the state administration/motorway company to plant guiding vegetation would contribute to a systematic solution of the problem. In Austria, the motorway company leases land around the green bridges. In case of D1 (previously D47), ŘSD CZ was tasked to plant guiding vegetation and implement other measures to safeguard connectivity by the Ministry of Environment.

Figure 13: FoE CZ managed to negotiate the planting of guiding vegetation on the municipal land in the ecological corridor near Jablunkov. Pictured here is the removal of protective fencing from mature trees attended by the media. © Ivo Dostál.

Available sources:
- Correspondence with ŘSD CZ, documentation and migration study, the decision of the regional authority

- Decision of the MoE CZ concerning D1 (D47) of 10 February 2010

- Article on planting the guiding vegetation near Jablunkov on the FoE CZ website:

http://www.carnivores.cz/press-news/outcomes-of-the-lynx-telemetry-monitoring-in-the-beskydy-mountains/

Actions required:
a. Facilitate discussion on systematic solutions for guiding vegetation along linear infrastructure

b. Ensure the implementation of guiding vegetation where recommended by migration studies.

Objective 3.3 Warning drivers in high accident/road-kill areas

Measure 3.3.1 Install a warning system in the area Lužná/Lidečko – Lomensko

Examples of identified problems:
The warning system for drivers was recommended in the Catalogue of measures of the TRANSGREEN Project and has been installed at some locations in the Moravian-Silesian Region. The recommended measures have not been implemented in the Zlín Region yet. Frequent wildlife crossings are recorded, for example, on I/57 near Lužná and Lidečko. The road separates the core area of the habitat of specially protected large mammals from the ecological corridor in the direction of Vizovické vrchy. This also affects protected species – in the past, killed beaver and lynx were recorded here. As examples from abroad show, the safety of drivers and wildlife would be improved by intelligent warning signs and reflective markings. Care must be taken to ensure that drivers are not distracted by such installations.

Available sources:
Catalogue of measures, TRANSGREEN

Young lynx killed in road collision

http://www.carnivores.cz/articles/a-lynx-cub-hit-by-a-car-in-vsetin-region/

Actions required:
a. Install warning signs for drivers

b. Install an intelligent warning system

c. Install reflective markings.

d. Monitor the pilot installation of the intelligent warning system as part of the construction of the green bridge near Svrčinovec.

Objective 3.4 Warning train drivers in areas with high accident/road-kill rates

Measure 3.4.1 Map the mortality on railways

Examples of identified problems:
Wildlife mortality data for railways is not publicly available. Likely, accident records do not include all the necessary details (e.g. exact coordinates). For example, according to a representative of the Regional Directorate of the Railway Administration in Ostrava, collisions are only recorded in the event of damage to a vehicle or operational restrictions. Three such incidents occurred between 1 January 2021 and 20 December 2021.

Available sources:
Statement of the Regional Directorate of the Railway Administration in Ostrava

Actions required:
a. Review existing data on wildlife mortality on railways.

b. Install warning signs on identified problematic sections.

Measure 3.4.2 Install warning system on railways

Examples of identified problems:
At this stage, it is unclear to what extent railway wildlife mortality is affecting local populations of endangered species. However, several accidents involving large carnivores have been documented (e.g. a female lynx in April 2017). It is, therefore, desirable to improve railway safety with respect to wildlife crossings.

Available sources:
Accident involving a female lynx Lenka, April 2017: https://www.selmy.cz/tiskove-zpravy/letos-prisly-v-beskydech-o-zivot-jiz-dve-rysice/

Actions required:
a. Investigate the possibilities of installing warning signs along the main railway corridors (could be done as part of ETCS implementation)

b. Install warning signs on problematic sections of regional lines.

Objective 3.6 Increase visibility for drivers/train drivers

Measure 3.6.1 Identify sections with poor visibility

Examples of identified problems:
The problem has been systematically studied within the project Complex Approach to the Protection of Fauna of Terrestrial Ecosystems from Landscape Fragmentation in the Czech Republic (EHP-CZ02-OV), funded by the Norwegian Funds. Based on the project, a map layer of the Habitat of selected specially protected species of large mammals was created, and recommendations for specific sites at critical points were proposed (TRANSGREEN, ConnectGREEN). Adding to the

Figure 14: Identified section with poor visibility on I/51. © Ivo Dostál.

implementation of these recommendations, the situation on railways should also be mapped.

Available sources:
Outputs of the TRANSGREEN and ConnectGREEN projects

Actions required:
a. Map railway sections with poor visibility.

Objective 3.7 Implement special measures to prevent bird mortality (impact of power lines, noise barriers)

Measure 3.7.1 Use bird mortality data to improve species conservation

Examples of identified problems:
Some stakeholders are already mapping bird mortality (NCA, Czech Ornithological Society). There are two centralised databases of national nature conservation agencies in the Czech and Slovak Republics (NDOP, KIMS). The information from the public received through reports and mobile applications (Avif, vtaky.sk) is also fed into these databases. Based on the data analysis, specific solutions can be proposed.

Available sources:
Methodology Doprava a ochrana fauny v České republice (Transport and Wildlife Protection in the Czech Republic)

Database of the NCA (NDOP)

Comprehensive Information and Monitoring System of SNC SR (KIMS)

Database of the Czech Ornithological Society (avif)

Database of the Slovak Ornithological Society

Actions required:
a. In cooperation with experts and NGOs, propose measures based on observed mortality distribution.

Objective 3.8 Implement special measures to prevent bat mortality (light pollution)

Measure 3.8.1 Evaluate bat mortality

Examples of identified problems:
Some stakeholders are mapping bat mortality (Czech Bat Conservation Society, ČESON) and the related problem of light pollution (Czech Astronomical Society). Bats, like birds, suffer from direct mortality at the intersections of linear vegetation with roads. The solution depends on the specific location, the type of road and the species of bats that occur there. Measures to protect migrating bats should be implemented in their flight corridors. Detailed information can be found in the methodology Transport and Wildlife Protection in the Czech Republic.

Valuable data will be obtained during the construction of the D3 motorway in Slovakia where protective barriers are being installed in the main flight corridors of bats, as recommended by the migration study. A centralised database should be established (if it does not exist already). Based on the data analysis, specific solutions can be proposed.

According to ČESON information, there is practically no knowledge of the effect of light pollution from car lights on flying bats, only the effect of street lighting is known.

Available sources:
Methodology Doprava a ochrana fauny v České republice (Transport and Wildlife Protection in the Czech Republic)

Actions required:
a. Consult existing data with NCA, Czech Bat Conservation Society, and Czech Astronomical Society to identify problematic areas and species of bats affected.

b. Monitor the construction of D3 in Slovakia and gather relevant data from the barriers in bat flight corridors.

Figure 15: A bat hit by road traffic. © Ivo Dostál.

Objective 3.9 Implement special measures to prevent amphibian and reptile mortality

Measure 3.9.1 Evaluate amphibian and reptile mortality

Examples of identified problems:
Numerous efforts are already underway in the pilot area to protect amphibians, especially during the breeding season. These are organized by the NCA (through administrations of protected landscape areas), local NGOs and the Czech Union for Nature Conservation (Czech Union for Nature Conservation). NCA produced a map of amphibian and reptile mortality on roads. Based on the data analysis, specific actions should be suggested to tackle the problem according to the methodology Transport and Wildlife Protection in the Czech Republic.

Available sources:
Methodology Doprava a ochrana fauny v České republice (Transport and Wildlife Protection in the Czech Republic)

NCA map showing sections of roads critical for amphibians and reptiles:

https://aopkcr.maps.arcgis.com/apps/webappviewer/index.html?id=0ff27c9de9fc434488a056bd0e2bed53

Actions required:
a. Consult existing data with NCA, local NGOs, and Czech Union for Nature Conservation.

b. Propose site-specific measures in accordance with the methodology Transport and Wildlife Protection in the Czech Republic.

c. Evaluate the effectiveness of implemented measures.

Objective 3.10 Collect and process data to identify the critical sections of roads, motorways and railways

Measure 3.10.1 Identification and cataloguing of critical points

Examples of identified problems:
The critical points in the Czech Republic are identified within the Habitat of selected specially protected species of large mammals. The catalogue is part of the Territorial Analytical Documents (phenomenon 36b). Within the ConnectGREEN project, 41 maps of critical sites in Beskydy, Hostýnské vrchy and Javorníky were processed. Maps for other parts of the concerned area have not been prepared yet.

Available sources:
NCA (2022). Territorial analytical documents: https://aopkcr.maps.arcgis.com/apps/webappviewer/index.html?id=e07f48c384534f038cd837f7eb00d569 (accessed: 2022-10-12)

Actions required:
a. Complete the records of critical points in other areas – e.g., White Carpathians, Kysuce.

b. Consult existing catalogues of critical points with the NCA, nature conservation and spatial planning authorities.

Objective 3.11 Establish and train special teams to deal with wildlife-related incidents on roads, motorways, and railway lines, e.g., a bear in a motorway/railway tunnel

Measure 3.11.1 Clarify the procedure and competences for the provision of veterinary care and handling of carcasses.

Examples of identified problems:
Frequent incidents involving wild carnivores in the Czech Republic show that these cases are not dealt with systematically and effectively. Delays in the diagnosis and treatment of injured animals and improper handling of carcasses have been noted. The remedy of the situation is hindered by an unclear definition of competences between the NCA and the MoE CZ.

For example, in September 2022, an injured wolf was found in the Karlovy Vary region but there were delays in diagnosing its exact injuries. Additionally, the animal was placed in an animal rescue centre lacking proper care equipment where it stayed for a long time.

To deal with similar situations more successfully, it is necessary to clarify the competences and responsibilities of relevant actors. The proper procedure should also be included in protected species management plans.

Experience from abroad shows that it is possible to rescue animals injured in traffic accidents and successfully return them to the wild if veterinary care is provided effectively and specialised rehabilitation facilities are available.

Available sources:
A wolf hit by a vehicle the Karlovy Vary region

https://www.selmy.cz/clanky/cesko-potrebuje-jednotny-plan-jak-postupovat-pri-zachrane-zranenych-selem/

Grey Wolf Management Programme (MoE CZ, 2020):

https://www.navratvlku.cz/o-vlkovi-program-pece-o-vlka/

Actions required:
a. Prepare a summary of incidents dealt with so far.

b. In cooperation with the NCA and MoE CZ, determine the competences of individual authorities.

c. Create a contact list of veterinarians in all regions who can provide immediate assistance.

d. Establish rehabilitation centres for wild animals including large carnivores, and ensure their financing by the state.

e. Add established procedures to protected species management plans where needed.

Objective 3.12 Develop and use an integrated database as a decision-support tool for dealing with traffic accidents (for implementing/ adapting measures to prevent wildlife mortality/property damage/human casualties)

Measure 3.12.1 Collect available data on wildlife-related traffic accidents

Examples of identified problems:
There is no central international database of wildlife-related traffic accidents. In the Czech Republic, a central database of road-kills (www.srazenazver.cz) that is based primarily on police records is managed by the CDV GIS-team. Although it does not capture all collisions, only those reported/ investigated by the police, it is the most comprehensive source of information on potentially critical sites where animal-vehicle collisions occur. In Slovakia, the SNC SR operates the KIMS database, which allows users to enter information on traffic accidents. However, not all cases are documented because nature protection authorities are often not called to the accident sites. Also, accident reports are often written on paper forms and are not digitally entered into a database.

Available sources:
Czech database of road-kills

KIMS database

Paper forms used by various authorities

Actions required:
a. Setting up an official procedure for comprehensive data collection (online system at the srazenazver.cz website is already prepared for this purpose); gathering records from nature conservationists, hunting associations, drivers and other citizens, in addition to police records.

b. Sharing data on critical points to open up possibilities for incorporating time-specific alerts into car navigation systems.

Threat/Pressure 4: Reduced landscape permeability caused by changes in land-use

Pilot area description:
The use of the landscape in Beskydy and Kysuce has changed in recent decades. The formerly scattered villages on the valley floor have merged into an almost continuous settlement. The surroundings of villages and towns have mostly changed from farmland and pastures to meadows, tourist and winter sports resorts.

What needs to be achieved:
- Implement recommendations of TRANSGREEN and ConnectGREEN projects. Land-use recommendations were formulated for several critical places. A similar catalogue of measures will be developed within the SaveGREEN project for the White Carpathians Protected Landscape Area (CZ) and the Biele Karpaty Protected Landscape Area (SK).

- Continuous monitoring and active participation in EIA processes is necessary to ensure landscape connectivity in critical locations.

- In the Czech Republic, the protection of connectivity is legislatively provided through introducing the habitat of selected specially

protected species of large mammals. The proposed measures, therefore, focus on the implementation of valid legislation.

General objectives set out to address the threats are:

4.1. Prevent changes in land use towards less permeable categories (including compensatory measures in terms of connectivity)

4.2. Facilitate/support land-use changes towards more permeable categories through agricultural subsidies

Measures proposed for each objective are described below with the list of required/ proposed actions:

Objective 4.1 Prevent changes in land use towards less permeable categories (including compensatory measures in terms of connectivity)

Measure 4.1.1 Respect the existence of migration corridors in spatial planning documentation

Examples of identified problems:
A crucial, but not always employed tool is the Strategic Migration Study (SMS) for spatial plans in the Czech Republic. While detailed migration studies during the EIA processes for transport infrastructure are common, SMS is often omitted in spatial planning. Still, they are of utmost importance: wrongly approved conception proceeds following wrong decisions. SMS should be requested:

a) as part of ZÚR (territorial development principles of regions) – conceptual solutions for transport, industrial parks, mining etc.;

b) as part of spatial plans of municipalities – specific built-up areas, local barriers etc.

SMS should not only be requested when creating the document itself but also during all changes (!) which lead, often unnoticed, to negative impacts. The environmental authorities are in charge of requesting SMS. The respective methodology is described in bigger detail in TP 180 (Anděl et al., 2006). An example of SMS in ZÚR can be found in the Olomouc region (Anděl et al., 2015).

Available sources:
Anděl, P., Hlaváč, V., Lenner, R. et al. (2006). TP 180 Migration objects for maintaining permeability of highways and roads for wild living animals. Liberec: Evernia, 97 p. ISBN 80-903787-0-6. Approved MD - OPK čj. 413/06-120-RS/2 from 27th July 06 with effect from 1 August 2006.

Anděl, P., Gorčicová, I., Dostál, I. et al. (2015). Strategic migration study for Olomouc region. Liberec: Evernia, 2015, 46 p.

Actions required:
a. Create Strategic Migration Studies (SMS) as part of prepared spatial plans and strategies.

b. Systematically request the assessment of connectivity under all proposed changes in spatial plans of all levels.

Measure 4.1.2 Ensure ecological connectivity in the Jablunkov region

Examples of identified problems:
The Jablunkov region is an area of crucial importance for the migration between the Beskydy Mountains and the Central Carpathians and for the large carnivore conservation in the Beskydy Mountains. Changes in land use in recent decades have led to a decline in landscape connectivity. Currently, only two corridors remain connecting the two mountain ranges on the Czech side of the border. This is due to increasing construction (residential houses, recreational facilities, industrial sites) and changes in agriculture (large-scale monocultures, fencing). The ownership structure of the landscape is complicated with many small owners in different parts of the valley.

Solutions for maintaining landscape connectivity were already included in the proposals that arose from the TRANSGREEN and ConnectGREEN projects. Additionally, the guiding vegetation planted by the FoE CZ should be maintained and, if possible, expanded as one of the efficient methods to restore connectivity of the area. The possibility of purchasing land to implement protection measures should be explored (funds can be obtained, for example, from the LIFE programme, as the experience in Romania shows).

Available sources:
List of measures resulting from the TRANSGREEN and ConnectGREEN projects

Article about the planting of guiding vegetation:

http://www.carnivores.cz/press-news/outcomes-of-the-lynx-telemetry-monitoring-in-the-beskydy-mountains/

Actions required:
a. Initiate negotiations with the Jablunkov political leadership and other local stakeholders.

b. Implement recommendations from the TRANSGREEN and ConnectGREEN projects.

c. Expand the guiding vegetation to other lands.

Measure 4.1.3 Implement measures resulting from the TRANSGREEN and ConnectGREEN projects

Examples of identified problems:
The TRANSGREEN catalogue of measures addresses the most pressing threats to transport infrastructure in the region. In addition, the ConectGREEN project also focuses on land use in general. The pilot areas largely overlap with the SaveGREEN pilot area. The main difference is the Bílé/Biele Karpaty (see Measure 4.1.4).

Apart from the Jablunkov region, the focus is mainly on the large terrain depressions in the vicinity of the project areas (Moravská brána, the valleys of Váh and Morava) and on the long mountain valleys in the central parts of the pilot area (the valleys of Vsetínská Bečva, Rožnovská Bečva and Senice).

Available sources:
TRANSGREEN list of measures, ConnectGREEN recommendations

Actions required:
a. Implement the proposed measures.

b. Update land-use data.

Measure 4.1.4 Catalogue of measures for Bílé/Biele Karpaty

Examples of identified problems:
A catalogue of measures is not yet available for critical points in protected landscape areas of Bílé Karpaty (CZ) and Biele Karpaty (SK). Nevertheless, this large area is an important habitat for many protected species in the westernmost part of the Carpathians. Similar catalogues to those produced in the TRANSGREEN and ConectGREEN projects would also be useful here for the protection of landscape connectivity.

Available sources:
TRANSGREEN list of measures, ConnectGREEN recommendations, biotope of large mammals

Actions required:
a. Create a catalogue of measures for Bílé/Biele Karpaty.

b. Present and discuss the document with local stakeholders

c. Adjust proposed measures according to stakeholders' suggestions.

Measure 4.1.5 Monitoring the development of barriers at critical points

Examples of identified problems:
The barriers at identified critical points were

mapped within the project with a limited implementation period that does not allow long-term and systematic monitoring. Thus, up-to-date information on the state of individual critical points is missing, and possible negative development trends (the emergence of new barriers) are only discovered by chance, often when it is too late to prevent them.

Available sources:
N/A

Actions required:
a. Establish a long-term programme for systematic monitoring of the emerging migration barriers in the territory at critical points.

Measure 4.1.6 Monitoring the expansion of built-up recreational areas

Examples of identified problems:
The expansion of many recreational areas (Pustevny, Lysá hora) has also contributed to the loss of large carnivore habitats in the region. The total area of slopes in the Beskydy Protected Landscape Area has almost doubled between 1993 and 2018 (Havlíček & Dostál, 2019). In the future, it will be necessary to monitor this issue and ensure that all environmental impacts concerning migratory protected species (e.g. large carnivores) are properly assessed.

Available sources:
HAVLÍČEK, M., DOSTÁL, I. Spatial Conflicts of Winter Ski Resorts with Wildlife Habitats – Case study Beskydy Mts. and Moravian Wallachia. In Fialová, J./ed./Public Recreation and Landscape Protection – with Sense Hand in Hand ...: Conference Proceedings. Křtiny, Czech Republic, May 13-15, 2019. Brno: Mendel University, pp. 365-370. ISBN 978-80-7509-659-3.

Actions required:
a. Carry out systematic monitoring of EIA procedures.

b. Ensure that landscape connectivity is maintained near recreation areas.

Figure 16: The growing recreational area Leskové. © Ivo Dostál.

Threat/Pressure 5a: Reduced landscape permeability caused by land management – fencing

Pilot area description:
In some cases, fencing can significantly reduce the permeability in ecological corridors. In the Czech Republic, this is often related to preventive measures against attacks of large carnivores on livestock. In Slovakia, fencing is installed to protect crops against herbivores.

What needs to be achieved:
- Design a sustainable fencing system for livestock farmers. Balance the needs of farmers (livestock protection) and landscape connectivity. A tailored approach is needed.
- Identify procedures to address the problem of agricultural fencing in Slovakia.

General objectives set out to address the threats are:

5a.1. Fencing regulations and promoting unfenced areas

5a.2. Develop guidelines and conditions concerning fencing for agriculture/ forestry subsidies or specific programmes

Measures proposed for each objective are described below with the list of required/ proposed actions:

Objective 5a.1 Fencing regulations and promoting unfenced areas

Measure 5a.1.1 Promote practices to reduce the use of agricultural fencing

Examples of identified problems:
In some cases, agricultural fencing can significantly reduce permeability in ecological corridors.

Fencing is often installed to protect livestock from attacks by large carnivores. A balance must be found between the need to protect large carnivore populations by preventing damage to livestock and maintaining landscape permeability. It is also necessary to monitor and comment on the associated EIA processes.

In Slovakia, there are no known calls for the fencing of pastures within the operational programmes. Traditional shepherding methods are also more widely used than in the Czech Republic, thus fencing of grazing areas is less of a problem. On the other hand, agricultural fencing is largely installed to protect crops from wildlife. Most of the land is located in areas with a lower level of nature protection, and it is not possible to effectively enforce a more acceptable solution for connectivity: in the areas with the first degree of protection, it is very difficult for the nature conservation authorities to monitor any new installations. In areas with the second and third degrees of protection, the nature conservation authority approval is required, whereas in the fourth- and fifth-degree areas, construction of fences is forbidden. Farmers are also forced to fence their land because in case of damage to unprotected crops they would not be entitled to any compensation.

Available sources:
Advice and support for farmers – website of FoE CZ and NCA

Actions required:
a. Educate farmers – field trips; an advisory team competent to propose specific measures depending on local conditions in the grazing area, farmer preferences, herd characteristics, and the landscape permeability requirements.

b. Participate in EIA processes.

c. Identify procedures to address the problem of agricultural fencing in Slovakia.

Figure 17: Electric fencing is an effective measure to protect livestock from predators, but it can also be a barrier to landscape permeability. © Radek Kříček.

Objective 5a.2 Develop guidelines and conditions concerning fencing for agriculture/forestry subsidies or specific programmes

Measure 5a.2.1 Introduce targeted subsidy titles that would reduce the use of fencing

Examples of identified problems:
In the Czech Republic, farmers have so far paid for the measures themselves or used the OPIE subsidy programmes. Currently, an OPIE III call is being drafted, which should specify the assessed impact on the landscape permeability in relation to the habitat of selected specially protected species of large mammals. In the past, national subsidies were also considered that could be granted without the opinion of nature conservation authority as long as the fencing does not require a building permit (e.g. portable nets). The resulting increase in fencing may create connectivity issues for different groups of animals (e.g. the documented mortality of amphibians in electricity grids). Therefore, the rules of any subsidy titles should, as much as possible, reflect and prevent all potential problems.

Available sources:
Advice and support for farmers – website of FoE CZ and NCA

Actions required:
a. Set the rules of agricultural subsidies (both European and national) to preserve landscape permeability for all categories of animals.

b. In the subsidy titles, describe as precisely as possible the rules according to which the nature conservation authority should assess the impact of the project on the habitat of selected specially protected species of large mammals. Set the requirements for pastures to remain passable when not used for grazing (e.g. open gates).

c. Educate nature conservation officers to ensure a consistent approach in different areas.

Threat/Pressure 5b: Reduced landscape permeability caused by land management – changes in vegetation or crop type/category

Pilot area description:
Although the more traditional and mosaic farming has been preserved to a greater extent in mountain areas, the Czech and Slovak Republics, including the pilot area, belong to countries with large expanses of cultivated agricultural monocultures. A homogeneous landscape with limited shelter is not suitable for a great number of migratory animals.

What needs to be achieved:
» Limit the extent of monocultures through appropriate agricultural policies.

» Maintain or restore natural habitats in the pilot area, especially in the valleys.

General objectives set out to address the threats are:

5b.1. Prevent large-scale monocultures and/or facilitate and promote mosaic cultivation

5b.2. Support adequate management of natural and marginal habitats

5b.3. Support and promote the development of examples of good agricultural, water management, and forestry practices sensitive to landscape permeability

Measures proposed for each objective are described below with the list of required/ proposed actions:

Objective 5b.1 Prevent large-scale monocultures and/or facilitate and promote mosaic cultivation

Measure 5b.1.1 Set up agricultural subsidies to promote mosaic farming.

Examples of identified problems:
Changes in farming over the past century resulted in the consolidation of farmland into large units and the drainage of land. This trend has negatively impacted biodiversity and also the migration opportunities for animals. The current subsidy rules do not lead to a significantly more diverse agricultural landscape.

Available sources:
EU Common Agricultural Policy

Existing subsidy programmes for farmers

Actions required:
a. Strengthen the support for practices creating mosaic landscapes within national agricultural subsidy rules.

Objective 5b.3 Support and promote the development of examples of good agricultural and water management, and forestry practices sensitive to landscape permeability

Measure 5b.3.1 Stop biodiversity from declining as a result of chemical contamination (prevent the use of pesticides in agriculture and forestry).

Examples of identified problems:
This measure does not have any significant influence on the permeability for large mammals; however, it can have a significant impact on the group of small animals such as birds, bats, amphibians, reptiles and especially invertebrates. In spite of this, the topic does not attract enough attention including protected landscape areas and the surroundings of Natura 2000 sites. The risk of monocultures is not present only in cultivation of one crop and in the size of affected lands but also in extensive and repeated use of chemicals (e.g. when growing rapeseed). Monitoring of this phenomenon should be carried out at least in the protected landscape areas as part of the complex area assessment (see 7.1.1.).

Available sources:
National action plan to reduce pesticide use

CENIA (2021). Report on the environment of the Czech Republic 2020. Czech environmental information agency. Available from: https://www.cenia.cz/publikace/zpravy-o-zp/

Actions required:
a. Include the problem of chemical contamination into the methodology of complex monitoring of the area (see 7.1.1.).

b. Increase the public awareness of the impact of pesticides on the landscape.

c. Support practical changes in the management of agricultural land.

Threat/Pressure 5c:
Reduced landscape permeability caused by land management – degradation of natural habitats

Not applicable.

Threat/Pressure 5d:
Reduced landscape permeability caused by land management – mineral extraction

Not applicable.

Threat/Pressure 6a:
Reduced landscape permeability caused by other anthropogenic activities – game management

Pilot area description:
Game management has a long tradition in the pilot area. It aims at reducing the numbers of

overpopulated ungulates, thereby protecting the forest ecosystem and enabling forest regeneration. It also slows down the spread of invasive species. Poaching is still an important factor in the mortality of some endangered species including large carnivores or birds of prey.

What needs to be achieved:

- Cooperate with hunter associations to lower the pressure on vital ecological corridors.
- Continue efforts to stop poaching in cooperation with all relevant stakeholders (Ministry of Environment, police, and border guards).

General objectives set out to address the threats are:

6a.1. Develop game management plans and apply EIA/AA procedures for impact avoidance-mitigation-compensation

6a.2. Facilitate data collection on key species

6a.3. Harmonize game management with the objectives of Natura 2000 and landscape permeability

6a.4. Implement poaching prevention and control

Measures proposed for each objective are described below with the list of required/ proposed actions:

Objective 6a.3 Harmonize game management with the objectives of Natura 2000 and landscape permeability

Measure 6a.3.1 Cooperation with local hunting associations

Examples of identified problems:
Hunting grounds and infrastructure for hunting are sometimes located near existing or planned fauna passages and generally

Figure 18: An example of poaching in an underpass under the Czech D1 motorway. © Ivo Dostál.

in ecological corridors (e.g. Lučivná green bridge). This causes increased stress for migrating animals and increases the risk of poaching target species. Greater cooperation and coordination in the placement of hunting facilities with hunting associations is needed. The situation is more complicated in areas with non-native or invasive species – there; hunting activities should not be restricted, but regulated.

Available sources:
Field observations

Actions required:
a. Establish a group or think tank to formulate best practices for regulating hunting in ecological corridors and cooperate with hunting associations.

Objective 6a.4 Implement poaching prevention and control

Measure 6a.4.1 Work with the general public

Examples of identified problems:
For some groups of species, such as large carnivores, mortality from poaching can greatly exceed mortality from traffic accidents. Similar observations from Scandinavia have been described by Adrén et al. (2006). It has been estimated that large numbers of lynx are also poached in the Czech Republic, based on an anonymous questionnaire among prospective and active hunters (Koubek & Červený, 2003). Assessments say that over the past 20 years, hunters have illegally killed approximately 500 individuals. This is several times the number of individuals in the wild. Repeated questioning has shown that hunters' attitudes are not improving, but have instead slightly worsened (Červený & Kušta, 2015). Since the 1990s, the risk of poaching has been associated with the level of public acceptance of large carnivores. In 1994, wolves from the central Carpathians started to return to the Beskydy Mountains, which caused a wave of fear and negative attitudes. This subsequently led to illegal extermination of the briefly recovered population. The last known case of lynx poaching in the pilot area is from the spring 2020 (see below). Poaching was also one of the reasons for the establishment of the volunteer Wolf Patrols (Vlčí hlídky) organised by FoE CZ.

Available sources:
Andrén et al. Survival rates and causes of mortality in Eurasian lynx (Lynx lynx) in multi-use landscapes

Červený & Kušta, 2015. Jak hodnotí myslivci z jihozápadních Čech existenci rysa ostrovida v honitbách? (The opinion of Southwest Bohemian hunters on the presence of Eurasian lynx in their hunting districts) Svět myslivosti, 2015.

Koubek & Červený, 2003. Mají velké šelmy šanci přežít v našich honitbách? (Do large carnivores stand a chance to survive in our hunting grounds?) Myslivost 3/2003.

Poached lynx, 2020:

https://www.selmy.cz/tiskove-zpravy/zastreleny-rys-v-chko-beskydy-aopk-cr-a-hnuti-duha-podavaji-trestni-oznameni/

Actions required:
a. Carry out field monitoring aimed at poaching prevention.

b. Educate the general public about large carnivores and poaching (awareness-raising events, media, social media).

Measure 6a.4.2 Support the authorities in the fight against poaching

Examples of identified problems:
The investigation of poaching in the Czech Republic and Slovakia has not been very successful so far. Many cases of poaching were dismissed in the past. However, recent investigations have led to charges against several persons. Border guard played an important role in these cases.

Available sources:
Unsolved cases:
https://www.selmy.cz/clanky/mrtva-vlcice-z-kokorinska-v-sobe-mela-zbytky-strely/

https://www.selmy.cz/tiskove-zpravy/zastreleny-rys-v-chko-beskydy-aopk-cr-a-hnuti-duha-podavaji-trestni-oznameni/

Recent cases:
https://www.selmy.cz/clanky/za-rysa-v-mrazaku-policie-obvinila-sefa-myslivcu-z-klatovska/

https://www.selmy.cz/clanky/celnici-rozkryvaji-rozsahly-pripad-pytlactvi-nasli-i-upytlacenou-sumavskou-rysici-michelle/

Actions required:
a. Coordinate anti-poaching measures between nature conservation authorities, police and border guard.

Figure 19: In 2020, a lynx died of a gunshot wound in Beskydy. © Michal Bojda.

Threat/Pressure 6b: Reduced landscape permeability caused by other anthropogenic activities – human-wildlife conflicts

Pilot area description:

Human-wildlife conflicts are particularly intensive in the pilot area. The oldest conflict is related to attacks on livestock by wolves, which started to return to the area at the end of the 20th century. Brown bears, otters and other species can also occasionally cause economic losses to humans. From the opposite viewpoint, human pressure on wildlife is steadily increasing. In addition to transport and land use, tourism also has a significant impact on ecosystems. In addition to traditional hiking and skiing, new forms of leisure activities are becoming increasingly popular also due to social media.

What needs to be achieved:

- Continue to support livestock farmers. FoE CZ provides advice on preventive measures and helps with subsidy applications. Conflict with tourism should be addressed, for example, through cooperation with the operators of relevant websites or social networks.
- Increasing public awareness is of great importance. This includes outreach towards farmers but also the general public and municipalities – installation of bear-proof containers, information on how to move in areas with brown bear presence, how to prevent overtourism, etc.

General objectives set out to address the threats are:

6b.1. Facilitate the implementation of legislation on damage compensation

6b.2. Facilitate traditional livestock farming practices

6b.3. Facilitate the implementation of modern prevention methods

6b.4. Facilitate increased subsidies for the conservation of large carnivores

6b.5. Regulate other anthropogenic activities that could increase the risk of conflicts (waste management, unsustainable development and tourism, etc.)

6b.6. Facilitate early interventions in special wildlife-related situations

The measures proposed for each objective are described below with the list of required/ proposed actions:

Objective 6b.1 Facilitate the implementation of legislation on damage compensations

Measure 6b.1.1 Informing farmers about damage compensation procedures

Examples of identified problems:
Some farmers are too slow to react to damage caused by large carnivores.

In the Czech Republic, the incidents should be reported as quickly as possible, within 48 hours at the latest. An employee of the NCA examines the site of the incident and writes a report. Another protocol is made by

Figure 20: Damage incidents should be reported without undue delay. © Radek Kříček.

a veterinarian. The farmer should preserve as much evidence as possible and may also document the event photographically. Once these steps have been taken, the farmer can apply to the regional authority for compensation.

In Slovakia, the farmer shall deliver a written report to the district authority no later than 48 hours after the event. A representative of the district authority, a veterinarian and an official of the SNC SR shall assess the incident at the site, write a report and document all relevant circumstances. The farmer can then apply to the district authority for compensation. The application must be processed within one month of the discovery of the damage, but no later than 6 months after the damage occurred.

Available sources:
CZ legislation, Act No. 115/2000 Coll.

SK legislation, Act No. 543/2002 Coll. as amended, Section 97 to 102

Advice and support for farmers – websites of FoE CZ, NCA and SNC SR

Actions required:
a. Awareness-raising events aimed at farmers.

Objective 6b.2 Facilitate traditional livestock farming practices

Measure 6b.2.1 Informing farmers about traditional shepherding methods

Examples of identified problems:
Although there are many examples of good practice of traditional shepherding in the pilot area, the practice declined during the 20th century. The number of shepherds declined significantly and traditional methods were largely abandoned. This applies in particular to the protection of livestock against predators (wolf, bear), which was no longer needed once the large carnivores have all but disappeared from the region. In the new millennium, the return of large carnivores was accompanied by an increase in damages to livestock farmers leading to a drop in acceptance by the public. The effective methods of prevention – the use of shepherd dogs and penning sheep at night – were largely abandoned.

Available sources:
Slavomír Finďo, Michaela Skuban, 2011: Ako chrániť hospodárske zvieratá proti velkým šelmám, Spoločnost pre karpatskú zver (How to protect livestock against large carnivore attacks, Society for Carpathian Wildlife)

Linda Blättler, Slavomír Finďo, 2018: Jak pastevečtí psi chrání stáda: metodická příručka pro ochranu stád pomocí pasteveckých psů (A guide to protecting herds with shepherd dogs), 1. vydání. – Praha: Agentura ochrany přírody a krajiny České republiky, 2018

Robin Rigg, 2020: Pastevečtí psi: Praktická příručka pro chovatele hospodářských zvířat, Hnutí DUHA Olomouc (Shepherd dogs: Practical guide for livestock farmers, FoE CZ)

Actions required:
a. Awareness-raising events aimed at farmers.

Objective 6b.3 Facilitate the implementation of modern prevention methods

Measure 6b.3.1 Inform and support farmers in introducing modern prevention methods

Examples of identified problems:

The problem of prevention is related to the situation described in Measure 6b.2.1. The situation regarding damage prevention and the acceptance of large carnivores is improving due to increased efforts by governmental and non-governmental organisations, which need to be continued.

Available sources:
Advice and support for farmers – website of FoE CZ and NCA

Actions required:
a. Awareness-raising events aimed at farmers.

Objective 6b.4 Facilitate increased subsidies for the conservation of large carnivores

Measure 6b.4.1 Facilitate the subsidy application process for modern prevention methods

Examples of identified problems:
A complicated bureaucratic process of obtaining money from European funds to finance preventive measures is for many farmers only manageable with the help of non-profit organizations (including FoE CZ) and private companies. No state-funded subsidies have yet been introduced. So far, sheep and goat farmers have only been able to obtain subsidies for preventive measures from the Moravian-Silesian and Hradec Králové regions.

Available sources:
Advice and support for farmers – website of FoE CZ and NCA

Subsidies from the Moravian-Silesian Region:

https://www.msk.cz/cs/temata/dotace/podpora-chovatelu-ovci-nebo-koz-v-oblastech-moravskoslezskeho-kraje-s-vyskytem-vlka-obecneho-pro-rok-2022-12105/

Subsidies from the Hradec Králové Region (website of the Czech-Moravian Association of Agricultural Entrepreneurs):

https://cmszp.cz/ostatni/2021/podpora-kralovehradeckeho-kraje-chovatelum-hospodarskych-zvirat-voblastech-s-vyskytem-vlka-obecneho/

Actions required:
a. Assist farmers in applying for subsidies for preventive measures.

b. Introduce easy-to-administer state-funded subsidies for preventive measures.

Objective 6b.5 Regulate other anthropogenic activities that could increase the risk of conflicts (waste management, unsustainable development and tourism, etc.)

Measure 6b.5.1 Limit publishing the information about sensitive locations online

Examples of identified problems:
In recent years, the boom of IT and social media has led to increasing amounts of information about interesting natural sites appearing on the internet. Some of these attractive locations are also important habitats for target species. Typical examples are rock formations frequently visited by the lynx. These places are used by the carnivores for resting, searching for prey, marking (as a form of social communication between animals) or as a safe place where to raise their offspring. Increasing numbers of human visitors can significantly disturb shy animals such as lynx. A study conducted in the Bohemian Forest showed the impact of tourism on lynx resting places and time spent with their prey (Belotti et al., 2018). Several studies also found that human activities, particularly off-trail, have a disturbing effect on wildlife (Miller et al., 2001). Although it is not possible to completely reverse this trend, some steps can be taken to mitigate the impacts. The focus should be on information sources with large audiences such as the map server mapy.cz. The providers of these services should be consulted to find a common solution. This could involve, for example, the removal of interactive icons or shared photos from online maps.

Available sources:
Belotti, Elisa & Mayer, Kathrin & Kreisinger, Jakub & Heurich, Marco & Bufka, Luděk. (2018). Recreational activities affect resting site selection and foraging time of Eurasian lynx (Lynx lynx). Hystrix. 29. 181-189.

Miller, S.G., Knight, R.L. & Miller, C.K. 2001: Wildlife responses to pedestrians and dogs. – Wildlife Society Bulletin 29: 124-132.

mapy.cz

Figure 21: Public descriptions of natural sites and rock formations increase the number of visitors to places which are also important habitats for large carnivores and other species. © mapy.cz.

Actions required:
a. Agreement on a systematic solution with major web portals such as mapy.cz.

Measure 6b.5.2 Eliminate the risk of bear synanthropization

Examples of identified problems:
In areas where brown bears are present, some individuals may come close to settlements in search of food. In the Slovak mountains, there are cases of bears walking through a village or rummaging through garbage. Authorities usually issue permits to kill such individuals because of a potential threat to humans. Such cases often lower public tolerance towards bears, support claims that bears are overpopulated, and increase pressure to regulate their population.

The solution lies in prevention. Some bears are attracted to human settlements because of easy access to food. These dangerous situations must be prevented. The brown bear is still a relatively rare species in the pilot area. However, preventive measures need to be implemented before potential problems arise. These include bear-proof containers (especially in remote locations) and educating local residents and visitors about the rules of behaviour in areas where bears are present (especially not to feed the animals).

Synanthropic bears shall not be confused with bears that display problematic behaviour. A good example is a female bear named Ema. Ema caused significant damage to farmers in a large part of the pilot area in autumn 2018. Authorities decided to capture the bear, but all attempts failed. The following year, Ema was accidentally captured during a telemetry tracking project and was equipped with a GPS collar. Surprisingly, her behaviour changed compared to the previous year and she was no longer causing any major damage. The behaviour change was probably related to a more mature age. This example teaches us to distinguish between problematic damaging animals otherwise displaying normal behaviour, and true synanthropic individuals. In both cases, prevention is the most effective tool to avoid conflict.

Recently, bears started moving to agricultural landscape areas in search of food. The reason is a large number of ungulates congregating in fields where they find energetically rich food. This can result in more bear sightings near villages, thus increasing the risk of potential conflicts.

Available sources:
selmy.cz

Telemetry tracking of Ema the bear:

http://www.carnivores.cz/articles/the-bear-ema-mostly-keeps-to-the-slovak-side-of-javorniky/

Actions required:
a. Install and maintain bear-proof containers.

b. Educate locals and visitors about the correct behaviour in areas with the presence of bears.

c. Limit the number of ungulates moving into the agricultural landscape to forage.

Objective 6b.6 Facilitate early interventions in special wildlife-related situations

Measure 6b.6.1 Create a response team

Examples of identified problems:
Some situations arising in connection with wildlife may require competent intervention. Such cases include animals injured or killed in traffic accidents (see also General objective 3.11), and theoretically also the occurrence of bold individuals of large carnivores. Apart from a dedicated team to deal with traffic situations described above, there should also be sufficient capacity to address the situations involving bold individuals. The team's tasks would include communication with people who have encountered a bold individual, using techniques to scare the animal, capturing, GPS tracking and, if necessary, removing it from the population according to up-to-date expert knowledge and valid legislation.

Actions required:
a. Compile an inventory of responses to situations involving bold large carnivores abroad.

b. Create a special response team to deal with situations involving bold large carnivores.

Threat/Pressure 7: Lack of coherent monitoring at landscape level and adaptation of solutions

Pilot area description:
Comprehensive monitoring of a range of phenomena is now required. Firstly, the movement and distribution of wildlife need to be mapped. It includes monitoring the large carnivores as umbrella species but also other groups of animals. This is not the only

a gap in knowledge that needs to be filled. It is necessary to deal with the selection bias in research on animal mortality, identify ecological corridors (especially in Slovakia), and map critical sites and the most vulnerable parts of linear infrastructure.

What needs to be achieved:
Integrating relevant data into a single database.

- Mapping the movement and dispersal of large carnivores and monitoring the mortality of different groups of species.
- Long-term monitoring of the functionality of fauna passages before and during construction and when in operation. Use the data in planning future transport projects.
- Continuous monitoring of SEA and EIA related to projects in ecological corridors.
- Identifying ecological corridors and accurate mapping of critical locations.

General objectives set out to address the threats are:

7.1. Facilitate the implementation of an integrated monitoring programme – procedures, databases, indicators, assessment

Measures proposed for each objective are described below with the list of required/ proposed actions:

Objective 7.1 Facilitate the implementation of an integrated monitoring programme – procedures, databases, indicators, assessment

Measure 7.1.1 Long term general monitoring of connectivity on the landscape level

Examples of identified problems:
A comprehensive and unified methodology for general assessment of landscape connectivity for wild animals is missing. Creation of such methodology should be perceived as a fundamental challenge. The methodology should be created by a team of Czech and Slovak experts to be used in a uniform way for the whole cross-border area. It shall include both aspects of functional connectivity for individual species and a complex assessment of the connectivity of the landscape.

Available sources:
Results of monitoring performed during previous activities and projects (e.g., selmy.cz, outputs of TRANSGREEN and ConnectGREEN projects)

Actions required:
a. Create a unified methodology to monitor the general landscape connectivity.

b. Secure organisational and financial resources for the monitoring.

Measure 7.1.2 Monitoring the effectiveness of existing fauna passages and landscape permeability in general

Examples of identified problems:
In the Czech Republic, an environmental impact assessment including a migration study is usually required for new projects. According to the current methodology of the NCA, migration studies include monitoring of landscape permeability, which should last for several years before, during and after construction. There are still gaps in data collection related to fauna passages. Where justified, longer observations than the minimum required by the methodologies would also contribute to a more accurate understanding of the impact of development projects on wildlife. Migration studies are largely based on incomplete police statistics on road-kills. A new comprehensive database would become a valuable source of information for future transport infrastructure planning.

The situation is similar in Slovakia, which also lacks a central database for migration studies. Different organisations (police, hunting

associations, NDS, railway administration) collect data separately and often without verification. Most records of road mortalities are not digitised.

Available sources:
Consultation within the working group

Actions required:
a. Creating and implementing the Monitoring Plan.

b. Long-term monitoring of fauna passages and their surroundings beyond the minimum period specified by migration studies.

c. Establishing a central database and systematically archiving the collected data, and drawing conclusions for future construction projects.

Measure 7.1.3 Monitoring of railway mortality

Examples of identified problems:
It is not clear how systematic and detailed the data are available on railway mortalities (see also Measure 3.4.1.). In most cases, detailed coordinates and other circumstances are probably missing.

Actions required:
a. Involve Railway Administration field staff in monitoring.

b. Develop and implement a monitoring plan.

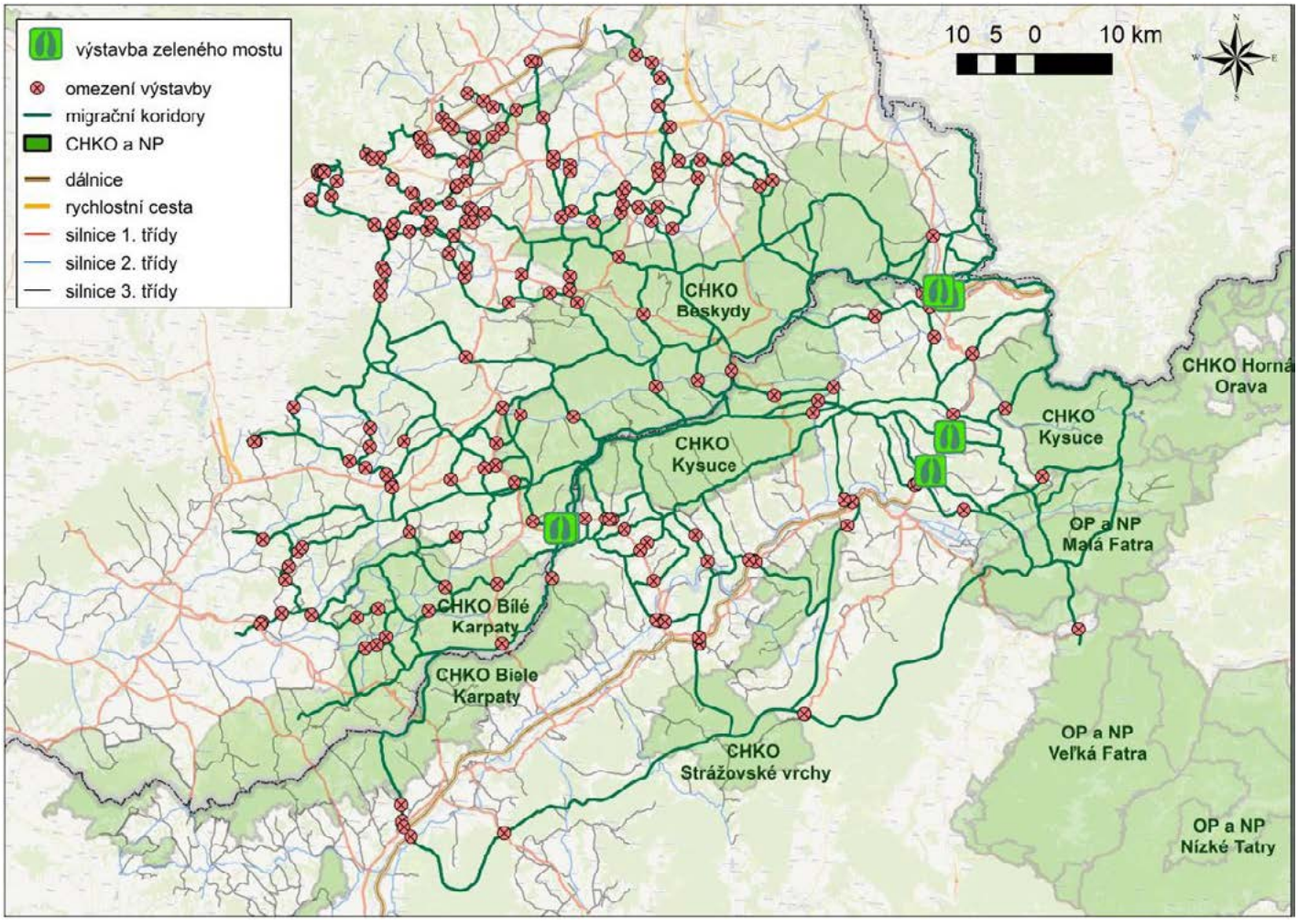

Figure 22: Transboundary mapping of migration corridors from 2019. © INTERREG V-A SK-CZ 304021D016.

Measure 7.1.4 Identification and protection of ecological corridors in Slovakia

Examples of identified problems:
In the Czech Republic, the habitat of selected specially protected large mammals prepared by the NCA has become a binding source of data for decisions in spatial planning. In Slovakia, there is no such instrument so far. Migration corridors were mapped and published in 2014 (Analysis of large carnivore occurrence and landscape permeability in the Western Carpathians). Modelling core areas and ecological corridors of large carnivores was carried out during the ConnectGREEN project. The model covered the whole of the Carpathians including the Slovak part, and can be used to advance the protection of landscape connectivity in Slovakia. The Czech approach can be used as an example.

Available sources:
Large carnivores and their ecological corridors in the Western Carpathians

ConnectGREEN model of ecological corridors

Habitat of selected specially protected species of large mammals

Actions required:
a. Encourage authorities to use the ConnectGREEN project outputs in their decision-making process.

b. Develop and implement a monitoring plan.

Measure 7.1.5 Reduce the selection bias in monitoring

Examples of identified problems:
The monitoring data will always be a subject to selection bias – varying monitoring intensity, food availability in different locations, and fewer data on large carnivores. Monitoring of traffic accidents will not necessarily cover critical locations along ecological corridors. This effect should also be considered in migration studies.

Available sources:
Bias in citizen science:

Bíl, M., Heigl, F., Janoška, Z., Vercayie, D., & Perkins, S. E. (2020). Benefits and challenges of collaborating with volunteers: Examples from National Wildlife Road-kill Reporting Systems in Europe. Journal for Nature Conservation, 54, 125798. doi:10.1016/j.jnc.2020.125798.

The highest mortality of a species does not equal the highest risk to the survival of the population and vice versa:

Grilo, C., Koroleva, E., Andrášik, R., Bíl, M., & González-Suárez, M. (2020). Road-kill risk and population vulnerability in European birds and mammals. Frontiers in Ecology and the Environment, 18(6), 323–328. doi:10.1002/fee.2216.

Actions required:
a. Include appropriate measures in capacity building.

b. Develop and implement a monitoring plan.

Measure 7.1.6 Monitoring of SEA, EIA processes

Examples of identified problems:
New threats to landscape connectivity are constantly emerging. According to European and national legislation, all policies and projects affecting Natura 2000 sites must be assessed through the relevant processes (SEA and EIA). Continuous monitoring of policies and projects evaluated in SEA and EIA aims to reduce the risks to landscape connectivity.

Available sources:
EIA and SEA on the European Commission website:

https://ec.europa.eu/environment/eia/index_en.htm

Czech legislation: Act No. 100/2001 Sb. on the Environmental Impact Assessment and amending some related laws (the EIA Act)

Slovak legislation: Act No. 24/2006 Coll. on Environmental Impact Assessment and on amendments to certain laws

Actions required:
a. Continue to monitor policies and plans evaluated in SEA and EIA.

b. Develop and implement a monitoring plan.

Threat/Pressure 8: Reduced support from stakeholders at landscape level for an integrated eco-system approach

Pilot area description:
An integrated approach to addressing fragmentation and protecting ecosystems is certainly needed. Landscape connectivity is affected by many human activities and the situation is further complicated by the fact that the pilot area is located in two countries and several regions. The exchange of information between relevant stakeholders should be encouraged and all parties should have access to the necessary information on the topic.

What needs to be achieved:
- Set up a local working group consisting of representatives from relevant sectors, building on previous contacts or collaborations.
- Involve the wider public to increase pressure for good solutions, and work with universities to back up proposed measures with sufficient research.

General objectives set out to address the threats are:
8.1. Facilitate collaboration and create a shared platform and database

8.2. Facilitate the dissemination of information, awareness, education, communication

8.3. Support research and studies on landscape connectivity; facilitate cross-sectoral capacity building and the development of new career opportunities (integrating biodiversity to other fields)

8.4. Facilitate the development of regional identity and promote the region – nature, culture, services (landscape permeability as one of the topics)

8.5. Facilitate the development and integration of local strategies into the regional sectoral strategy (landscape permeability as one of the topics)

8.6. Facilitate and support complementary initiatives (landscape permeability as one of the topics)

Measures proposed for each objective are described below with the list of required/ proposed actions:

Objective 8.1 Facilitate collaboration and create a shared platform and database

Measure 8.1.1 Create a platform for information and knowledge exchange between stakeholders

Examples of identified problems:
Greater cooperation between the national and local stakeholders would benefit solutions for maintaining or improving landscape connectivity in the pilot area. Lack of communication currently leads to some of the issues mentioned in this document (large mammal habitat protection, emergency response, fencing, etc.).

Figure 23: Impassable urbanized valley of Kysuce river © Čadca Turzovka

Available sources:
The Framework Convention on the Protection and Sustainable Development of the Carpathians

TRANSGREEN

ConnectGREEN

SaveGREEN

Actions required:
a. Establish a local working group and ensure its long-term functioning after the end of the project.

b. Set up an information system for municipalities focusing on the protection of ecological corridors in spatial planning (methodologies, link to a map of ecological corridors, etc.).

Objective 8.2 Facilitate the spread of information, awareness, education, communication

Measure 8.2.1 Increase awareness among the general public

Examples of identified problems:
Unlike other environmental topics, the problem of landscape connectivity is still known little among the general public – it is mere authors' assumption as there has been no research examining this question. Threats to landscape connectivity affect a wide range of species. The need to protect some species is easier to be communicated to the public than others. It is therefore possible to use the existing communication channels to raise awareness of landscape connectivity issues. Large carnivores are one such example; however, but bats and other popular species can also be considered.

Figure 24: Young wolves © Peter Drengubiak

Available sources:
Outreach activities of FoE CZ (large carnivores)

Outreach activities of the Czech Bat Conservation Society (bats)

Outreach activities of the Czech Ornithological Society (birds)

Actions required:
a. Continue species-specific web and social media communications, including the topic of landscape connectivity.

b. Organize lectures, debates and information days for the general public.

Measure 8.2.2. Increase the awareness of authoritie

Examples of identified prblems:

The authorities in the Czech and Slovak parts of the pilot area do not always proceed according to the applicable legislation on the protection of migration corridors for large mammals. Examples include problems with the construction of linear infrastructure described in section 1.02.1. or the decision of the Slovak district court in the case of the construction of a private building, even though the nature conservation authority did not dismiss the impact on the Natura 2000 protected areas due to the threat to the ecological corridor (see the Visolaje case in Available Sources). The problem can be mitigated by better awareness of authorities and the provision of easy-to-use materials and maps for spatial planning.

Available sources:
Article on the Visolaje case on the FoE CZ website:
tinyurl.com/57nwvsrn

Actions required:
a. Increase awareness of regional authorities (see section 1.02.1.).

b. Identify municipalities with territory extending into ecological corridors of large mammals.

c. Provide background information on large mammal corridors to municipal authorities.

Objective 8.3 Support research and studies on landscape connectivity; facilitate cross-sectoral capacity building and the development of new career opportunities (integrating biodiversity into other fields)

Measure 8.3.1 Engage students and universities

Examples of identified problems:
Measures to promote landscape connectivity require further research. Especially in the long run, this can be achieved by inviting university students to focus on related topics in their theses.

Available sources:
University departments of ecology or physical geography.

Actions required:
a. Initiate collaboration with universities to offer students thesis topics related to landscape connectivity.

Objective 8.5 Facilitate the development and integration of local strategies into the regional sectoral strategy (landscape permeability as one of the topics)

Measure 8.5.1 Development plans to contain general principles for the protection of landscape permeability

Examples of identified problems:
State and regional institutions, municipalities and local action groups create their own territorial development plans. In the Czech Republic, these include the Principles of Territorial Development (ZÚR) issued by individual regions. It is a strategic document that is subject to SEA. Only the Olomouc Region currently includes the habitat of protected large mammals as a whole in its Principles of Territorial Development. Other regions are yet to reflect this in future updates of their strategic documents. These documents should guarantee a sufficient level of landscape connectivity.

The most fundamental and general document is the National Development Strategy (Politika územního rozvoje). While it mentions landscape connectivity, the wording is vague and not ambitious enough. The opportunity to modify this strategic document will arise during the updating process. Any new updates should be monitored and subject to comments.

Available sources:
National Development Strategy of the Czech Republic

Principles of Territorial Development of the Olomouc Region

Principles of Territorial Development of the Moravian-Silesian Region

Principles of Territorial Development of the Zlín Region

Principles of Territorial Development of the South Moravian Region

Municipal land-use plans

Actions required:
a. Monitor ongoing SEA processes, and participate in commenting.

b. Incorporate permeability issues into strategic documents at all levels.

PILOT AREAS:

Austria

1 Kobernausser forest

2 Pöttsching (Alpine-Carpathian Corridor)

Czech Republic/Slovakia

3 Beskydy-Kysuce CZ-SK cross-border area

Hungary/Slovakia

4 Novohrad-Nógrád SK-HU cross-border area

Ukraine

5 Zakarpattia region

Romania

6 Mureş valley (Arad-Deva)

7 Mureş Valley (Târgu Mureş – Târgu Neamţ)

Bulgaria

8 Rila-Verila-Kraishte corridor

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Project partners:

Austria: WWF Central and Eastern Europe (Lead Partner), Environment Agency Austria

Bulgaria: Black Sea NGO Network, Bulgarian Biodiversity Foundation

Czech Republic: Friends of the Earth Czech Republic – Carnivore Conservation Programme, Transport Research Centre Czech Republic

Hungary: CEEweb for Biodiversity, Hungarian University for Agriculture and Life Sciencis

Romania: Zarand Association, EPC Environmental Consultancy Ltd., WWF Romania

Slovakia: Slovak University of Technology in Bratislava – SPECTRA Centre of Excellence of EU

Associated Strategic Partners:

Austria: Ministry for Climate Action, Environment, Energy, Mobility, Innovation, and Technology

Bulgaria: Ministry of Agriculture, Food and Forestry – Executive Forest Agency, Southwestern State Enterprise SE – Blagoevgrad

Czech Republic: Ministry of the Environment, Nature Conservation Agency

France: Infrastructure and Ecology Network Europe (IENE)

Germany: Bavarian State Ministry of the Environment and Consumer Protection

Greece: Egnatia ODOS S.A.

Hungary: Natinoal Infrastructure Developing Private Company Ltd. (NIF Ltd.), Ministry of Agriculture, Danube-Ipoly National Park Directorate

Romania: Ministry of Environment, Waters and Forests, Ministry of Public Works, Development and Administration, Ministry of Transport, Infrastructure and Communications

Slovakia: State Nature Conservancy, Ministry of Environment, Ministry of Transport and Construction, National Motorway Company

Ukraine: M.P. Shulgin State Road Research Institute State Enterprise – DerzhdorNDI SE, Department of Ecology and Nature Resources of Zakarpattia Oblast Administration

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