

Local Cross-Sectoral Operational Plan

Novohrad

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



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

Danube Transnational Programme, DTP3-314-2.3

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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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The Novohrad project area is characterised by a diversity of natural conditions, which are reflected in the diversity of natural habitats. Their main feature is the diverse real vegetation made up of forests of different types as well as grass-herb and wetland vegetation. Scrub, rock and other habitats are also present. Naturally, the present vegetation has been and still is largely influenced by man, who manages both the forests and the parts of the landscape he has deforested.

The largest forested areas in the Novohrad project area are located in its northern and central part - in the mountains and foothills of Poľana, Ostrôžky and parts of the Veporské vrchy and Revúcka vrchovina, which encroach the project area in the east. In the Ostrôžky Mountains, the more extensive forests stretch in a north-south

direction as far as the South-Slovak basin - the Ipel' River valley near Lučenec - and, thus, form an important backbone of ecological connectivity in this direction. More significantly, larger fragments of forests in the open countryside, which form important corridors or stepping stones of the ecological network, are located e.g. near Detva (Rohy), Stožok (Chvojno, Siroň), Podkriváň (upper course of the Krivánsky potok brook), near Tomášovce, etc. Natural corridors that connect forested areas and are evident when looking at the landscape, on a map or in reality, also form the lines of bank vegetation along watercourses, forest outcrops in the open countryside, overgrown gaps and valleys as well as tree lines and other lines and patches of non-forested woody vegetation. Such a network of features represents natural migration and dispersal routes for species that are



tied to forest environments as well as species that are generalists and can adapt to both forested and open landscapes. The connectivity between the main forest units for forest-dependent species, in our case mainly *Ursus arctos*, *Canis lupus*, *Lynx lynx*, *Cervus elaphus*, *Capreolus capreolus*, *Sus scrofa*, is threatened by a number of factors in the areas of linear infrastructure, spatial planning, forestry, water management, agriculture, hunting management and others. In order to ensure the maintenance of passages for these species, we need to know their migration routes. Identifying areas where passability is severely compromised and proposing solutions for restoring or maintaining it was part of the inter-sectoral operational plan.

However, the need to preserve migration not only relates forest-dependent species. A large group of animal and plant species

explicitly avoids forest environments and seeks habitats in the so-called open countryside. An ecological network consisting of larger or smaller woodland areas will, therefore, not be suitable or sufficient for these species. They include smaller vertebrates such as rodents and insectivores, but also some amphibians and reptiles and, naturally, many insects such as butterflies. These species are predominantly associated with different types of grassland and non-forest wetland (e.g. vernal pools, fens, etc.) on a range from dry and warm to waterlogged or flooded areas. The ecological network for open countryside species will, thus, look different to that for woodland species, although they will intermingle or may run through the area side by side. This is no different in the Novohrad project area.

However, there is incomparably less experience with identifying ecological

networks for non-forest habitats (open landscape) species in Slovakia and worldwide than for forest species. However, it is the species tied to non-forest landscapes that are the first to be affected by landscape fragmentation, as open landscapes are more “attractive” for development, the costs of development there tend to be lower than in a still forested landscape. For these reasons, we have at least attempted to take the first step in the SaveGREEN project to identify an ecological network for non-forest species as well. We chose two butterfly species of European importance as model species - *Phengaris (Maculinea) teleius* and *Lycaena dispar*, with the former being the ‘main’ species and the latter the ‘auxiliary’ species. Our aim was to map the occurrence of these species in the pilot area (at potential, pre-selected sites), identify the most important source (core areas), most likely stepping stones or interaction elements (stepping stones) and potential ecological corridors (dispersal pathways), based on the quality of the populations. Due to time and financial constraints, it has not yet been possible to collect sufficient information to establish a comprehensive ecological network and verify its functionality by mapping all potential corridors. However, it has been possible to identify threats at the mapped sites and in adjacent parts of the project area and propose measures to improve the status and connectivity of habitats for the species.

In terms of maintaining connectivity, it is also important to look at so-called “blue connectivity”. This includes the so-called lateral and longitudinal connectivity of watercourses, the maintenance of which is important not only for aquatic-dependent species but also for large terrestrial species.

The Novohrad pilot area is characterised by a dense river network, the main axes of which are the Slatina, the Ipeľ and the Krivánsky potok brook. The Ipeľ, the third longest river in Slovakia, rises near the village of Látky,

flows into the Danube and forms the border with Hungary for about 140 kilometres, which increases its importance and creates a scope for cross-border cooperation in its protection and sustainable use. Since the 1970s, the Ipeľ riverbed has been heavily modified, regulated and straightened in many places, yet it plays a significant role in the Novohrad region, not only as a water source (the Málinec reservoir), but also as an ecosystem that provides a habitat for many species of aquatic and water-dependent animals (invertebrates, fish, amphibians, reptiles, and mammals).

Therefore, when planning the monitoring and designing measures to improve connectivity, we also focused on investigating the existing cross-barriers on watercourses, which are a persistent constraint to the migration of some aquatic and water-bound animals. Removing or improving the passability of these barriers somewhat affects the reduction in aquatic habitat fragmentation in the pilot area. We focused on mapping 4 species of European importance - *Lutra lutra lutra*, *Astacus astacus*, *Unio crassus* and *Natrix tessellata*, which can be considered as umbrella species in relation to the migratory passability of watercourses, but also with regard to the migration of the ichthyofauna of the territory concerned. The proposed measures, if any, will lead to improvements in the migratory permeability of aquatic habitats. Moreover, little attention has been paid so far to the mapping of selected species in the pilot area and adding some information on the occurrence of these species will help to streamline the planning of measures so that the region connectivity may be improved.

In the context of planning, monitoring and designing the most appropriate measures to ensure, improve or restore the functionality of ecological connectivity, we have identified the following as the main factors influencing landscape connectivity at the national level:



1. construction of new and operation of the existing linear transport structures;
2. uncontrolled territorial development - expansion of built-up areas of municipalities, including the construction of large industrial or other complexes;
3. changes in land use in general - e.g. conversion of permanent grassland into arable land, intensification of the use of TTP (e.g. replacement of manual mowing with machine mowing), large-scale monoculture cultivation, removal of non-forest woody vegetation (e.g. clearing of so-called white areas - overgrown meadows and pastures), but also lack of management, e.g. overgrowth of invasive plants, etc.;
4. fencing in the countryside - fencing of agricultural land, menageries, fencing of private property and elements of linear infrastructure;
5. water structures and modifications on watercourses that physically hinder the migration of aquatic animals and have a significant negative impact on the natural circulation and deposition of sediments;
6. inadequate protection of the existing corridors - weak legislative protection against development, against fencing of land, as well as against other activities that could endanger their passability (disturbance of animals by tourists, hunting, etc.), or poor implementation of measures legislatively enshrined in spatial planning documents;
7. Insufficient knowledge of information on migration corridors, their location and quality. This issue is being addressed by a

number of organisations, whether state, non-state, non-governmental or private sector, but the data at their disposal are not aggregated and unified into a single database and map output, and as a result are not easily accessible to key groups.

The final version of the Cross-sectoral Operational Plan will serve as a basis for implementing specific measures to ensure, improve or restore the functionality of ecological connectivity for selected target animal groups in the Novohrad region; specifically, in the Slovak part of the pilot area Novohrad - Nógrád of the SaveGREEN project. The most important aspect is that each relevant sector considers and incorporates the recommendations of the Cross-sectoral Operational Plan into their own strategic documents, e.g. management plans for protected areas, local, regional, or national plans, etc. In order to incorporate the recommendations and effectively address the defined issues, collaboration between the different stakeholders is an important aspect.

An overview of stakeholders from the Novohrad Pilot Area relevant to each sector was created during the project (Stakeholder Analysis Report, Annex 2). A range of stakeholders were contacted during the project periods and some representatives decided to become members of the local working group. The group was continually involved in the project activities, for example, by participating in the development of CSOP, or SK - HU Transnational workshop. In the future, it is planned to maintain the group as an important communication and implementation platform in the field of landscape connectivity in the pilot area.

In the transportation sector, the main investors and stewards are the National Motorway Company (motorway and expressway), Slovak Road Administration (first class roads), Banská Bystrica Self-governing Region (second- and third-class roads), and Railways of the Slovak Republic. The sector is supervised by the Ministry of Transport and

Construction of the Slovak Republic. Another important stakeholder in transportation is the Police of the Slovak Republic - Traffic Inspectorate Banská Bystrica.

In the area of spatial planning and development, all the levels are involved, including municipalities, cities, districts, regions, and national governments. The region concerned is Banská Bystrica Self-governing Region. The agenda mainly falls within the competence of the Ministry of Transport and Construction of the Slovak Republic. But there is also an important stakeholder - the Slovak Environmental Agency.

In agriculture, forestry, water management, and nature protection, we should mention the Ministry of Environment of the Slovak Republic; The State Nature Conservancy of the Slovak Republic, mainly the Protected Landscape Area Cerová vrchovina and Poľana, the Ministry of Agriculture and Rural Development of the Slovak Republic, the National Forest Centre, a hunting association, the Slovak Water Management Enterprise, and the Environmental department of districts of Lučenec, Detva, and Zvolen.



CHAPTER 2

Logframe

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The logical framework is the spreadsheet part of the cross-sectoral operational plan, which is guided by the threats and objectives defined in the SaveGREEN project. Each identified threat includes a paragraph dedicated to the specificities of that threat for the pilot territory of Novohrad-Nógrád. The specificities also form the basis for defining specific problems threatening the ecological connectivity of the selected target species. In a logical sequence, the measures and activities identified to mitigate or eliminate the specific problem have been further proposed for the defined problems. Targets for which problems, measures and activities have been defined are indicated in black in the list of targets. Objectives that have not been identified as relevant for the Slovak part of the Novohrad - Nógrád pilot area during the project duration are marked in grey. The cross-sectoral operational plan will serve as a living document that will be

regularly adjusted after the project closure, as further changes may occur over time that may jeopardize the plan and will need to be added to the already defined problems. Equally, however, some issues may be removed and, thus, be no longer relevant to the plan.

Threat/Pressure 1: New infrastructure projects may increase the barrier effect

Specifics of the threat/pressure in the Novohrad – Nógrád PA:

The planned construction of new and



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operation of existing linear transport infrastructure structures:

- a. Roads under construction:
 - i. R2 - section Kriváň – Lovinobaňa – Tomášovce
 - ii. R7 - section Veľký Krtíš - Lučenec
- b. Roads in operation:
 - i. R2 – section Zvolenská Slatina – Kriváň
 - ii. First class roads - I/16 and I/75
 - iii. Second class roads - II/591, II/585, II/526
- c. Railway lines in operation:
 - i. Railway Line No. 160 - Zvolen - Filákovo (planned project “Electrification and optimization of the railway line Zvolen – Filákovo”)
 - ii. Railway Line No. 161 - Veľký Krtíš - Lučenec

R2 expressway

The R2 expressway in the section Zvolen - Lučenec is an important transport corridor connecting the central part of Slovakia with its southern part. Currently in the pilot area, it includes all stages of construction and operation:

- » section Zvolen, East - Pstruša in the length of 7.85 km handed over for use in 2017 and section Pstruša - Kriváň in the length of 10.38 km handed over for use in 2015;
- » Kriváň - Mýtňa section length of 8.94 km under construction from March 2020 and Mýtňa - Tomášovce section a length of 12.82 km under construction from August 2019;

- » section Tomášovce - Lučenec, which is not included in the construction before 2028.

Various mitigation measures are planned on the under-construction sections of R2 Kriváň - Mýtina and Mýtina - Tomášovce, which can positively influence the improvement of migration in this section with regard to the relief of the I/16 class I road. The proposed measures under construction include a viaduct (between Podkriváň - Píla), an ecoduct (near Tomášovce), and other types of underpasses. In the next few years, two more sections of the expressway are planned to be built. One of them is the extension of the currently under-construction section of R2 towards the east (Lučenec/Rimavská Sobota). The second section connects the already built section of the R2 expressway Zvolen East - Pstruša with the road infrastructure in the west of the town of Zvolen (the urban part of Zvolen, connection to the intersection with the R1 expressway). Both planned sections will cross migration corridors.

R7 expressway

The R7 expressway, which upon its completion will connect Bratislava and Lučenec, will represent an important transport corridor that will ensure the connection of south-western Slovakia and the southern part of the central Slovakia through the superior infrastructure. One of the planned sections of the R7 expressway linking Veľký Krtíš and Lučenec with the length of almost 33 km is to pass through the pilot area of the SaveGREEN project. The section of the R7 expressway Veľký Krtíš - Lučenec is at the stage of project arrangement and preparation of a feasibility study. In 2011, a notification of the project delivery to the EIA process was submitted and the scope of the assessment of the proposed activity for this project was established.

Railways

An important upcoming project is the planned electrification and optimization of

line No. 160 in the section Zvolen - Filľakovo with a total length of 66 km, which is to be implemented by the Railways of the Slovak Republic. The optimization will include technical modifications ensuring smooth operation of the line after the electrification process, which will lead to increased speed on the section in question. The line is single-track in the majority of its length; two sections (Lovinobaňa - Kriváň and Slatinka - Zvolen) are double-track. The railway line crosses several identified ecological corridors and although the project may increase the barrier effect, it also presents an opportunity to reconstruct some of the buildings and adjacent land in the landscape to improve the passability of the landscape.

General Objectives set to address the Threat 1. include:

In relation to new project infrastructure:

01. Ensure the collection of supporting data for new infrastructure projects
02. Support the SEA/EIA/AA processes and procedures with relevant data and examples of good-practice
03. Support the design & technical details and constructive solutions with examples of good-practice

In relation to linear infrastructure under construction:

- 1.1 Maximize the functionality of underpasses (all objects)
- 1.2 Maximize functionality of overpasses (all objects)
- 1.3 Assign legal status and develop coherent regulations for all objects which are potential wildlife passages
- 1.4 Increase permeability of embankments (*when & where fencing is not mandatory*)

Objective 0.1: Ensure supporting data for new infrastructure projects

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD (those that we think could start in SaveGREEN)</i>	Notes
<p>P1: The operation of the new sections of the R2 and R7 expressways and the rail electrification project will increase the barrier effect.</p> <p>P1a: The construction and operation of R2 will cause a barrier effect to terrestrial and aquatic wildlife through disturbance, siltation of watercourses, fencing and traffic</p> <p>P1b: The construction and operation of the R7 expressway in the section Velký Krtíš - Lučenec may threaten the connectivity of an important migration corridor in the vicinity of Ľuboreč.</p> <p>P1c: Lack of cooperation between stakeholders in planning the construction of a green bridge near the village of Tomášovce, as well as in other cases of planned green bridges.</p> <p>P1d: The construction of the R2 expressway in the section Zvolen West - Zvolen East crosses the pilot area and increases the barrier effect due to insufficient mitigation measures. A multifunctional bridge (at Lieskovec) should serve as an ecoduct; however, it does not meet the required parameters of a green bridge.</p> <p>P1e: The project of electrification and optimization of the railway line Zvolen - Filákov, which crosses several identified migration corridors, may reduce their passability.</p>	<p>O.1.1 Planning and construction of suitable migration objects (viaducts, green bridges, tunnel solutions, etc.) with parameters suitable for the selected target groups of animals</p> <p>P1a: Possible solutions: viaduct, possibly green bridge or deep tunnel, removal of migration barrier on the watercourse</p> <p>P1d: Framework design of migration permeability of the proposed R2 in the section Zvolen West - Zvolen East (northern bypass of Zvolen) in the area of forest biotopes of Bakova jama and Lieskovec</p>	<p>a) Actively participate in the assessment of strategic documents related to transport (SEA process).</p> <p>b) Specifying requirements to ensure migration in the EIA process.</p> <p>c) Regular updates of the manual MIGRAČNÉ OBJEKTY PRE VOĽNE ŽIJÚCE ŽIVOČÍCHY Projektovanie, výstavba, prevádzka a oprava.</p> <p>d) Update the existing manual for technical specifications of migration facilities (TP 04/2013 MIGRAČNÉ OBJEKTY PRE VOĽNE ŽIJÚCE ŽIVOČÍCHY Projektovanie, výstavba, prevádzka a oprava) with the latest scientific knowledge.</p> <p>e) To unify the monitoring system of migration objects (their efficiency).</p> <p>f) To anchor the monitoring system in binding legislation.</p> <p>g) Propose measures to ensure the protection of migration corridors in relation to the existing migration objects. Propose measures in cooperation with stakeholders (municipalities, nature conservation, hunting associations, and farmers) and incorporate them into the existing documentation, e.g. spatial plans, management plans, etc.</p> <p>h) To remove the migration barrier on the watercourse in accordance with the Methodology of the Ministry of Environment of the Slovak Republic (bio-ecological project assignment).</p>	<p>O1.1.d the activity was implemented during the duration of the project</p>

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD (those that we think could start in SaveGREEN)</i>	Notes
<p>P2: There is little experience in Slovakia with the integration of migration objects into the landscape in order to increase their functionality for wildlife. Capacities related to the management of sensitive areas are low. Competences and rules for land management are not established.</p>	<p>0.1.2 Landscaping of underpasses and overpasses (i. - railway/ii. - motorway)</p>	<p>a) Develop guidelines for landscape design and build capacity through know-how exchange. b) Incorporate landscaping requirements through the EIA/AA and environmental permitting processes. c) Develop pilot projects focused on specific management/restoration of green infrastructure to maximise the functionality of objects in relation to the migration requirements of target animal groups.</p>	
<p>P3: Insufficient experience with the protection or appropriate management of land adjacent to migration objects by integrating connectivity-relevant land into the landscape to increase its passability. Capacity for appropriate land management is inadequate. Unclear or missing competences and rules for protection/management of adjacent land.</p>	<p>0.1.3 Ensure appropriate management of land adjacent to migration objects.</p>	<p>a) Raise the awareness of relevant stakeholders in the field of landscaping and maintenance of land in the vicinity of the objects, taking into account the latest knowledge. b) Include modifications to land near to migration objects in EIA/AA processes and environmental permits, inclusively as compensatory measures. c) Implement pilot projects aimed at management/restoration of green infrastructure elements in order to maximize the functionality of the objects in relation to the migration requirements of the target animal groups (in the pilot area).</p>	

Objective 1.1 Maximize the functionality of underpasses (all objects)

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD (those that we think could start in SaveGREEN)</i>	Notes
<p>P1: Inappropriate technical provision of underpasses for the selected animal species Railway underpasses are a good example. Animals are afraid to use them; they rather cross the railways.</p>	<p>1.1.1 Increasing the migration potential in the existing underpasses of linear infrastructure by their appropriate modification</p>	<p>a) Mapping and evaluation of the passability of the existing underpasses on linear infrastructure. b) Proposal of measures to improve passability for selected target species and their implementation by relevant stakeholders (construction of dry footbridges for otters in culverts with watercourse; minor surface modifications, etc.). c) Establish long-term monitoring to track the functionality of the measures.</p>	

Objective 1.3: Assign a legal status and develop coherent regulations for wildlife passages

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD (those that we think could start in SaveGREEN)</i>	Notes
P1: Missing management system for the protection of land adjacent to migratory objects	1.3.1 Improvement and harmonisation of legislative processes in relation to land protection, possible changes in the legislation	a) Preparation of an analysis of the existing legislation in relation to protection of migration corridors, with proposals for changes leading to the improvement and preservation of migration potentials. b) Arranging meetings with relevant groups to discuss the implementation of the proposed measures and the current legislative processes. c) Initiate legislation to increase the protection of migration corridors (e.g. in the Landscape Planning Act).	
	1.3.2. Determine the responsibility/competence in the management of land adjacent to migration objects (e.g. adequate management of guiding greenery, limitation of land fencing, limitation of construction, limitation of hunting rights e.g. by establishing non-hunting areas)	a) Preparation of an analysis of the existing legislation in relation to protection of migration corridors, with proposals for changes leading to the improvement and preservation of migration potentials. b) Arranging meetings with relevant groups to discuss the implementation of the proposed measures and the current legislative processes. c) Initiate legislation to increase the protection of migration corridors (e.g. in the Landscape Planning Act).	
	1.3.3 Incorporate the necessary regulations into the spatial planning documentation	a) Measures to be reflected in binding documents. b) Initiate legislation to increase the protection of migration corridors (e.g. in the Landscape Planning Act).	

Objective 1.4: Increase the permeability of embankments

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD (those that we think could start in SaveGREEN)</i>	Notes
P1: Inappropriate technical treatment of grass strips on the embankments of linear constructions leads to increased fragmentation of grassland habitats and a reduced ability of migration of animal species tied to the non-forest environment	1.4.1 Ensuring the permanent care of grass strips along linear structures, as well as the planting and management of grass strips on road and railway embankments and in ditches	a) Planting and management of meadow and grass vegetation on embankments of linear infrastructure - road I/16, railway No. 160 and road R2 in the vicinity of Krivánský potok brook and river Slatina. b) Determination of responsibility for the care of grass strips along linear structures not under the management of the linear infrastructure manager and the setting up of appropriate care to allow the migration of animals c) Place greater emphasis on the restoration of grassland habitats following the construction of linear infrastructure (e.g. EIA opinions).	

Threat/Pressure 2: Structural interventions on the existing transport and other linear infrastructure (maintenance, upgrading, without changing the category/class of the infrastructure etc.) and other linear features may increase the barrier effect at landscape level

Specifics of the threat/pressure in the Novohrad – Nógrád PA:

It is important to preserve migration corridors also in the case of planned upgrade or routine road maintenance. This is particularly important for the first-class roads I/16, I/71, and I/75, which serve as the main traffic corridors in the pilot area, and their traffic density is very high. Similarly, railway line No 160 is the only (and, therefore, important) railway that provides rail transport between the central (Zvolen, Detva, and others) and the southern part of Slovakia (Lučenec, Filákovo, Tornaľa, and Moldava nad Bodvou to Košice) with a connection to Hungary. In the case of modernizing the railway infrastructure, it is necessary to maintain the lateral passability of the line for animals (infrastructure without fences; correct positioning of noise barriers; elimination of steep slopes; ensuring the passability of

drainage channels, etc.). Modifications to transport infrastructure that are not subject to environmental impact assessment under the EIA may pose a threat to their passability.

General Objectives set to address the threat 2 are:

- 2.1 Safeguard the permeability of the existing transport infrastructure (including enhancement of permeability of the existing features, when possible)
- 2.2 Safeguard the transversal permeability of river banks (including enhancement of permeability of the existing features, when possible)
- 2.3 Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)

Objective 2.1: Safeguard the permeability of existing transport infrastructure

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD (those that we think could start in SaveGREEN)</i>	Notes
P1: Reconstruction/ upgrading of roads may lead to increased barrier effect with a negative impact on animal migration in critical sections.	2.1.1 Informing the road manager about critical sections of the road from animal migration viewpoint, as well as about possible solutions to improve the current situation	<p>a) Identify critical points on the roads in terms of migration, inform road managers about them, including the proposal of measures to mitigate the impacts of the reconstruction/modernization of road in critical sections.</p> <p>b) Ensure ongoing monitoring of animal passage through critical road sections.</p> <p>c) Prepare an intervention programme in cooperation with road managers.</p>	
P2: Increasing traffic volume and speed on roads can lead to an increase in the barrier effect with a negative impact on animal migration	2.1.2 Changing behaviour and increasing driver vigilance to prevent vehicle-animal collisions	<p>a) Analyse traffic volume data on a regular basis</p> <p>b) Prepare an awareness raising campaign for drivers</p>	
P3: Reconstruction/ upgrading of railways may lead to increased barrier effect with a negative impact on animal migration in critical sections.	2.1.3 Implementation of measures to reduce mortality and improve the passability of tracks for animals	<p>a) Identify and register the list of critical sections for the Slovak Railways, including the proposal of measures to mitigate the impacts of the reconstruction/modernisation of the railway line Zvolen - Filakovo in critical sections.</p> <p>b) Ensure continuous monitoring of animal passage through critical sections of the line</p> <p>c) Informing the Slovak Railways about critical sections from animal migration viewpoint, as well as about possible solutions to improve the current situation</p> <p>d) To propose measures to reduce mortality and improve the passability of the tracks for animals in cooperation with the representatives of the Slovak Railways</p> <p>e) Prepare an application that records mortality numbers</p> <p>f) the use of appropriate game deterrents</p> <p>g) regular inspection and cleaning of culverts, etc.</p>	

Objective 2.2: Safeguard the transversal permeability of river banks

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD (those that we think could start in SaveGREEN)</i>	Notes
<p>P1: Regulated watercourses present constraints to animal migration (e.g. steep banks, fast-flowing deep water, banks lined with rubble)</p>	<p>2.2.1 Returning rivers to their original channels, promoting the preservation of riparian vegetation, removal of identified barriers on watercourses in the pilot area.</p>	<p>a) Identify and prepare a list of critical reaches with riparian barriers on watercourses; b) Establish a central database of monitoring data as a basis for developing appropriate solutions; c) Establish a working group of experts to promote appropriate and affordable solutions; d) Prepare an action plan to remove defined barriers with the Slovak Water Management Enterprise; e) Prepare pilot projects aimed at removing/modifying barriers, including their funding.</p>	
<p>P2: Insufficient protection of riparian vegetation and its edges in the vicinity of Krivánsky potok brook and Slatina river leads to fragmentation of meadow biotopes and reduced ability of migration of animal species tied to non-forest environment</p>	<p>2.2.2 Systematic restoration of riparian vegetation and edges in cooperation with stream managers to restore meadow biotopes in the vicinity of watercourses</p>	<p>a) Removal of invasive and non-native tree/plant species, reseedling with native grasses and forbs with restoration management, as well as planting of herbaceous borders along the banks of the Krivánsky potok brook b) systematic management of selected sites aimed at setting up a mowing regime with a view to suppress invasive species and restore natural grassland biotopes</p>	

Objective 2.3: Safeguard the longitudinal permeability of rivers

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD (those that we think could start in SaveGREEN)</i>	Notes
<p>P1: Small dams create a barrier for aquatic animals. Regulated watercourses pose restrictions to aquatic animal migration (e.g. dams, stepping stones)</p>	<p>2.3.1 Removal of identified dams/steps/ channels or passage through fishways</p>	<p>a) Identify and prepare a list of critical stream reaches with barriers; b) Establish an internal database of mapping data of selected animal species as a basis for the preparation of appropriate solutions; c) Create a working group of experts to promote bio-ecological solutions for migration barriers on watercourses according to the methodology of the Ministry of Environment of the Slovak Republic; d) Prepare an intervention plan with the stream manager – the Slovak Water Management Company and the Forests of the Slovak Republic e) Prepare pilot projects aimed at removing/modifying barriers, including a proposal for their funding.</p>	

Threat/Pressure 3: Linear transport infrastructures (including electric power lines) cause wildlife mortality

Specifics of the threat/pressure in the Novohrad – Nógrád PA:

Several critical sections of Class I, II and III roads are not marked with warning road signs “Beware of wildlife”. Such signs need to be installed in these sections to alert drivers to the increased presence of animals. This does not only mean the presence of large mammals or carnivores, the sign can also draw attention to the migration route of amphibians or otters, for example. Attention should also be paid to placing traffic signs that reduce the maximum speed limit to 70 km/h. Cutting back the vegetation within 3 m of the road is also important, for example the removal of tree and scrub vegetation that may prevent drivers from seeing animals near the carriageway in time.

Appropriate vegetation management on critical sections could help migratory animals to find and use the existing fauna crossings, which would help to reduce animal-vehicle collisions.

General Objectives set to address the threat 3 are:

- 3.1 Implement an adequate fencing system on motorways & high-speed railways, including escape gates
- 3.2 Direct animals towards functional underpasses
- 3.3 Warning drivers on road-kill/accident-prone areas
- 3.4 Warning train conductors on rail-kill/accident-prone areas

- 3.5 Prevent accidents caused by mammals being blocked in railway tunnels or on long bridges
- 3.6 Increase drivers' visibility on roads/railways
- 3.7 Implement special measures to avoid birds mortalities (powerlines, noise barriers impact)
- 3.8 Implement special measures to avoid bats mortalities (light impact)
- 3.9 Implement special measures to avoid amphibian & reptile mortalities
- 3.10 Collect and process data to identify critical sections on roads, motorways and railways where road-kill occurs
- 3.11 Create and/or train specialized teams to deal with wildlife-related incidents on motorways, railways, roads, including emergency interventions, i.e. bears on the motorway/railway tunnels
- 3.12 Develop and use an integrated database as a decision-support tool to address traffic incidents (for implementing/adjusting measures to prevent wildlife traffic-kills/damage/human casualties)

Objective 3.2 Direct animals towards functional underpasses

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD</i> <i>(those that we think could start in SaveGREEN)</i>	Notes
P1: No functional measures are implemented (e.g. vegetation modifications, suitable fencing) in the vicinity of the underpasses that are part of the identified corridors.	3.2.1 To design appropriate engineering and vegetation modifications in the vicinity of migration objects.	a) Develop guidelines for technical and vegetation modifications to ensure the functionality of migration objects; b) Identify the owners/users of land in the immediate vicinity of the underpasses and discuss with them the possibility of implementing appropriate vegetation and technical modifications.	

Objective 3.3: Warning drivers on road-kill/accident-prone areas

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD</i> <i>(those that we think could start in SaveGREEN)</i>	Notes
P1: Vehicle collisions with wildlife are frequent due to insufficiently marked critical sections.	3.3.1 Installation/operation of preventive measures (traffic signs, signal signs, etc.)	a) Identify and prepare a list of critical road sections in terms of migration; b) Reduce the speed limit to 70 km/h; c) Improve drivers' visibility by removing trees and shrubs within 3 m of the road; d) Install "Beware of Wildlife" signs in both directions to alert drivers of increased animal presence, including modern signage; e) Cooperate with the Slovak Police to measure how speed limits are kept, especially in the morning and evening hours, including permanently monitored sections; f) Ensure continuous collection and analysis of mortality data.	

Objective 3.6: Increase drivers/conductors visibility on roads/railways

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD</i> <i>(those that we think could start in SaveGREEN)</i>	Notes
P1: Lack of visibility for both drivers and wildlife	3.6.1 Implementation of measures to improve visibility for the drivers and for wildlife and set up optimal management to maintain this condition	a) Identify locations critical in terms of insufficient visibility both for the driver and for wildlife on lower category roads b) Design and implement measures to improve visibility for the drivers and wildlife c) Design optimal management to maintain visibility in selected sections d) Propose a change in legislation to remove vegetation in the area of 5m off the road at critical road sections.	

Objective 3.9: Implement special measures to avoid amphibians & reptiles mortalities

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD</i> <i>(those that we think could start in SaveGREEN)</i>	Notes
PI: Reptile and amphibian road mortality	3.9.1 Design and management of guiding features in the vicinity of underpasses	a) Design road sections with permanent barriers to guide reptiles and amphibians to underpasses	

Objective 3.10: Collect and process data to identify incidents/accidents in critical sectors on roads, motorways and railways

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD</i> <i>(those that we think could start in SaveGREEN)</i>	Notes
PI: Data on collisions with wildlife on roads, highways and railways are not centrally and systematically collected, processed and used to ensure the functionality of migration corridors	3.10.1 A central database of data on wildlife road, highways and railway collisions is systematically used to ensure the passability of migration corridors (will be part of the central geodatabase from Objective 3.12.)	<p>a) Collect data from relevant stakeholders</p> <p>b) Develop and use an integrated database as a decision-making tool for reducing collisions with wildlife.</p> <p>c) Set up a single data model for data collection by different stakeholders</p>	Collision data to potentially collect from: <ul style="list-style-type: none"> » Motorway company, » Slovak Road Administration » Railways of Slovakia » State Nature Conservancy » Hunters » Slovak police » Insurance companies » Transport Research Institute » Ministry of Transport and Construction of the Slovak Republic » General public (mobile application)

Objective 3.12: Develop and use an integrated database as decision-support tool to address traffic incidents (for implementing/adjusting measures to prevent wildlife traffic-kills/damages/human casualties)

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD</i> <i>(those that we think could start in SaveGREEN)</i>	Notes
PI: Lack of uniform and accessible information on maintaining functional and ecological landscape connectivity (data on wildlife collisions on roads, highways, and railroads, linear construction map, land-use map, animal occurrence data, etc.).	3.12.1 Functional central geodatabase	<p>a) Develop and use an integrated geodatabase as a decision-making tool for reducing wildlife collisions.</p> <p>b) In collaboration with relevant stakeholders, set up a system and methodology for data collection and storage, as well as a unified data model for data collection</p> <p>c) Provide legislative, financial and long-term sustainable support for the creation and operation of a central geodatabase at the national level</p>	Data to collect potentially from: <ul style="list-style-type: none"> » National Motorway Company » Slovak Road Administration » Railways of Slovakia » State Nature Conservancy of Slovak Republic » Hunters » Police Corps » Insurance companies » Transport Research Institute » Ministry of Transport and Construction of the Slovak Republic » General public

Threat/Pressure 4: Changes in land-use may reduce landscape permeability

Specifics of the threat/pressure in the Novohrad – Nógrád PA:

It can be concluded that the cumulative effect of migration barriers is increasing as a result of territorial development (including its transport infrastructure). To ensure that the area remains passable for animals in the future, it is necessary to maintain migration corridors, improve the passability of existing migratory objects and ensure adequate management of adjacent land. The identified bio-corridors should be consulted with the relevant local authorities (municipality, self-governing region) in order to enforce their protection by incorporating them into spatial plans at each level. The area can be used for economic or recreational purposes, but the function of the migratory corridor must be fully preserved by an absence of activities/features that reduce its permeability, (land fencing, construction, etc.)

Example of identified threat:

During the survey in the pilot area, it was discovered that underpasses under road bridges on the R2 expressway (in the Stožok area) are used for migration. The underpasses allow the migration of animals from Polana towards the Krupina plateau. In the Stožok municipality spatial plan, the development of an industrial zone is planned directly in this area, which is likely to cause partial or complete dysfunction of the migration corridor.

The second aspect is the improvement/preservation of migration potential on agricultural land. The identified agricultural lands are typically under large-scale monoculture cultivation. In this area, it is important to focus on building a diverse mosaic agricultural landscape with plenty of linear and insular non-forest shrub vegetation

and the use of agroforestry management systems on the land with a minimum area of fenced land. For animal species tied to the non-forest environment, it is also necessary to focus on the planting or restoration of meadows, grass, and herbaceous belts along watercourses with a link to the agricultural landscape as well as embankments of linear infrastructure.

General Objectives set to address the threat 4 are:

- 4.1 Enforce legislation preventing changes of land-use toward less permeable categories (including compensatory measures targeting connectivity). Direct animals towards functional underpasses
- 4.2 Facilitate/support changes of land-use toward more permeable categories, i.e. through agricultural payments

Objective 4.1 Enforce legislation preventing changes of land-use toward less permeable categories (including compensatory measures targeting connectivity)

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD</i> <i>(those that we think could start in SaveGREEN)</i>	Notes
<p>PI: Municipal development plans (whether or not consistent with the land-use plans) may compromise the passability of identified migration corridors, including the passability of underpasses and overpasses.</p>	<p>4.1.1 Regulation/ restriction of spatial development by means of spatial planning instruments (e.g. in the form of binding regulations)</p>	<p>a) Participation in the preparation of new legislation, in particular the Nature and Landscape Protection Act; the Landscape Planning Act.</p> <p>b) By engaging in the EIA/SEA process when assessing plans and projects that could adversely affect animal migration, promote actions leading to the protection and preservation of animal migration routes.</p> <p>c) Ensure the protection of identified migration corridors in the spatial planning of the municipalities/Self-governing regions concerned.</p> <p>d) Through changes in legislation, set up a system of compensation for restrictions on the use of land lying in migration corridors for different user groups.</p>	

Objective 4.2 Facilitate/support changes of land-use toward more permeable categories, i.e. through agricultural payments

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD</i> <i>(those that we think could start in SaveGREEN)</i>	Notes
<p>PI: A number of agrotechnical practices result in changes in the landscape structure that multiply the barrier effect or prevent animal migration altogether</p>	<p>4.2.1 Through induced changes in subsidy policy, encourage practices that increase the migratory potential of agricultural land</p>	<p>a) Develop a proposal for a set of measures aimed at improving/ maintaining migration potential on agricultural land. The main actions supported are: building a varied mosaic of agricultural landscapes with plenty of linear and insular vegetation, with a minimum area of fenced land.</p> <p>b) For species tied to non-forest environments, provide plantings of meadow, grassland or herbaceous strips with linkages to agricultural landscapes as well as embankments of linear infrastructure.</p> <p>c) Introduce systematic management of selected sites aimed at adjusting the mowing regime with regard to the restoration of natural grassland biotopes.</p> <p>d) Submit this set of measures to the Agricultural Paying Agency as one of the basis for setting up payment schemes for agri-subsidies.</p>	

Threat/Pressure 5a: Changes in land management – fencing – may reduce landscape permeability

Specifics of the threat/pressure in the Novohrad-Nógrád PA:

Fencing of large areas has been a phenomenon in Slovakia in the last decades, which significantly reduces the possibility of free movement in the landscape not only for wildlife but also for humans. Its growth is mainly due to measures related to the protection of agricultural land and crop insurance. Extensive fencing is also created in the construction of road infrastructure as a protection measure against collisions between vehicles and animals. Fencing is also important for game reserves, production and industrial sites, recreational and residential parts of the countryside, forest nurseries, etc. The cumulative effect of various types of fencing as well as other

barriers in the landscape significantly reduces the migratory potential of the landscape and has a limiting effect not only on the annual long-distance migration of animals but also on the local short-distance daily migration for food and shelter.

General Objectives set to address the threat 5a are:

5a.1 Set up fencing regulations and promoting non-fenced areas

5a.2 Develop guidelines and impose fencing-related conditions linked with agriculture/forestry subsidies or specific programmes

Objective 5a.1: Fencing regulations and promoting unfenced areas

(potential) Problems	Proposed Measures	Actions (<i>monitoring, policy,...</i>) + BOLD (those that we think could start in SaveGREEN)	Notes
P1: Fencing is not regulated in relation to the conservation of identified migration corridors	5a.1.1 Introduction of fence regulation and implementation of measures to open up fenced areas in order to maintain the functionality of identified migration corridors	<ul style="list-style-type: none"> a) Monitoring of new fencing projects on agricultural and other land. b) Designing mitigation measures for fenced areas; e.g. temporary fencing, adjusting fencing parameters, maintaining open sections within larger fenced areas, consistently removing dysfunctional, etc.). c) Educating land users on the importance of migration corridors and solutions to replace fencing through seminars, field trips, etc. d) Educate permitting officials on the importance of regulating the extent of fencing in the light of the needs of migratory animals. e) Enforcement of fencing conditions in relation to agricultural and other subsidies. 	

Objective 5a.2: Develop guidelines and impose fencing-related conditions linked with agriculture/forestry subsidies or specific programmes

(potential) Problems	Proposed Measures	Actions (<i>monitoring, policy,...</i>) + BOLD (those that we think could start in SaveGREEN)	Notes
P1: Insurance conditions/subsidy policy encourage/eliminate fencing of land	5a2.1 Modification of insurance conditions/conditions for obtaining subsidies so as to aim at the temporary or total elimination of fencing.	<ul style="list-style-type: none"> a) To draw up a draft list of conditions for eliminating fencing on agricultural and forestry land. b) To submit this list to the responsible body (at MoA) and insurance companies with a proposal for adjusting the insurance/subsidy conditions, after discussion with the representatives of foresters/farmers. 	

Threat/Pressure 5b: Changes in land management – crop cultivation/natural vegetation management – may reduce landscape permeability

Specifics of the threat/pressure in the Novohrad-Nógrád PA:

Monoculture cultivation has a significant impact on animal migration. A large readily available food source can alter animal behaviour with respect to changing the migration routes. A system of compulsory fencing, coupled with insurance and reimbursement of compensatory measures, contributes to the barrier effect.

Monoculture crop growing areas have been defined in the pilot area around Velká nad Iplom, Panické Dravce, Rapovce, Gregorova Vieska, Halíč, Tomášovce and to a lower extent also in the area of Pstruša - Stožok. In all of these areas, animal migration routes have been confirmed, but these may be influenced by readily available food. It is, therefore, important to

focus on building a varied mosaic agricultural landscape in these areas, with plenty of linear and insular non-forest scrub vegetation and the use of agroforestry farming systems on land with a minimum area of fenced plots.

General Objectives set to address the threat 5b are:

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

5b.2 Support adequate management of natural features & marginal habitats

5b.3 Support and promote the development of good-practice examples of connectivity-conscious agriculture, water management and forestry practices

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

(potential) Problems	Proposed Measures	Actions (<i>monitoring, policy,...</i>) + BOLD (those that we think could start in SaveGREEN)	Notes
P1: Large blocks of agricultural monocultures can increase the barrier effect in the landscape	5b.1.1 Modify the conditions for obtaining agri-subsidies so that they are geared towards encouraging crop rotation plans and agrotechnical practices based on building a varied, mosaic agricultural landscape with plenty of non-forest canopy vegetation.	a) To draw up a draft list of steps towards building a varied, mosaic agricultural landscape with plenty of non-forest shrub vegetation. b) To submit this list to the Agricultural Paying Agency with a proposal to modify the subsidy conditions, after discussion with the farmers' representatives.	

Threat/Pressure 5c: Land management causing degradation of natural habitats may reduce landscape permeability

Specifics of the threat/pressure in the Novohrad-Nógrád PA:

Watercourses that are regulated or modified have a straight channel and fortified banks are less permeable in terms of migration of different species. An example is the Krivánsky potok brook from Podrečany to its confluence with the Ipeľ River near Trebelovce, which is characterised by a regulated straight channel with a trapezoidal cross profile. In addition to the unsuitable river bed morphology, increased organic pollution is probably also a problem.

In the section south of Lučenec, however, the condition of the bank vegetation - overgrowth of invasive plants, especially buckwheat (*Fallopia* sp.) - is also a significant problem in terms of connecti-

ty. All of these form almost continuous stands here. Such herbaceous structure is practically impassable for animals, including species tied to meadow and wetland habitats such as, e.g., Scarce Large Blue and Large Copper butterflies.

General Objectives set to address the threat 5c are:

5c.1 Prevent/control spreading of invasive plant & animal species. Renaturation of invaded/degraded lands

5c.2 Prevent/enforce legislation on fire occurrence

5c.3 Prevent alteration of water bodies, restore hydric system and support renaturation of wetlands

5c.1 Prevent/control the spread of invasive plant & animal species. Renaturation of invaded/degraded lands

(potential) Problems	Proposed Measures	Actions (<i>monitoring, policy...</i>) + BOLD (those that we think could start in SaveGREEN)	Notes
P1: Uncontrolled spread of invasive species and inadequate restoration of natural riparian vegetation reduces the permeability of landscape for selected species	5c.1.1 Introduction of systematic management of invasive species with regard to the restoration of natural vegetation	a) Eradication/suppression of invasive plant species along watercourses, preferably along the Krivánsky potok brook in the section of Podrečany - Trebelovce (confluence with the Ipeľ River), restoration of native herbaceous and woody riparian vegetation and restoration management.	

5c.3 Prevent alteration of water bodies, restore hydric system and support renaturation of wetlands

(potential) Problems	Proposed Measures	Actions (<i>monitoring, policy...</i>) + BOLD (those that we think could start in SaveGREEN)	Notes
P1: Regulated watercourses are unsuitable for migration and do not provide sufficient habitats/suitable conditions for migratory (terrestrial) fauna species.	5c.3.1 Restore the hydraulic system and promote wetland restoration through river channel modification close to the natural character	a) Renaturation of the Krivánsky potok brook - restoration of the river bed close to its natural character and the surrounding wetlands	

Threat/Pressure 6a: Other anthropogenic activities – game management – may reduce landscape permeability

Specifics of the threat/pressure in the Novohrad-Nógrád PA:

The exercise of hunting rights, especially in the vicinity of objects used by animals for migration (sub-bridges, culverts, bridges, ecoducts), may significantly influence the willingness of animals to use these objects for comfortable passage. This is true not only for objects built to maintain migration potential within migration corridors but also for objects built for other purposes (crossing streams, terrain, etc.), which are used by animals in the same way.

To guide and set the conditions for hunting activities within individual hunting grounds, hunting management plans are used. These provide for the declaration of so-called non-hunting areas (for the period of the hunting ground lease, but a maximum of 15 years). Non-hunting areas are usually towns and villages. This provision could be used to set up non-

hunting areas in the vicinity of migration objects (up to approximately 500 m, depending on the type of object) to preserve their migration potential. Hunting management plans are approved by the competent Land and Forestry Department at the relevant District Authority.

General Objectives set to address the threat 6a are:

- 6a.1 Develop coherent game management plans and apply the EIA/AA procedures in order to avoid-mitigate-compensate for impacts
- 6a.2 Facilitate data collection on key-species
- 6a.3 Harmonize game management with Natura 2000 and connectivity-related objectives
- 6a.4 Implement poaching prevention and control

Objective 6a.1: Develop coherent game management plans and apply EIA/AA procedures in order to avoid-mitigate-compensate for impacts

(potential) Problems	Proposed Measures	Actions (<i>monitoring, policy,...</i>) + BOLD (those that we think could start in SaveGREEN)	Notes
P1: Inappropriate game management can reduce the permeability of the landscape (e.g. hunting near migratory objects reduces the willingness of animals to use them)	6a.1.1 Ensuring appropriate hunting management to maintain the functionality of migration corridors	<ul style="list-style-type: none"> a) Prepare a list of hunting associations in the pilot area; b) Establish cooperation with local hunting associations; c) Conduct an educational campaign on best practices in game management in migration corridors. d) Suggest the provision of non-hunting areas within the wording of the comment defined during the interdepartmental comment procedure “We therefore suggest that the Ministry of the Environment should be able to request the Ministry of Agriculture to declare hunting land as a non-hunting area in the critical points of migration corridors”, I propose to introduce this provision also in close proximity to the implemented migration objects. 	

Threat/Pressure 6b: Other anthropogenic activities – human-wildlife conflicts – may reduce landscape permeability

Specifics of the threat/pressure in the Novohrad-Nógrád PA:

The region of Podpolanie is characterized by a scattered settlement pattern, which is also associated with traditional livestock breeding. The free roaming of animals across the landscape helped to preserve the natural structure of the landscape. This type of farming has gradually begun to disappear from the landscape in favour of other, less economically demanding farming methods, which, however, often contribute to increasing the barrier effect since they involve large-scale fencing. The animals are kept free, but in a secluded area and without a shepherd. However, this method of livestock rearing often causes soil degradation, which can lead to soil erosion during heavy rainfall. Soil degradation is mainly caused by the long-term presence of animals in one area in all types of weather. The original Carpathian way of farming, however, included shepherds who moved animals from place to place at regular intervals during the day, which did not lead to intensive degradation of the pasture land. In the Carpathian way of farming, fencing is mostly used only for the construction of pens, where livestock

is generally confined at night, reducing the barrier effect in the landscape.

General Objectives set to address the threat 6b are:

- 6b.1 Facilitate the implementation of legislation on damage compensations
- 6b.2 Facilitate the implementation of traditional shepherding
- 6b.3 Facilitate the implementation of modern methods for prevention
- 6b.4 Facilitate increased subventions based on large carnivore conservation
- 6b.5 Regulate other anthropogenic activities which could increase the level of conflicts (waste management, unsustainable development & tourism activities etc.)
- 6b.6 Facilitate rapid intervention in special situation related to wild animals

Objective 6b.2: Facilitate the implementation of traditional shepherding

(potential) Problems	Proposed Measures	Actions <i>(monitoring, policy,...) + BOLD</i> <i>(those that we think could start in SaveGREEN)</i>	Notes
P1: Although traditional pastoralism is a well-established and functional practice, its use is only slowly catching on.	6b.2.1 Promote traditional pastoralism in and around identified ecological corridor areas.	a) Prepare a list of farmers and farming cooperatives that keep the sheep in the target areas of the pilot area; b) Implement pilot projects on traditional pastoralism in the pilot area; c) Provide incentives (financial and/or material) for farmers seeking to convert to traditional pastoralism; d) Organise an information campaign on the benefits of traditional pastoralism.	

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

Specifics of the threat/pressure in the Novohrad-Nógrád PA:

Responsibility for the monitoring of underpasses and overpasses that are part of preventive measures to preserve migration corridors is not set. Without long-term/regular monitoring of the passability of underpasses or overpasses, there is no objective knowledge of the functionality of these objects in terms of their use by migratory animals. Monitoring of the objects is, therefore, part of the solution to maintain or improve their functionality in

the identified migration corridors. Relevant data are also needed to implement changes in the legislative area as well as various other mitigation measures.

General Objectives set to address the threat 7 are:

7.1 Facilitate the implementation of an integrated monitoring programme – procedures, database, indicators, and assessments

Objective 7.1 Facilitate the implementation of an integrated monitoring programme – procedures, database, indicators, and assessments

(potential) Problems	Proposed Measures	Actions (<i>monitoring, policy,...</i>) + BOLD (those that we think could start in SaveGREEN)	Notes
P1: There is a lack of data on the effectiveness of the implemented preventive measures to promote migration with regard to their functionality as well as their financial relevance.	7.1.1 Ensure systematic monitoring of the effectiveness of migration support measures	<ul style="list-style-type: none"> a) Seek solutions in cooperation with stakeholders b) Prepare a methodology for monitoring the functionality as well as effectiveness of the implemented preventive measures (before, during, after) c) Identification of the organisation responsible for this monitoring d) Based on the evaluation of effective measures, create a catalogue of measures as examples of good practice for future proposals for solutions. 	Stakeholders: The Ministry of the Environment of the Slovak Republic, The State Nature Conservancy of the Slovak Republic, The National Motorway Company, The Police force

Threat/Pressure 8: The support of stakeholders for a cross-sectoral & integrated approach at landscape level is reduced

Specifics of the threat/pressure in the Novohrad-Nógrád PA:

In Slovakia, the issue of migration corridor identification is addressed by different organisations/institutions at different levels, with different methodologies and for different purposes. However, it can be assumed that every year a lot of data on animal migration will be added, from different projects, research tasks, and migration studies. Not all of them are easily accessible for those who could use this information suitably. By aggregating them and putting them into a single data model, they could provide a more comprehensive picture of animal migration in our area and would be more accessible to all interest groups.

General Objectives set to address the threats 8 are:

8.1 Facilitate networking and develop a common platform and database

8.2 Facilitate information, awareness, education, and communication

8.3 Support research and studies focused on connectivity; facilitate inter-sectoral capacity building and development of new professional opportunities (mainstream biodiversity to other sectors)

8.4 Facilitate the development of regional identity and promote the area – nature, culture, services (connectivity as one of the topics)

8.5 Facilitate the development & alignment of local strategies into regional sectoral strategy (connectivity as one of the topics)

8.6 Facilitate and support complementary initiatives (connectivity as one of the topics)

Objective 8.1 Facilitate networking and develop a common platform and database

(potential) Problems	Proposed Measures	Actions (<i>monitoring, policy,...</i>) + BOLD (those that we think could start in SaveGREEN)	Notes
P1: Lack of cooperation between stakeholders in sharing data on animal migration or occurrence Lack of a map base that would unify all the available data on migration corridors in the territory of the Slovak Republic	8.1.1 Create a platform and database for information sharing	a) Establish working groups at local and national level (long-term); b) Create an information-sharing platform; c) Create a unified database of animal migration data with a web-based map display	

Objective 8.2 Facilitate information, awareness, education, and communication

(potential) Problems	Proposed Measures	Actions (<i>monitoring, policy,...</i>) + BOLD (those that we think could start in SaveGREEN)	Notes
P1: The issue of landscape permeability is still not well-known among the general public.	8.1.1 Increase awareness among the general public.	a) Continue species-specific web and social media communications, including the topic of landscape permeability	



CHAPTER 3

DESCRIPTION OF IDENTIFIED CRITICAL SITES IN THE PILOT AREA FOR EACH TARGET ANIMAL GROUP

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1. Large terrestrial animal species primarily associated with forest environments

(large carnivores and ungulates)

Critical area No. 1: Planned section of the R2 expressway near the village of Lieskovec

The construction of the R2 expressway in the section Zvolen East - Kriváň has divided the territory and limited the connectivity of the landscape between the Poľana Biosphere Reserve, the Štiavnické vrchy Mountains Protected Landscape Area, the Javorie

Mountains and the Krupinská planina Plain. No ecoduct has yet been built on this section of the R2 expressway; only sub-bridges that bridge watercourses and terrain unevenness can serve as green infrastructure elements here. As the land connecting these technical elements has not been identified and subsequently protected as a biocorridor in the land-use plans of the towns and villages concerned, gradual changes in the landscape may lead to a complete cut-off and loss of functional connectivity between the northern and southern parts of the area. The same situation can be observed toward the west of the related area - the section of the R1 expressway Zvolen East - Banská Bystrica North, where the cumulative effect of several barriers is manifested. In this area, the completion of a section of the R2 expressway is planned, which would connect "Zvolen – West" and "Zvolen – East" and would thus build on the already constructed section of the R2 expressway

Zvolen East - Kriváň. The construction of this section will intersect an important biocorridor, which passes through the area located between the villages of Lieskovec, Zolná and Zvolenská Slatina. Currently, it is one of the few passable corridors in the area, which allows for migration of animals from north to south.

Proposed measures:

- » Considering the above-mentioned facts, a technical solution that would preserve the functional ecological connectivity in the locality Jelšovce - Do Breziny (Lieskovec, Zvolen district) (48.5797172N, 19.2251992E) on R2 Zvolen North - Zvolen East is necessary. Technical solution should create at least 80m long space in the given location, allowing for the lateral passage of the R2 expressway.
- » Construction of a suitable preventive measure (ecoduct, viaduct, underpass, and overpass) should be an appropriate technical solution, considering the latest version of TP067 and the results of the EIA/SEA and the appropriate assessment.
- » The road leading from the Agricultural Cooperative Lieskovec to the road II/591 should be separated from the ecoduct. This road can be replaced the existing road connection between Lieskovec and Zolná.
- » Barriers made of natural material (stones, tree trunks) should be placed in the ecoduct at the point where it connects to the surrounding countryside, preventing vehicles from entering the ecoduct. However, the barriers must not prevent animals from using the ecoduct.
- » To reduce the negative effects of traffic noise, we propose to install sound barriers in this section of the expressway, which would be directly connected to the sound barriers located on the body of the ecoduct. However, they must be suitably designed to eliminate collisions with birds. This measure will increase the chances of functional use of this critical location by wildlife species

that are shy and can be stressed by traffic noise.

- » The surface of the ecoduct should be covered by grass in the central part and by suitable indigenous tree species on the sides (considering the forest vegetation level and the typological units of the surrounding forest stands).
- » The ecoduct should be connected with the surrounding forest vegetation at the site "Za Skalickou" (48.5716342N, 19.2190431E) and with the bank vegetation of the Hučava River (48.5863867N, 19.2241669E) by guiding greenery.
- » The identified ecological corridor, which would be preserved by a properly designed technical object, should be included in spatial plans of the relevant municipalities in order to avoid its destruction in the future.

Stakeholders:

Banská Bystrica Region; City of Zvolen; Municipality of Lieskovec; Municipality of Zvolenská Slatina; National Motorway Company; Slovak Road Administration - Investment Construction and Road Administration - Banská Bystrica; Railways of the Slovak Republic; State Nature Protection of the Slovak Republic; Protected Landscape Area Poľana; Slovak Water Management Enterprise - Banská Bystrica, Upper Hron River Administration in Zvolen; District Office in Zvolen - Environmental Department; Local Hunting Associations

Identified threats to the critical site:

- » **Threat 1:** New Transport and other Linear Infrastructure projects may increase the barrier effect at landscape level.

Identified objectives for the critical site:

- » **1.1** Maximize the functionality of underpasses (all objects)
- » **1.2** Maximize the functionality of overpasses (all objects)

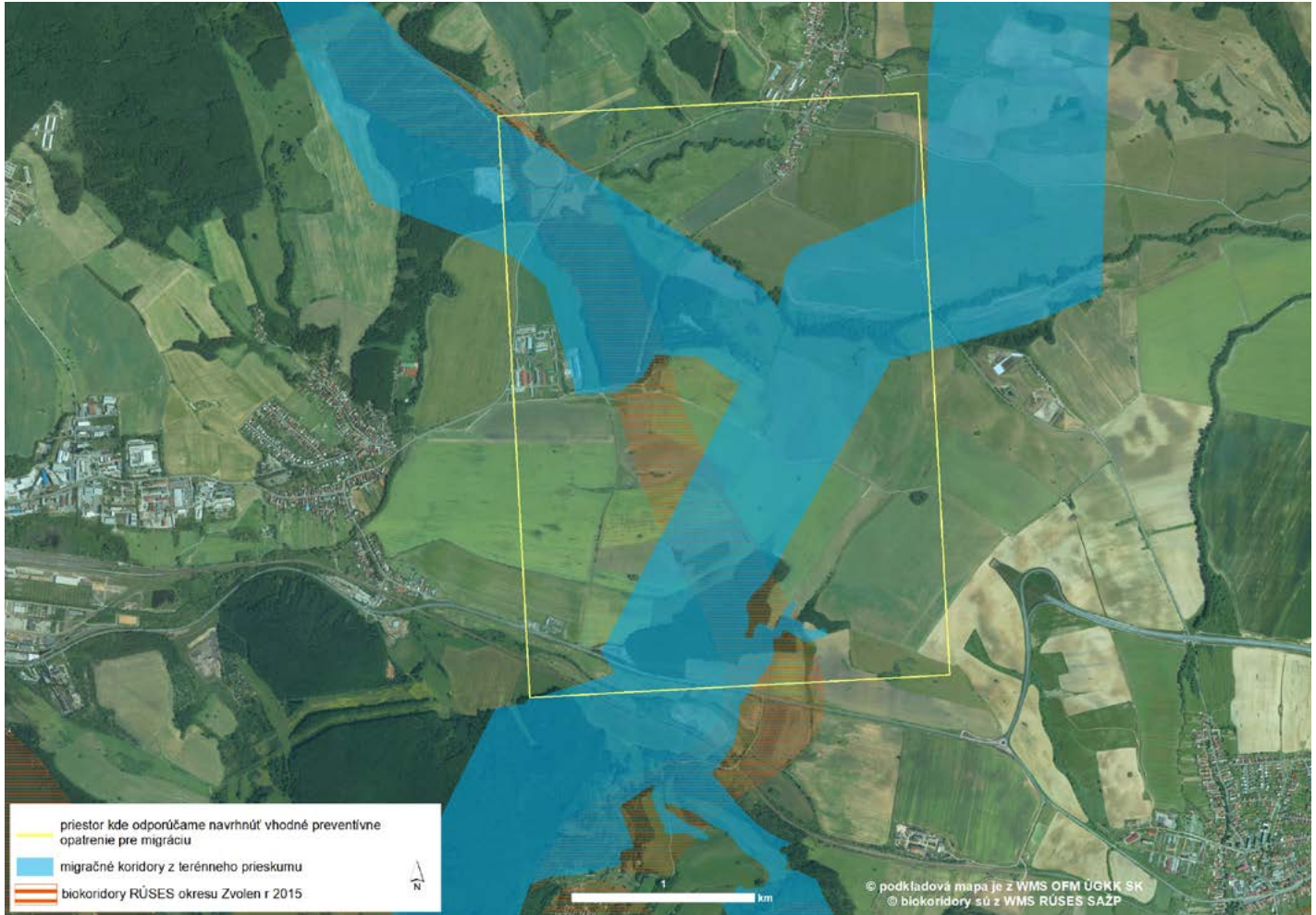


Figure 1 Map of the solved area, the proposed location of an ecoduct at the point of crossing with the selected R2 variant in the section Zvolen west - Zvolen east.

- » **1.3** Assign a legal status and develop coherent regulations for all objects which are potential wildlife passages

and grassland communities. Maintaining the functional connectivity of this area is important for maintaining the gene flow in wildlife populations.

**Critical area No. 2:
the planned section of the R7
expressway near the village of
Ľuboreč**

The area in question represents an important link (ecological corridor) between the northern and southern parts of the pilot area. It connects the area in the north, which is permanently inhabited by large carnivores (Poľana Biosphere Reserve) with the peripheral areas in the south along the Slovak-Hungarian border. The area is made up of compact, connected forest cover

The construction of the R7 expressway in the section of Veľký Krtíš - Lučenec is proposed in several variants. The migration corridor is crossed by variants A and B near the village of Ľuboreč - variant A and near the village of Trenč - variant B. Option A would be in the area between Ľuboreč and Lehôtka in collision with an important migration corridor, which connects the orographic units of the Krupinská planina Plain and the Southern Basin (its southern edge is defined by the state border of the Slovak Republic with Hungary). Alternatively, the location of an ecoduct is also proposed.

Proposed measures:

- » To install traffic signs (speed reduction; beware of animals) on the selected section of I/75 road (in the vicinity of the villages of Ľuboreč and Trenč), as well as traffic signal deterrents, which react only to the impact of the light from an approaching car. This could be done before the construction of the R7 Veľký Krtíš - Lučenec.
- » Considering the above-mentioned facts, we propose to technically solve the construction of the R7 Veľký Krtíš - Lučenec expressway section in two alternatives according to the choice of the implemented variant so that the functional connectivity of the countryside is preserved by applying a suitable technical solution ensuring the lateral passability of the R7 expressway in the section of at least 100 m in length.
- » We consider the construction of a suitable preventive measure (ecoduct, viaduct, underpass, and overpass) to be an appropriate technical solution, considering the latest version of TP067 and the results of the EIA/SEA and the appropriate assessment.
- » In the case of the variant with the construction of the ecoduct, we propose to install barriers made of natural material (stones, tree trunks) on the body of the ecoduct at the point of connection to the surrounding countryside, preventing motor vehicles from entering the body of the ecoduct. However, the barriers must not prevent animals from using the ecoduct.
- » In order to reduce the negative effects of traffic noise, we propose the installation of sound barriers in this part of the expressway, directly following the noise barriers on the body of the ecoduct (if the variant with the ecoduct is implemented). The sound barriers shall be suitably adapted against collisions with birds. This measure will increase the chances of functional use of this critical location by wildlife species that are shy and may be stressed by traffic noise.
- » The surface of the ecoduct is proposed to be reforested with trees with respect to the forest vegetation stages and typological units of the adjacent forest stands.
- » The identified biocorridor passing through the migration object should be incorporated into the spatial plans of the affected municipalities and thus prevent it from being endangered by future construction.
- » The bridges of watercourses (Ľuboreč, Veľická potok brook and Kamenné), located in the area in question, are proposed to be technically solved with regard to the migration requirements of wild animals (to preserve the natural character of the watercourse channel, on each side of the watercourse to leave at least 15 m long, dry space of the under-bridge, serving to connect the terrestrial part of the biocorridor, the surface of the under-bridge is proposed to be covered with natural material - soil, rake); specifically, watercourses.

Stakeholders:

Banská Bystrica Self-governing Region; City of Lučenec; Municipality of Ľuboreč; Municipality of Lehôtka; Municipality of Mašková; Municipality of Trenč; National Motorway Company; Slovak Road Administration - Investment Construction and Road Administration Banská Bystrica; Railways of the Slovak Republic; State Nature Conservancy of the Slovak Republic; Protected Landscape Area Cerová vrchovina; Slovak Water Management Enterprise - Banská Bystrica, Upper Hron River Basin Administration Zvolen; District Office Lučenec- Environmental Department; Local Hunting Associations

Identified threats to the critical site:

- » **Threat 1:** New Transport and other Linear Infrastructure projects may increase the barrier effect at landscape level.

Identified objectives for the critical site:

- » **1.1** Maximize the functionality of underpasses (all objects)

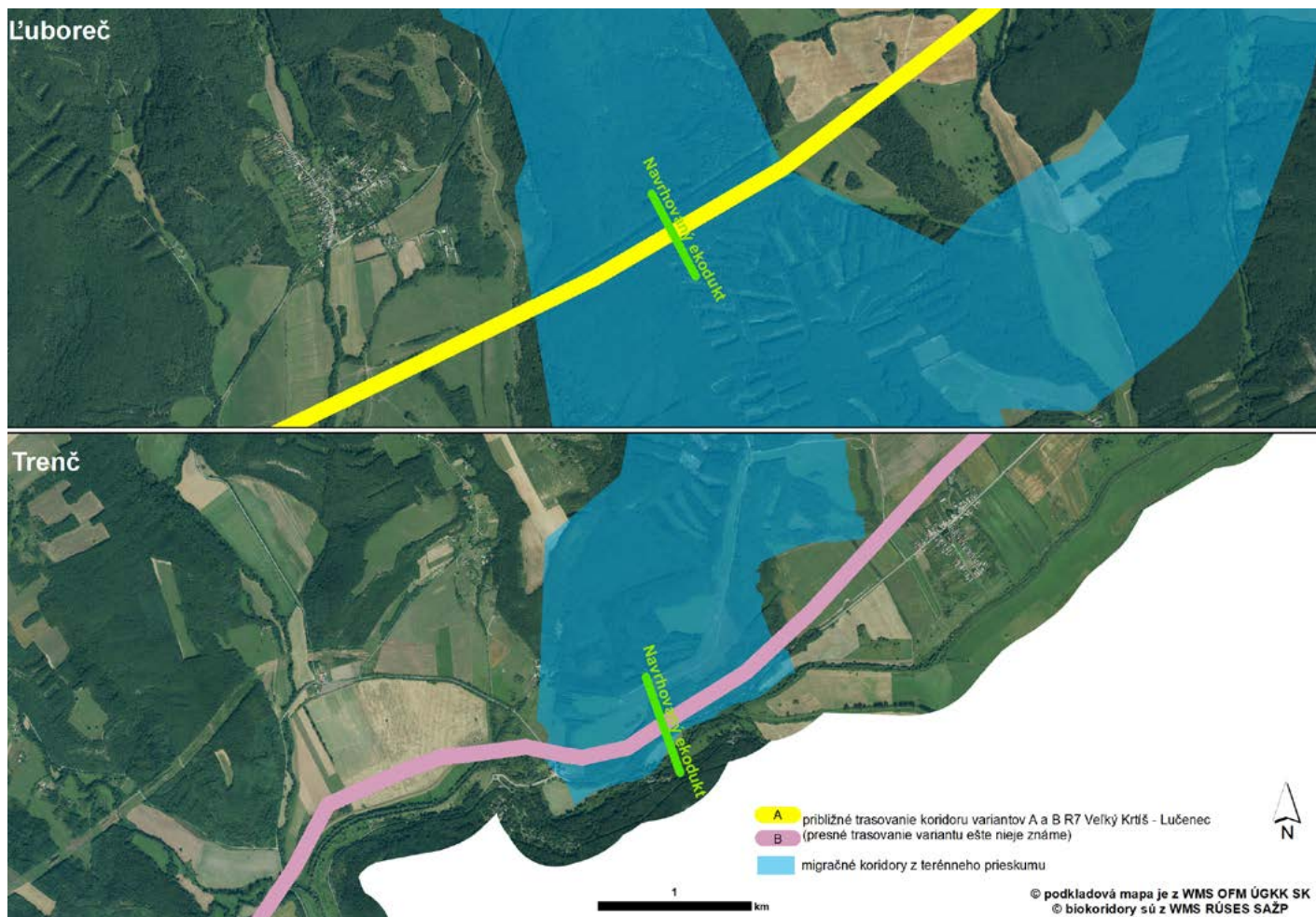


Figure 2 Map of the area under consideration, proposal for the location of the ecoduct on the route of the planned R7 expressway near the village of Ľuboreč, alternatively near the village of Trenč.

- » **1.2** Maximize functionality of overpasses (all objects)
- » **1.3** Assign a legal status and develop coherent regulations for all objects which are potential wildlife passages

**Critical area No. 3:
Section of the built expressway R2
Zvolen East - Kriváň**

The Slatina River represents a terrestrial-hydric biocorridor of regional importance. The construction of the R2 expressway in the section Zvolen east - Kriváň interrupted the connection between the Poľana Biosphere Reserve in the north and the Štiavnické vrchy and Krupinská planina Plain in the south of Slovakia. The technical design of the R2

expressway was not executed with sufficient regard to the migration requirements of wildlife. To ensure the functional connectivity of the landscape, only some sub-bridges over adjacent watercourses (the Hradná stream, the Slatina River) are usable in this section of R2. The longest section of the bridge is located to the east of the village of Víglaš, at the confluence of the Hradná stream and the Slatina River. At this point, the R2 expressway is carried on bridge piers, where an approximately 600 m (175 m + 410 m) long section of the bridge has been created, allowing the R2 expressway to be crossed by wildlife. This area has the greatest potential to alleviate migratory pressure on wildlife. The abundance of animal tracks, droppings and animal trails demonstrate that this is indeed the case and the area provides an important link between the areas divided

by the transport infrastructure. However, the area that acts as an ecological corridor and directly connects to this sub-bridge is insufficiently protected. The area to the east of Víglaš, along the I/16 Road is already almost completely built up and partially hinders wildlife migration. The movement of animals is, therefore, concentrated in sections that are located along the course of the Slatina River, thus creating a critical place for migration in the vicinity of the Víglaš Castle. At this point, the riverbank vegetation of the Slatina River connects directly to the adjacent forest habitat, which is a link to other sites on the Krupinská planina Plain and the Štiavnické vrchy Mountains.

Two other smaller functionally used under-bridges under the R2 expressway, which are expected to function in the long term, are located north of Stožok and southeast of Detva. In both cases, these are functional ecological corridors between the Poľana Biosphere Reserve and the Krupinská planina Plain, as evidenced by the animal signs of the residence (e.g. tracks, droppings) and animal trails, as well as their direct occurrence confirmed by monitoring and carried out using photo traps.

Proposed measures:

- » In the section of the expressway R2 Zvolen east - Kriváň it is necessary to identify all sub-bridges that have the potential to serve as underpasses for wildlife and thus fulfil

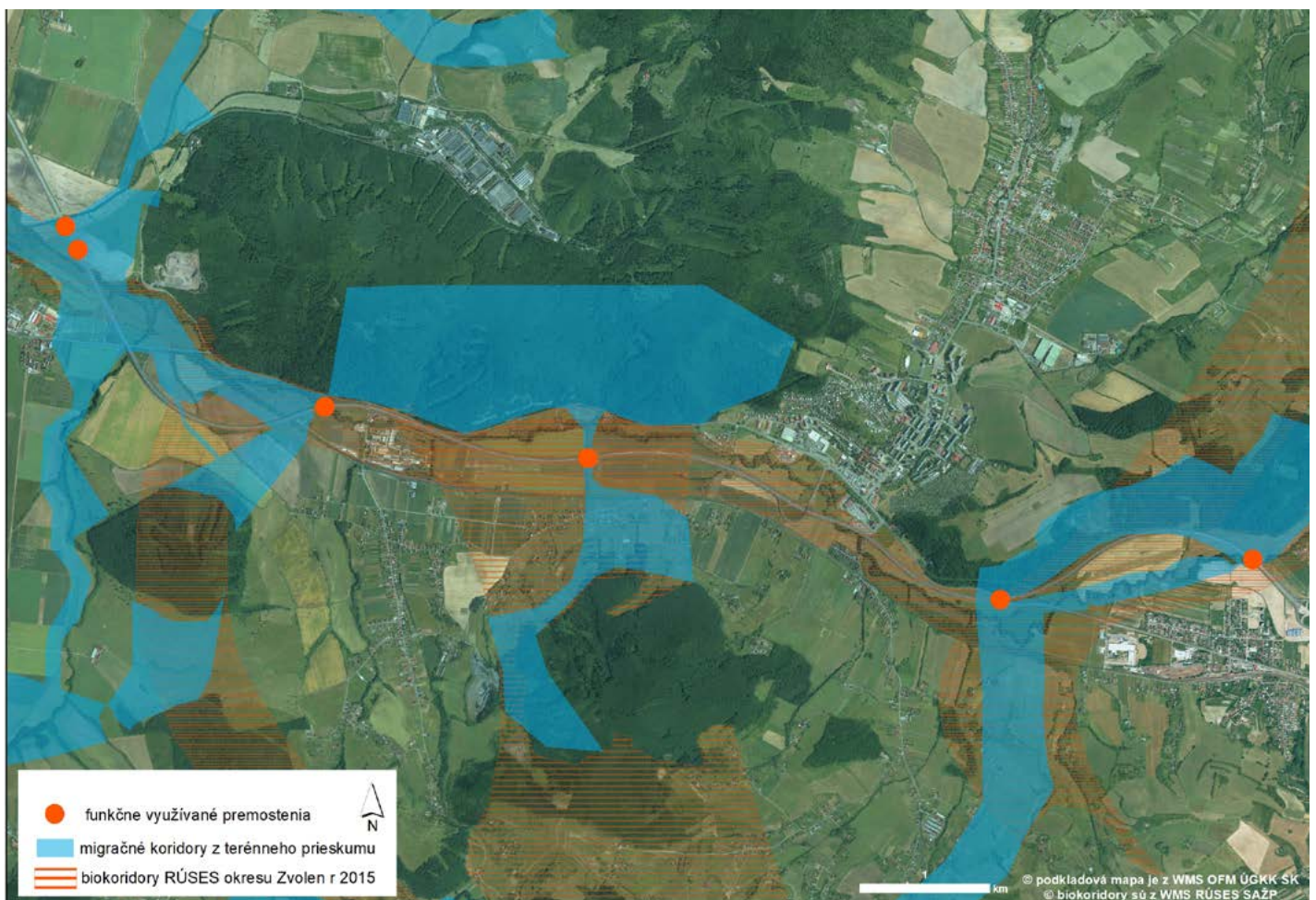


Figure 3 Map of the area of interest in the section Pstruša - Kriváň, red points represent functionally used sub-bridges, and blue polygon represents migration corridors for large carnivores and their umbrella species verified by field survey.

their migratory requirements in the area. These are mainly watercourse bridges.

- » The functionality of all identified underpasses needs to be verified by monitoring - animal presence, photo traps - or a combination of these two methods.
- » After confirming the functionality of the underpasses, it is necessary to identify the adjacent surroundings, which serve as a bio-corridor and a link between the two sides of the area.
- » On the selected bio-corridors, it is necessary to identify critical points (bottlenecks, places threatened by linear transport infrastructure, etc.). Critical points identified along the route

of biocorridors need to be consulted with the concerned municipality and the area/facility manager (Slovak Road Administration, etc.).

- » At the identified critical points, we propose to remove tree and shrub vegetation at a distance of less than 3 m from the road, which may prevent drivers from spotting animals in the vicinity of the road in time; install warning signs "Beware of wildlife!", warning drivers of the risk of collision with wildlife; and reduce the maximum permissible speed to 70 km/h.
- » The identified biocorridors should be consulted with the local government concerned (municipality, Self-governing

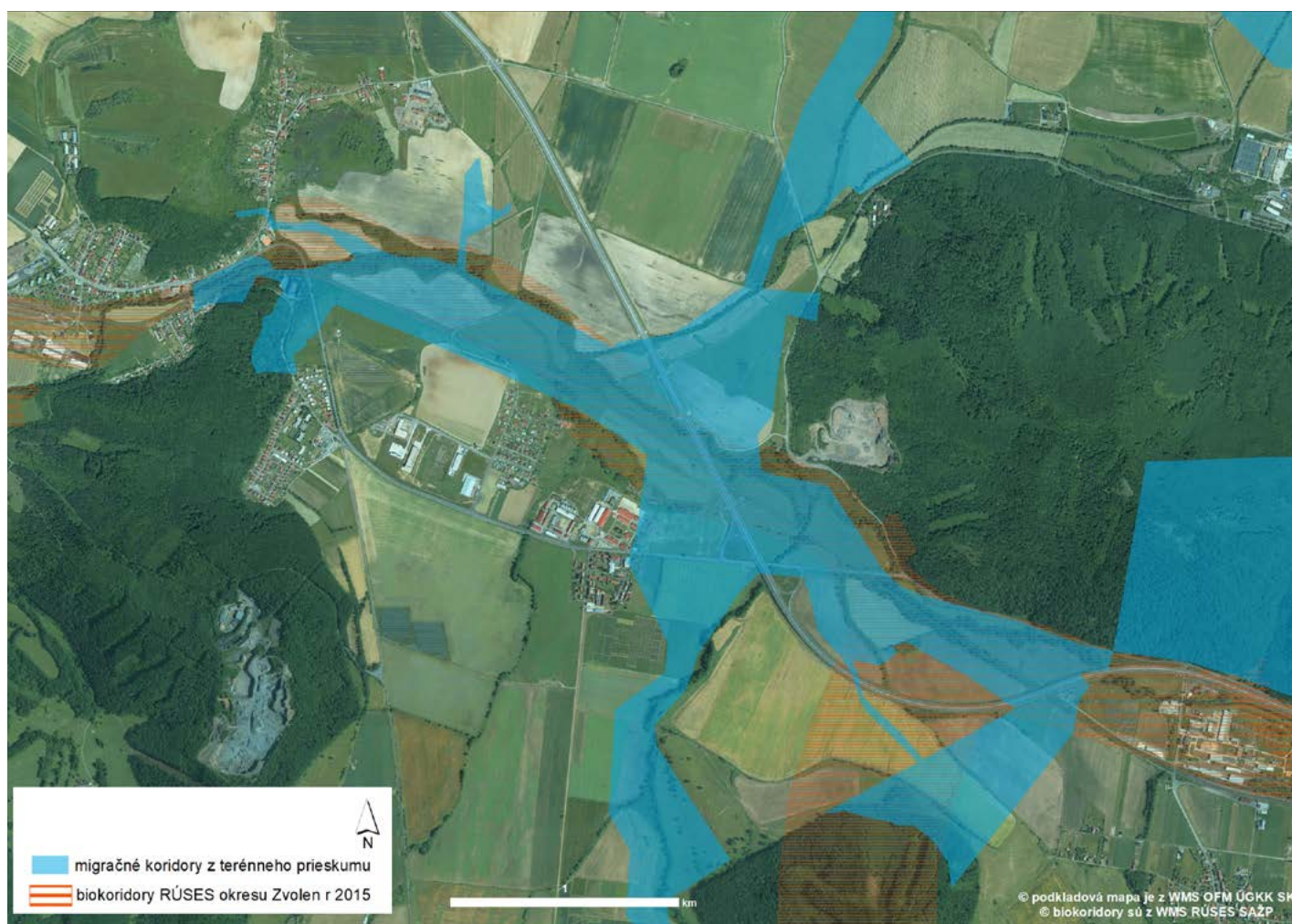


Figure 4 Map of the area of interest in the locality between Víglaš and Pstruša, showing the main migration corridors (blue polygon) for large carnivores and their umbrella species.

region) and their protection should be enforced by including them into spatial plans at each level. The area may be used for economic or recreational purposes, but it must not be degraded, built over or fenced off. At the same time, the identified biocorridors should be consulted with the linear infrastructure manager with a view to building a new preventive measure (suitable migration object) on an existing section.

Critical locations identified in the critical area:

1. In the locality of Víglaš there is a critical place in close proximity to the Víglaš Castle. In this place the migration corridor is crossed by the I/16 road and the single-track railway line No. 160. The section south of Víglaš Castle (from 48.5555756N, 19.3008081E to 48.5525575N,

19.3020953E) and the underpass under the R2 expressway at the point of bridging the confluence of the Hradná brook and the Slatina River (48.5510314N, 19.3227822E) are of strategic importance for the preservation of the functional connectivity of the landscape.

2. In the locality of Stožok (Figure 9), there is another critical area at the crossing of the migration corridor of the R2 expressway - the Slatina River bridge in the area of the Slatina River in the cadastral area of Stožok. This area is defined in the Stožok municipality spatial plan as a PROPOSAL for areas of warehouses and technical buildings. In close proximity to the sub-bridge, there is a fenced area with solar panels, which is adjacent to the MOT station on the eastern side (on the orthophoto it has not yet been completed). At

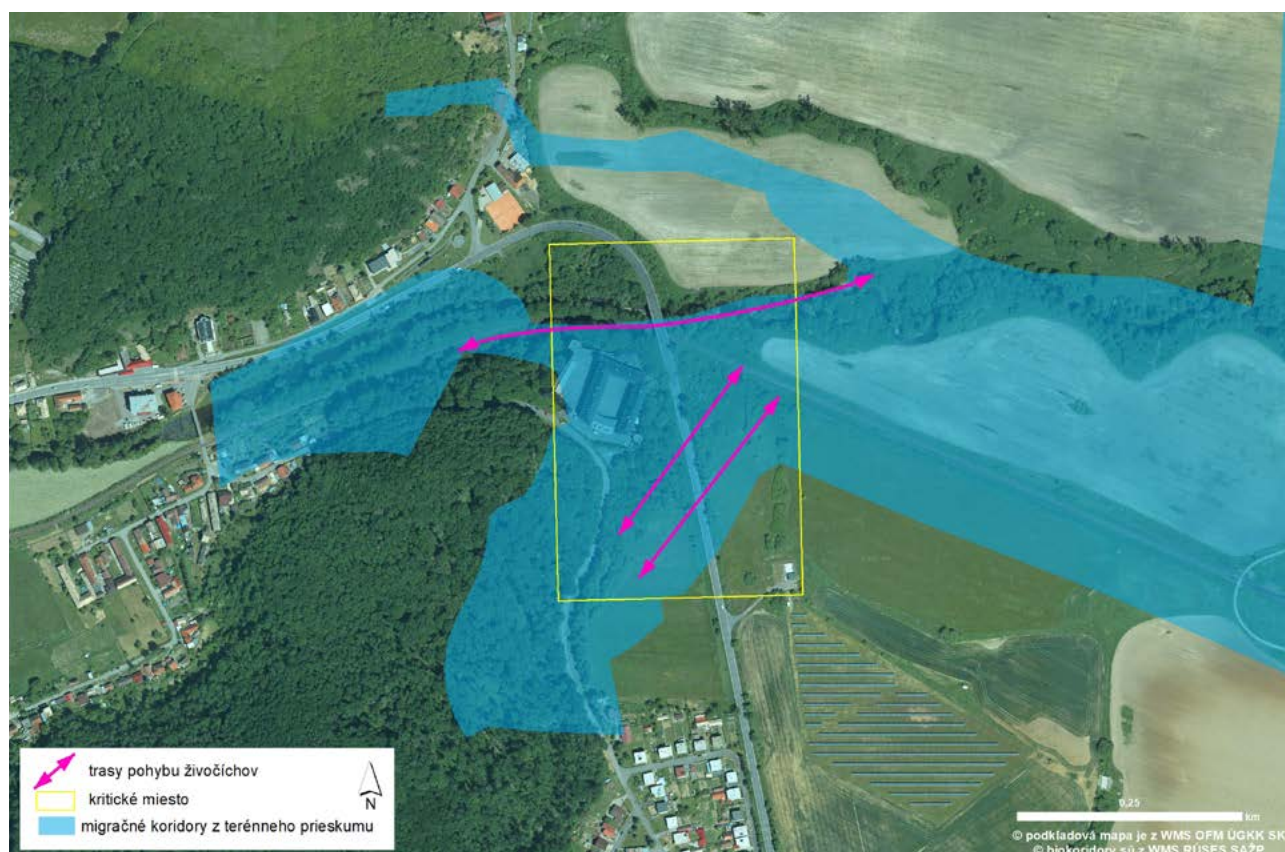


Figure 5 Critical area (yellow rectangle) in the vicinity of Víglaš Castle - crossing of the biocorridor, railway line 160 and road I/16. The given section represents one of the last undeveloped areas allowing migration in N-S direction for large carnivores and their umbrella species. The arrows represent the movement routes of selected species through the critical area. The proposed measures should be implemented in this area to reduce the risk of traffic collisions with animals.

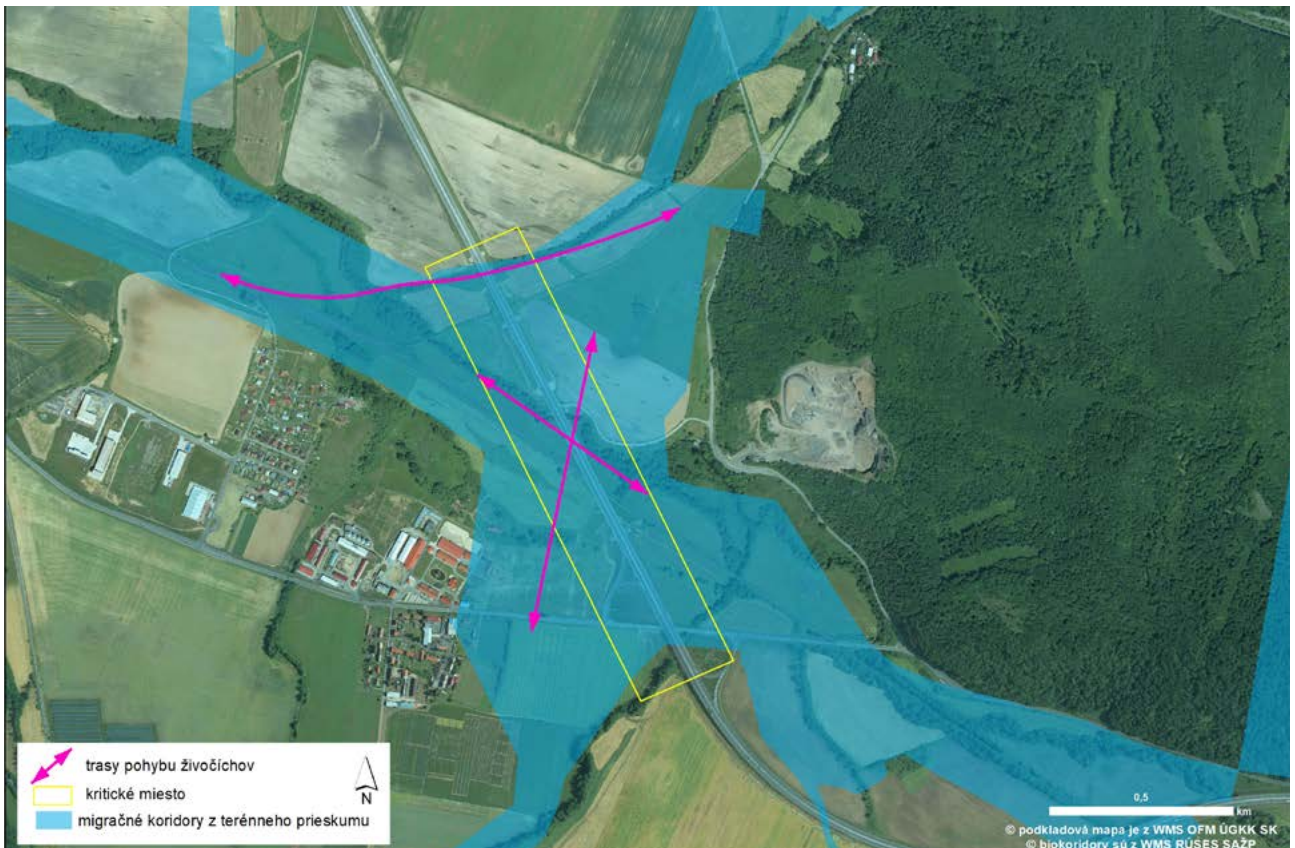


Figure 6 Critical area in the vicinity of the bridges of the Slatina River, Dúbravský potok brook and railway line No. 160 (yellow rectangle), the preservation of the passability is necessary in this place for the preservation of the functional connectivity of migration corridors.

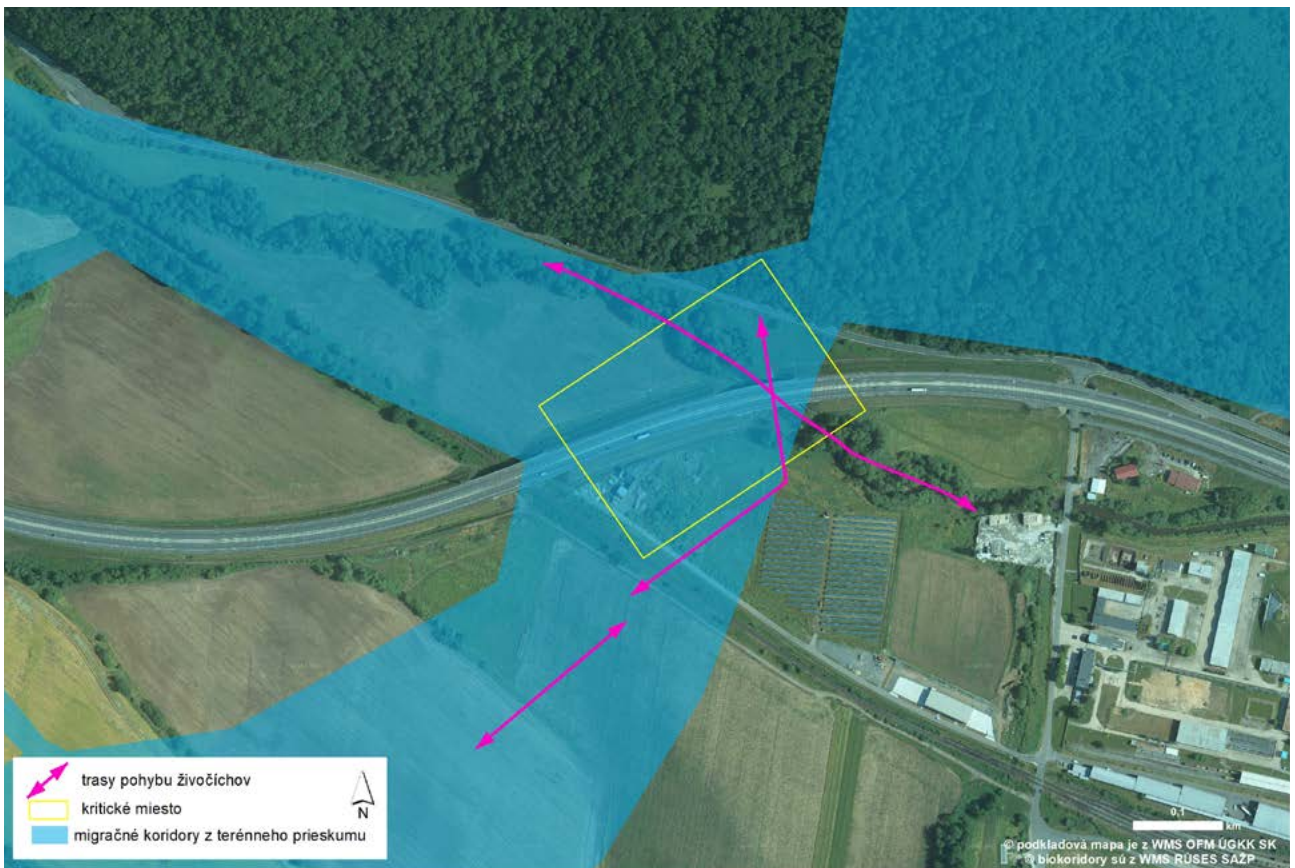


Figure 7 Map of the critical point in the section of the expressway R2 Zvolen East - Kriváň, locality of Stožok.

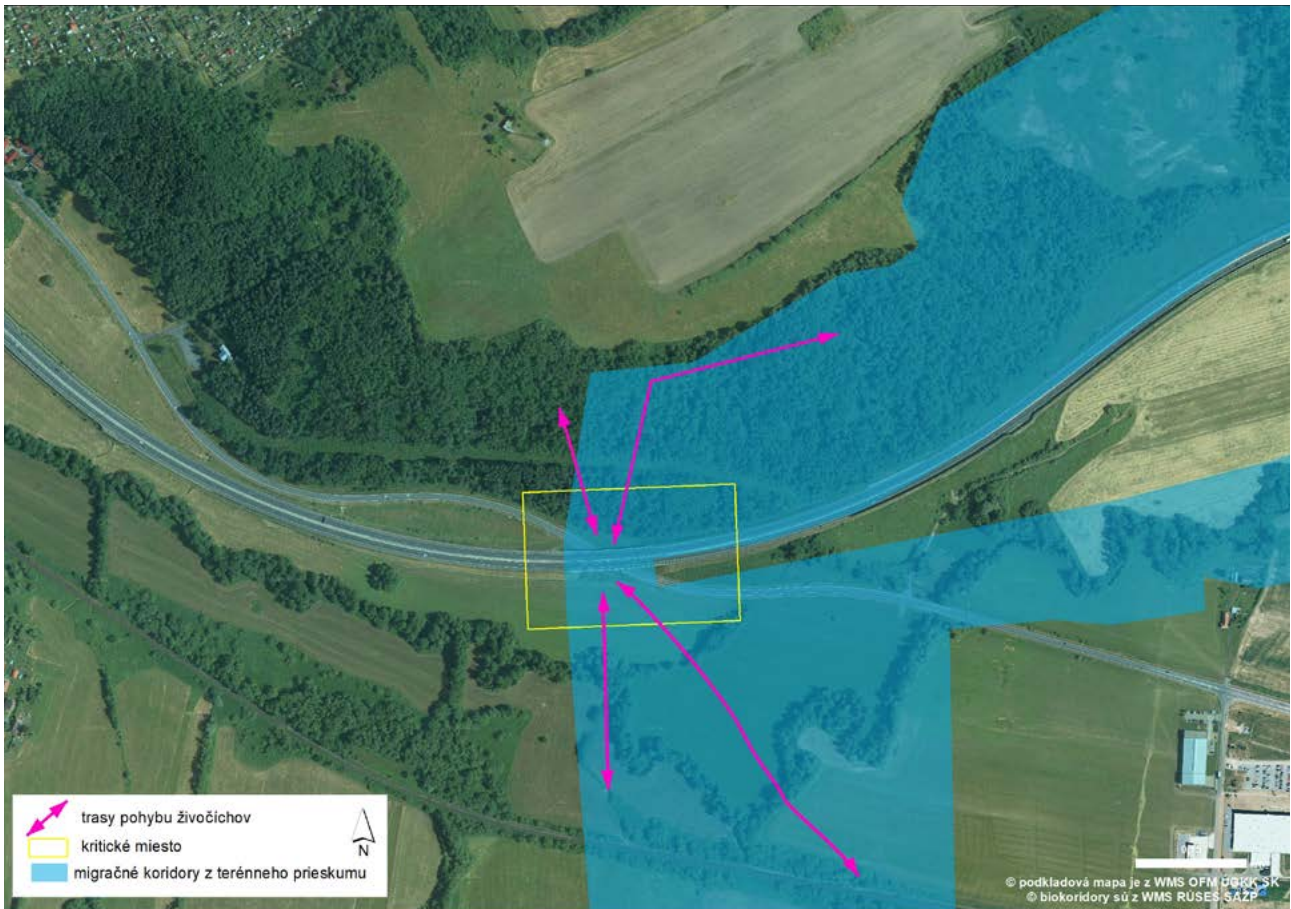


Figure 8 Map of the critical point in the section of the expressway R2 Zvolen východ - Kriváň, locality of Detva.

the narrowest point, between the solar panel fence and the R2 expressway fence, there is only 70 m of open space that allows for animal migration. However, there is a presumption that this currently open space will be built over in the future and that animal movement will be definitively prevented at this point.

Stakeholders:

Banská Bystrica Self-governing Region; City of Detva; Municipality of Stožok; Municipality Of Víglaš; Municipality of Dúbravy; Municipality of Kriváň; Municipality of Korytárky; National Motorway Company; Slovak Road Administration - Investment Construction and Road Administration - Banská Bystrica; Railways of the Slovak Republic; State Nature Conservancy of the Slovak Republic; Protected Landscape Area Poľana; Slovak Water Management Enterprise - Banská Bystrica, Upper Hron River Basin Administration Zvolen; District Office Detva - Environmental Department; Local Hunting Associations;

Police of the Slovak Republic - Traffic Inspectorate in Banská Bystrica

Identified threats to the critical site:

- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.
- » **Threat 3:** Linear transport infrastructure elements (including electric power lines) cause wildlife mortalities
- » **Threat 4:** Changes in land-use may reduce landscape permeability

Identified objectives for the critical site:

- » **2.1** Safeguard the permeability of the existing transport infrastructure (including enhancement of permeability of the existing features, when possible)

- » **3.2** Direct animals towards functional underpasses
- » **3.3** Warning drivers on road-kill/accident-prone areas
- » **4.1** Enforce legislation that prevents changes of land-use towards less permeable categories (including compensatory measures targeting connectivity)

**Critical area No. 4:
section of the R2 expressway near the
village of Podrečany (currently under
construction)**

In the locality of Podrečany, part of the section

of the R2 expressway is built on bridge piers. It is the bridging of the Dúbravský potok brook, south of the confluence with the Salajka brook. The section is currently under construction and after its completion it will be approximately 400 m long, which will facilitate migration for wildlife and thus dampen their migratory pressure in the vicinity. After the completion of the R2 Mýtňa - Lovinobaňa expressway, the Podrečany site will also represent an important migration link for animals more demanding of migration objects, such as large mammals. The natural terrestrial-hydric biocorridor here represent the watercourses that continuously link both sides of the area, divided by the R2 expressway. Class I road 16 (I/16) and railway line 160 remain a risk factor in this location. In the case of the I/16 road, we expect a reduction

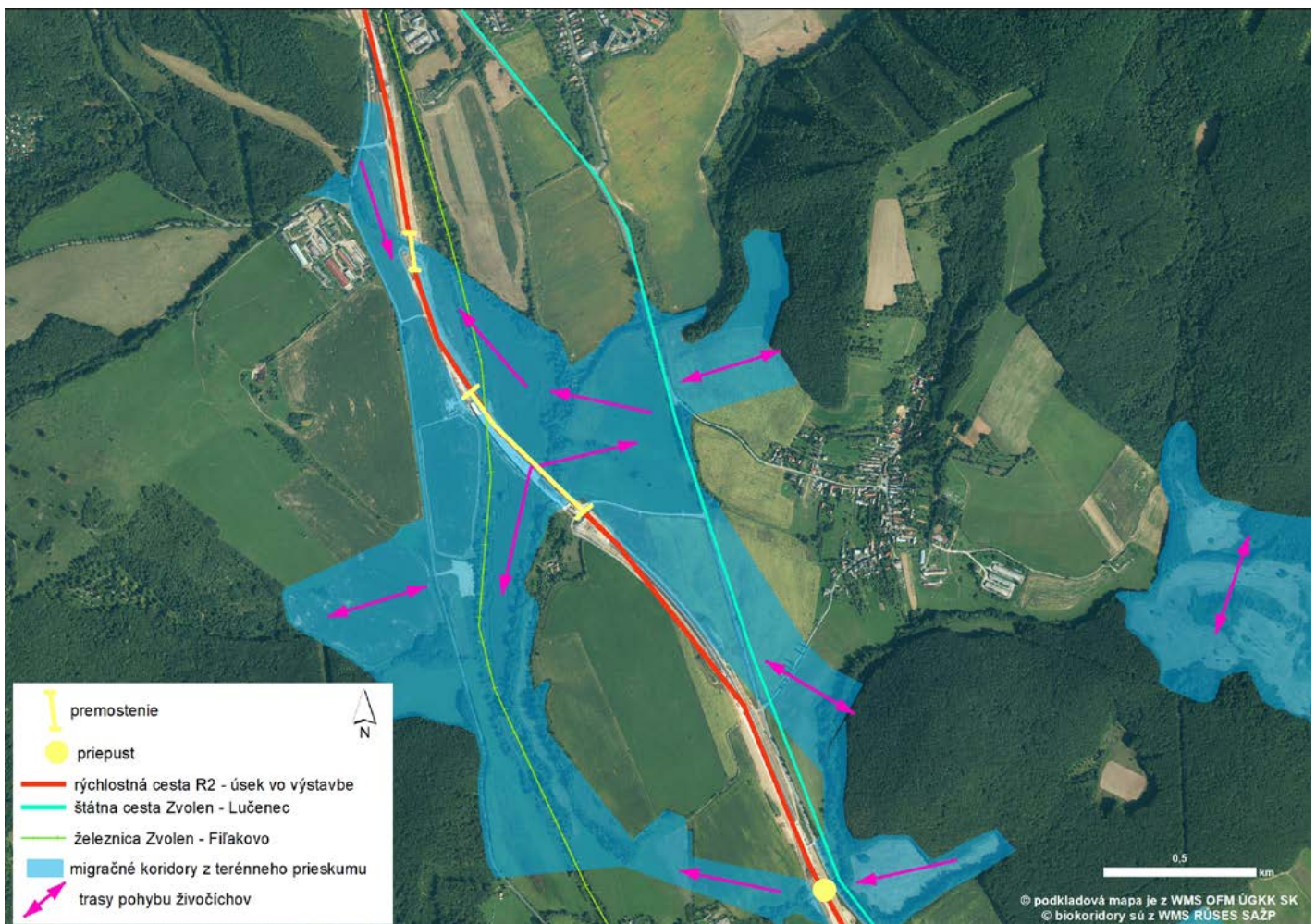


Figure 9 Map of the area of interest, locality of Podrečany.

in the traffic volume, which will shift to the R2 expressway once it has been completed.

In addition to the Dúbravský potok brook bridge, there are two other technical facilities on the R2 expressway in Podrečany that can serve to mitigate the negative impacts of the transport infrastructure:

1. Bridging of Budinský potok brook, east of Nature Reserve Ružinské jelšiny. Also, in the case of this sub-bridge, its functional use will presumably be used for migration also for those species that are more demanding of migration objects. Its width is approximately 30 m.
2. A culvert for the Uderinka stream, north of the village of Podrečany. In the case of this object, it is assumed that it will be used for species less demanding of migration objects (small to medium-sized mammals).

Proposed measures:

- » The identified bio-corridors need to be consulted with the local government concerned (municipality, Self-governing region) and their spatial protection needs to be enforced by incorporating them into spatial plans at each level. The area may be used for economic or recreational purposes, but it must not be degraded, built over or fenced off.
- » Critical points identified along the route of biocorridors need to be consulted with the affected municipality and the area/facility manager (Slovak Road Administration, Railways of the Slovak Republic and others).
- » At the crossing points of migration corridors and roads, we propose to remove tree and shrub vegetation at a distance of less than 3 m from the road, which may prevent drivers from spotting animals in the vicinity of the road in time; install vertical warning signs "Beware of wildlife!", warning drivers of the risk of collision with wildlife; and reduce the maximum permissible speed to 70 km/h.
- » In case of modernising the transport infrastructure in the place of its intersection

with the biocorridor, it is necessary to preserve its lateral passability for wildlife (no fences, noise barriers, or creating steep slopes of drainage canals, etc.).

Critical sites identified in the critical area (Podrečany site):

1. Crossing of the biocorridor with the I/16 road, south of the village Lovinobaňa - Uderiná. Especially critical is the 2 km long stretch from the forest stand, which forms a natural biocorridor and serves as a guiding element along the Salajka stream (48.4265397N, 19.5977644E), to the forest stand in the place of the Uderinka stream bridge (48.4093350N, 19.6084075E).
2. Crossing of the biocorridor with the railway line No. 160. Especially critical is the section from the bridging of the Krivánsky potok brook (48.4228761N, 19.5909150E) to the village of Podrečany (48.4080900N, 19.5978675E).
3. Crossing of the biocorridor, railway line No. 160 and class III road No. 2664 between the villages of Lovinobaňa and Podrečany. Especially critical is the section from the forest stand (48.4198486N, 19.5887650E), to the village of Podrečany (48.4092794N, 19.5933528E) (Figure 12).

Stakeholders:

Banská Bystrica Self-governing Region; City of Lučenec; Municipality of Lovinobaňa; Municipality of Podrečany; National Motorway Company; Slovak Road Administration - Investment Construction and Road Administration - Banská Bystrica; Railways of the Slovak Republic; State Nature Conservancy of the Slovak Republic; Protected Landscape Area Cerová vrchovina; Slovak Water Management Enterprise - Banská Bystrica, Upper Hron River Basin Administration Zvolen; District Office Lučenec - Environmental Department; Local Hunting Associations; Police of the Slovak Republic - Traffic Inspectorate in Banská Bystrica

Identified threats to the critical site:

- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure

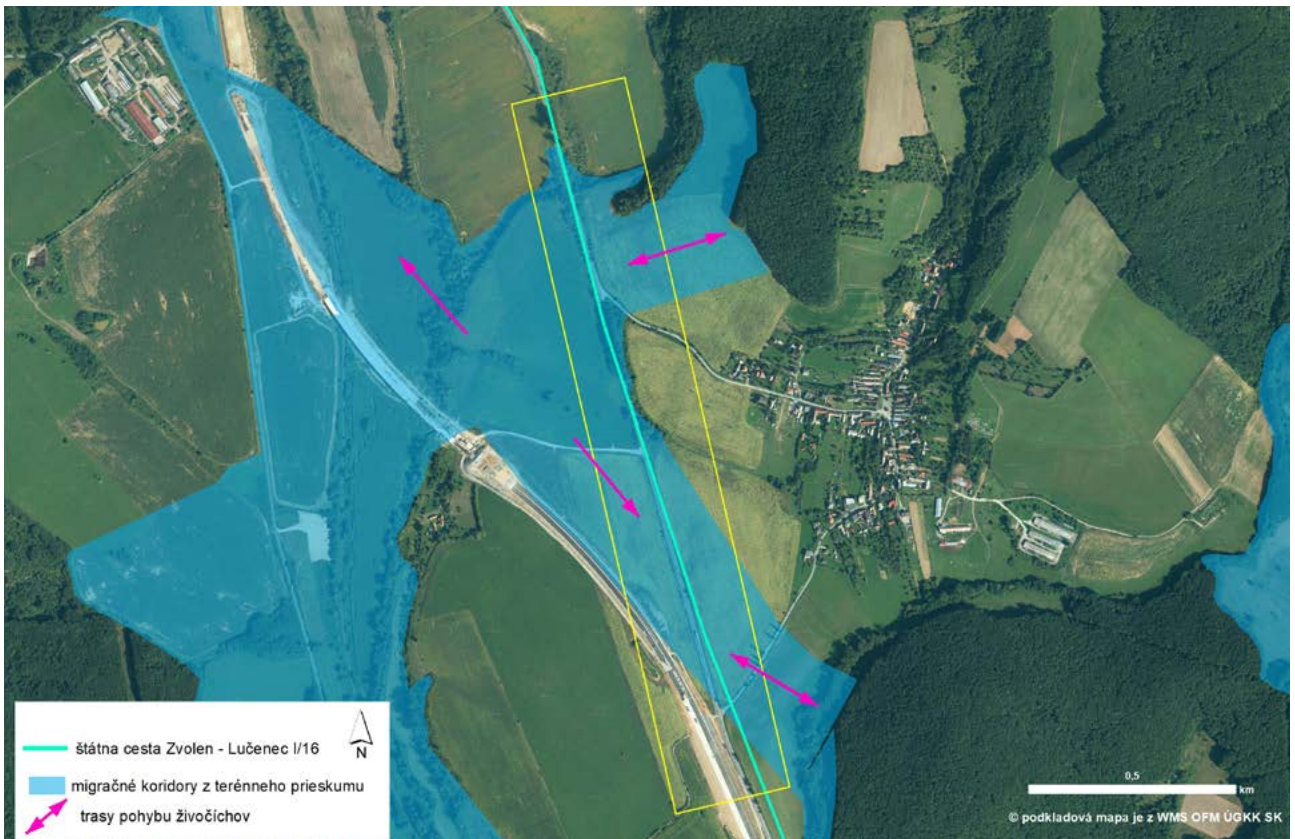


Figure 10 Critical section (yellow rectangle), crossing of the biocorridor and the I/16 road, southwest of the village of Lovinobaňa - Uderiná.

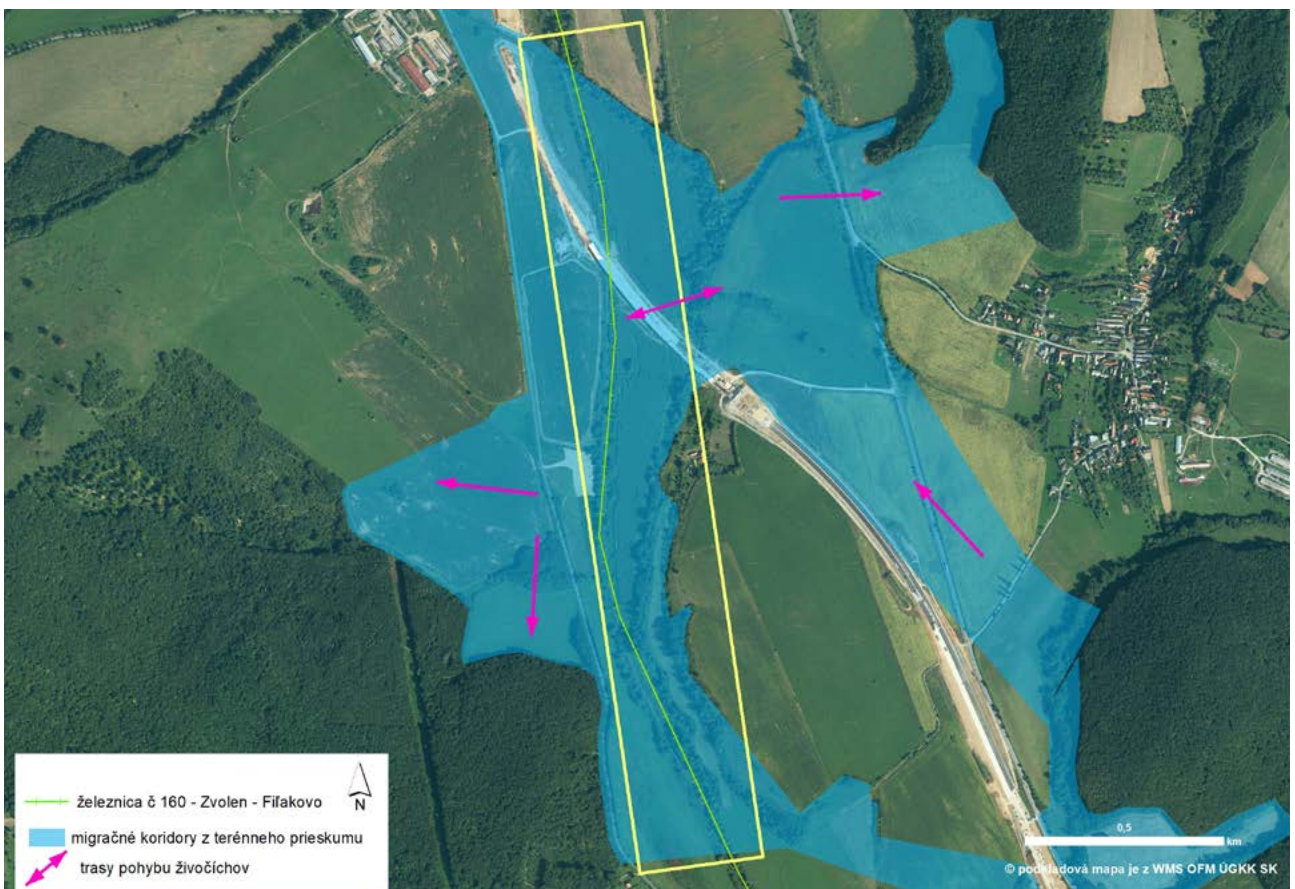


Figure 11 Critical section (yellow rectangle), crossing of the biocorridor and railway line No. 160, between the villages of Lovinobaňa and Podrečany.

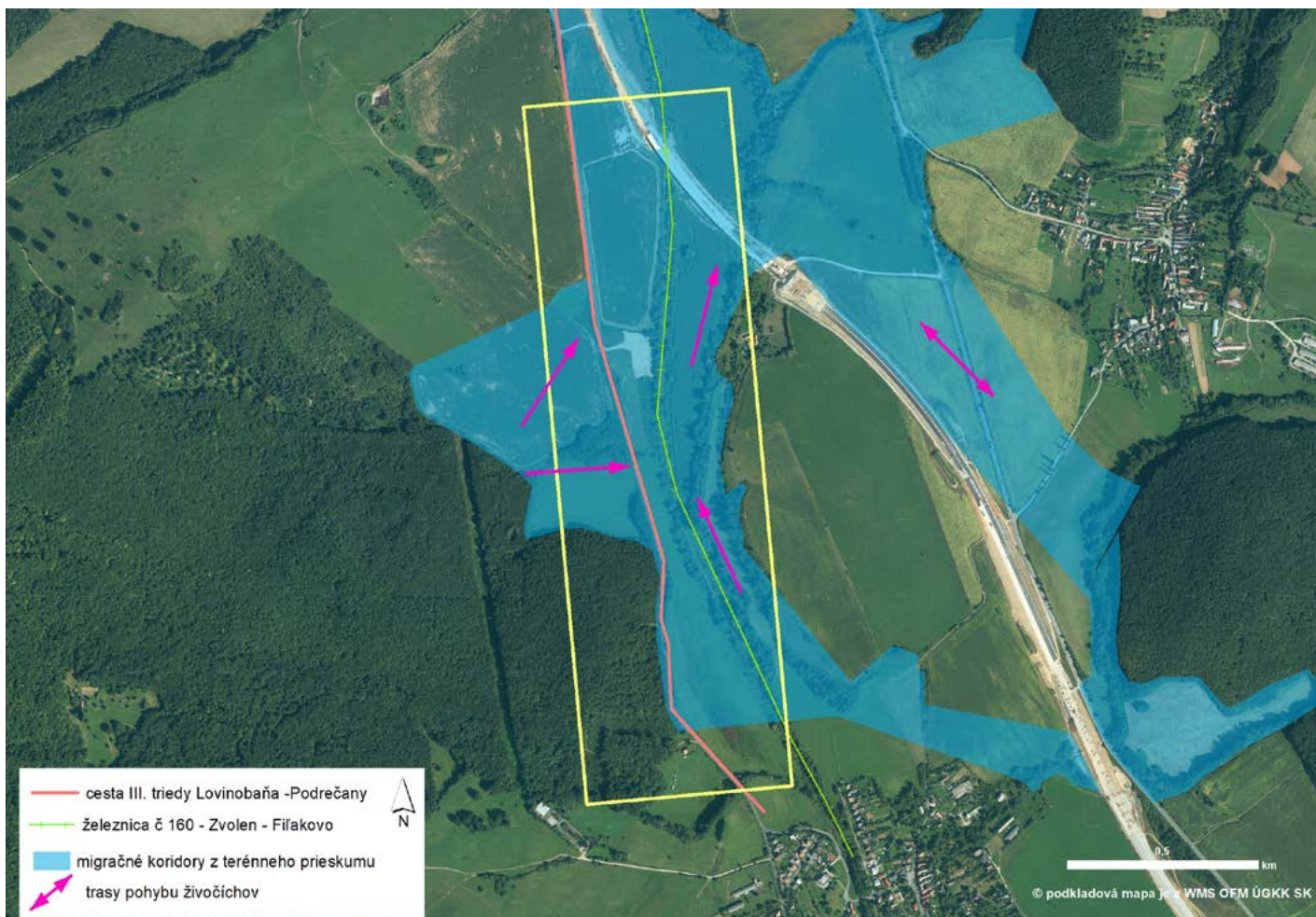


Figure 12 Critical section (yellow rectangle), crossing of the migration corridor, railway line No. 160 and class III road No. 2664 between the villages of Lovinobaňa and Podrečany.

(maintenance, upgrading without changing the category/class of the infrastructure, etc.) and on other linear features may increase the barrier effect at landscape level.

- » **Threat 3:** Linear transport infrastructures (including electric power lines) cause wildlife mortalities
- » **Threat 4:** Changes in land-use may reduce landscape permeability

Identified objectives for the critical site:

- » **2.1** Safeguard the permeability of the existing transport infrastructure (including enhancement of permeability of the existing features, when possible)
- » **3.2** Direct animals towards functional underpasses

- » **3.3** Warning drivers on road-kill/accident-prone areas
- » **4.1** Enforce legislation that prevents changes of land-use towards less permeable categories (including compensatory measures targeting connectivity)

Critical area No. 5: section of the R2 expressway near the village of Tomášovce (currently under construction):

The Tomášovce locality is important because of the planned construction of an 80 m wide green bridge over the R2 expressway. It will be situated between the villages of Tomášovce and Podrečany, south of the Halier Motel. It will form a link between the adjacent forest areas on both sides

of the R2 expressway. In the wider context, it will enable functional connectivity between the Slovenské Rudohorie Mountains and the Krupinská planina Plain and further downstream, including the south of Slovakia. It will, thus, enable the movement of animals in search of food, seasonal movements, but also in search of a mating partner or in the dispersal of juveniles. Its planned exit directly to the I/16 road on its north-western side is risky. The ideal solution to eliminate this risk would be to build a variant of the ecoduct that bridges both the I/16 and R2 roads and exits directly to the forest stand. Another risk factor remains the temporary termination of the R2 expressway in its close proximity. Until the animals learn to use the ecoduct, there is a risk of them bypassing the fencing of the R2 expressway just at the section where the R2 connects to the I/16 road. This risk could be mitigated by suitably planted guidance greenery between the woodland above Tomášovský rybník Pond and the body of the ecoduct. However, it would only fulfil its func-

tion once it has grown and been united. In the meantime, the fencing of the I/16 road should also be considered. The railway line No 160 and road III/2664, which both cross the route of the biocorridor, pose a lower risk to animal movement.

In addition to the forest complexes involved, there are a number of interacting elements in the landscape adjacent to the planned body of the ecoduct - hedges and small fragments of forest in the agricultural landscape. There are also several watercourses that act as terrestrial-hydric biocorridors. These include the Krivánsky potok brook, the Psota brook and the Točnica brook, and also their riparian vegetation. An important function will be fulfilled mainly by the forest cover adjacent to Tomášovský pond, which will be directly connected to the ecoduct body after its construction by means of the guiding greenery. All these elements will be important interaction elements of the bio-corridor that will pass through the planned ecoduct body.

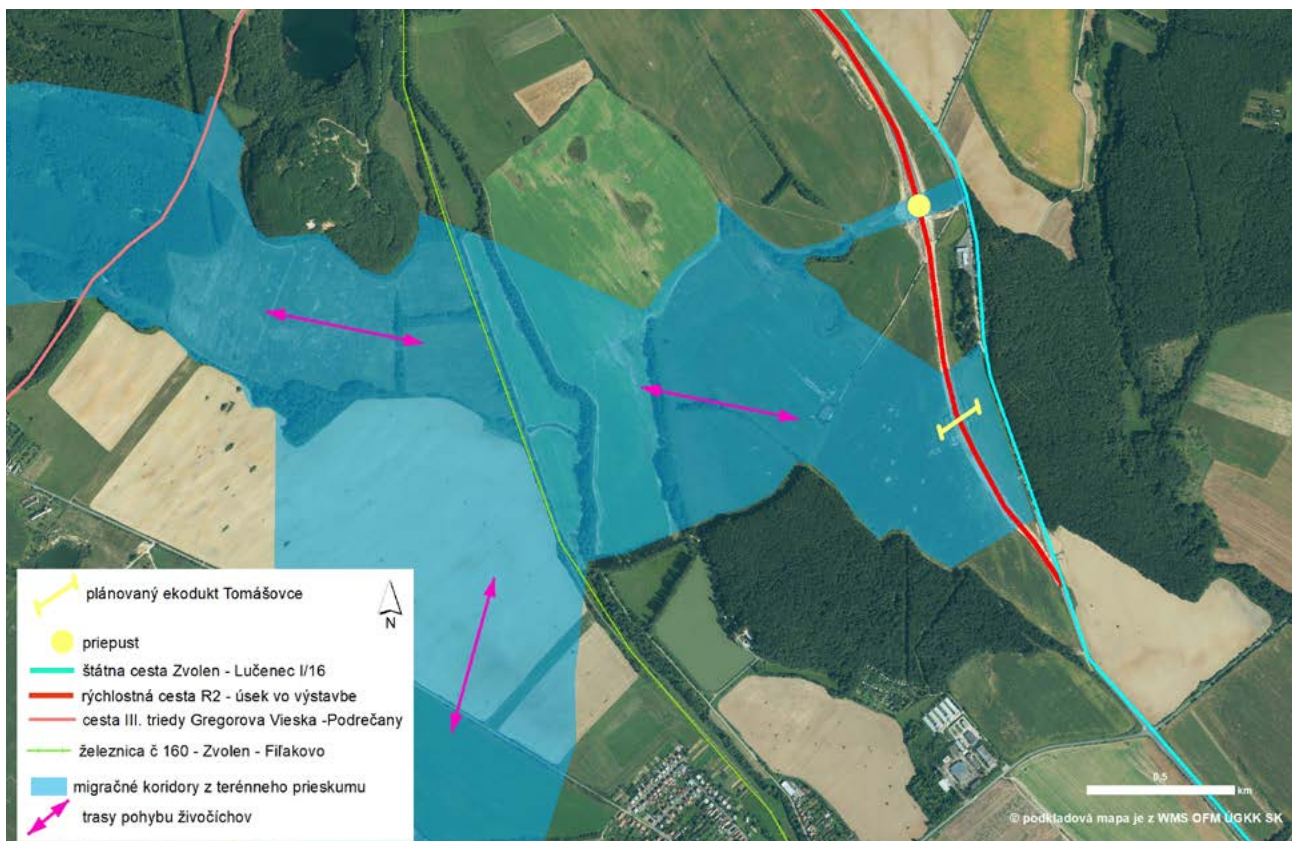


Figure 13 Map of the area of interest, locality Tomášovce with marked linear transport infrastructure, which intersects with the route of the migration corridor.

Proposed measures:

- » Construction of an ecoduct variant that bridges both the I/16 and R2 roads and leads directly to the forest stand.
- » The surface of the ecoduct is proposed to be grassed over and shrubs planted on its sides. Species selection would consider the phytocenological and typological units of the surrounding forest stands, with emphasis on provincial suitability.
- » Purchase, lease or agreement with the owners of the land required for the planting of diversionary greenery.
- » Planting of guiding greenery to the body of the ecoduct.
- » The identified biocorridors need to be consulted with the local government concerned (municipality, Self-governing region) and attempts should be made to enforce their spatial protection by incorporating them into spatial plans at each level. The area may be used for economic or recreational purposes, but it must not be degraded, built over or fenced off.
- » On the selected biocorridors it is necessary to identify critical points (bottlenecks, places threatened by linear transport infrastructure, etc.).
- » Critical points identified along the route of biocorridors need to be consulted with the affected municipality and the area/facility manager (Slovak Road Administration, Railways of the Slovak Republic, and others).
- » At the crossing points of migration corridors and roads, we propose to remove tree and shrub vegetation at a distance of less than 3 m from the road, which may prevent drivers from spotting animals in the vicinity of the road in time; install vertical warning signs "Beware of wildlife!", warning drivers of the risk of collision with wildlife; and reduce the maximum permissible speed to 70 km/h.

Stakeholders:

Banská Bystrica Self - governing Region; City of Lučenec; Municipality of Tomášovce; Municipality of Podrečany; National Motorway Company; Slovak Road Administration - Investment Construction and Road Administration Banská Bystrica; Railways of the Slovak Republic; State Nature Conservancy of the Slovak Republic; Protected Landscape Area Cerová vrchovina; Slovak Water Management Enterprise - Banská Bystrica, Upper Hron River Basin Administration Zvolen; District Office Lučenec - Environmental Department; Local Hunting Associations; Police of the Slovak Republic - Traffic Inspectorate Banská Bystrica

Identified threats to the critical site:

- » **Threat 1:** New Transport and other Linear Infrastructure projects may increase the barrier effect at landscape level.
- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.
- » **Threat 3:** Linear transport infrastructures (including electric power lines) cause wildlife mortalities
- » **Threat 4:** Changes in land-use may reduce landscape permeability

Identified objectives for the critical site:

- » **1.2** Maximize the functionality of overpasses (all objects)
- » **1.3** Assign a legal status and develop coherent regulations for all objects which are potential wildlife passages
- » **2.1** Safeguard the permeability of the existing transport infrastructure (including enhancement of permeability of the existing features, when possible)

- » **3.2** Direct animals towards functional underpasses
- » **3.3** Warning drivers on road-kill/accident-prone areas
- » **4.1** Enforce legislation that prevents changes of land-use towards less permeable categories (including compensatory measures targeting connectivity)

**Critical area No. 6:
Section of the constructed 1st class road I/16 DIVÍNSKY HÁJ - DOLNÉ FAFÁKY**

This section is important for the migration of large terrestrial mammals and large carnivores, as it connects the forest complexes of Ostrôžky with the forest complexes of the Revúcka vrchovina Upland. The area is crossed by the I/16

road and the railway line No. 160 Zvolen - Košice, which crosses the migration corridor along its entire length. In the area of the migration corridor, there are also forest complexes, permanent grasslands with a mosaic of non-forest woody vegetation, arable land and the bank vegetation of the Krivánsky potok brook and Vrbinský potok brook. The Krivánsky potok brook also forms the function of a terrestrial-hydric biocorridor. Although the migration corridor is currently passable, due to the existing multi-barrier effect in the form of the existing I/16 road, the R2 expressway and the railway line 160, we assess the passability of the corridor as: a migration corridor with significantly limited passability. Currently, the migration corridor is significantly affected mainly by the construction of the R2 Kriváň - Lovinobaňa - Tomášovce expressway.

Proposed measures:

- » Installation of traffic signs (speed reduction; beware of animals) on critical sections of the

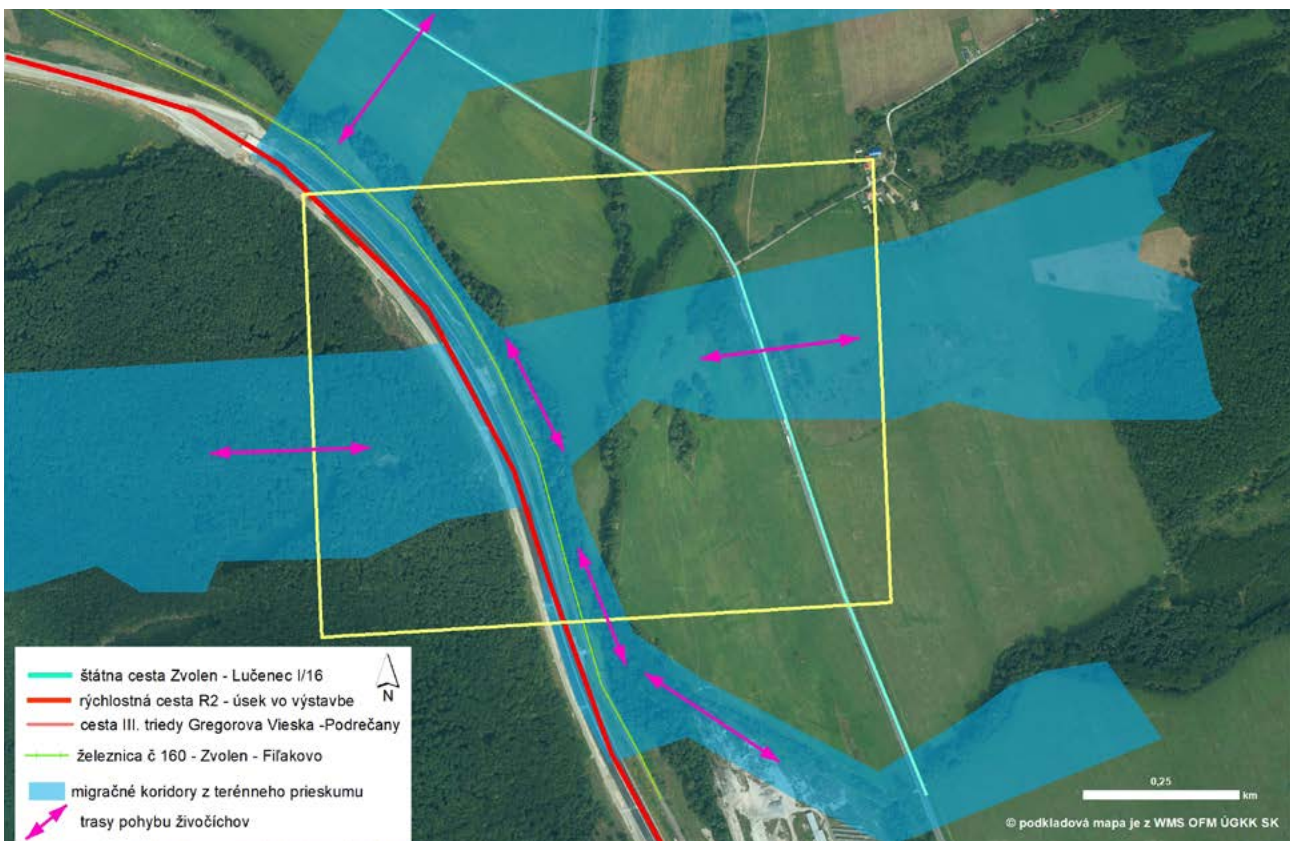


Figure 14 Critical section (yellow rectangle), crossing of the migration corridor, railway line 160, road I/16 and the section of R2 under construction between Divínsky Háj - Dolné Fafáky

I/16 class I road in the section from km 275.0 to 276.0.

- » We consider the construction of a suitable preventive measure (ecoduct, viaduct, underpass, or overpass) to be an appropriate technical solution for maintaining the passability of this section, taking into account the latest version of TPO67 and considering the results of the EIA/SEA and the appropriate assessment.
- » In the case of further planned construction and increased intensity of railway traffic, it is necessary to propose, via the railway line No. 160 Zvolen - Lučenec, a suitable technical solution enabling the movement of large terrestrial mammals.
- » The ideal solution would be to design a suitable technical solution for maintaining the passability so as to bridge both the railway line No. 160 Zvolen - Lučenec and the expressway R2.
- » From the viewpoint of preserving the passability of the landscape, it is appropriate to address the necessary fencing in the migration corridor area as well as prevent potential construction with a significantly negative impact on migration in the area. Evaluate activities and development trends in the area and exclude development tendencies with a significant negative impact on the migration of large terrestrial mammals.
- » Where appropriate, introductory greenery (e.g. planting of trees to provide food for animals) may be planted to enhance the attractiveness and functionality of the use of the migration corridor by large terrestrial mammals. Where appropriate, measures such as the creation of marshes and other water areas should be implemented.

Stakeholders:

Banská Bystrica Self-governing Region; National Motorway Company; Slovak Road Administration - Investment Construction and

Road Administration Banská Bystrica; Railways of the Slovak Republic; State Nature Conservancy of the Slovak Republic; Protected Landscape Area Cerová vrchovina; Slovak Water Management Enterprise- Banská Bystrica, Upper Hron River Basin Administration Zvolen; District Office Lučenec - Environmental Department; Local Hunting Associations; Police of the Slovak Republic - Traffic Inspectorate Banská Bystrica

Identified threats to the critical site:

- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.
- » **Threat 3:** Linear transport infrastructures (including electric power lines) cause wildlife mortalities
- » **Threat 4:** Changes in land-use may reduce landscape permeability

Identified objectives for the critical site:

- » **2.1** Safeguard the permeability of the existing transport infrastructure (including enhancement of permeability of existing features, when possible)
- » **3.2** Direct animals towards functional underpasses
- » **3.3** Warning drivers on road-kill/accident-prone areas
- » **4.1** Enforce legislation preventing changes of land-use towards less permeable categories (including compensatory measures targeting connectivity)

Critical area No. 7: Section of the built 1st class road I/75 and 3rd class road III/2644 in the section of Lučenec - Halič

The north-south oriented migration corridor is located in the cadastral territory of the

municipalities of Halič, Stará Halič and Lučenec (Lučenec district). It connects fragments of forest complexes of the Lučenec basin. The main localities are: Veľká Lipina, Panská hora, part of Tuhársky potok brook, Dolná Telka, Nad studňou and Skalica. Class I road I/75 and Class III road III/2644 pass through the area. The Tuhársky potok brook, which is a left-side tributary of the Krivánsky potok brook, also flows through it. In addition to the roads, class I road I/75 and class III road III/2644, another migratory barrier situated close to the migration corridor is the photovoltaic power plant of L'adovo. In the area of the migration corridor, there are non-forest areas, mainly arable land and to a lesser extent permanent grassland and non-forest woody vegetation. Currently, the migration corridor is functional and passable; however, due to the existing Class I road I/75 and Class III road III/2644, this

corridor is assessed as a migration corridor with moderately limited permeability. The proposed route of the future R7 expressway is a critical area.

Proposed measures:

- » Installation of traffic signs (speed reduction; beware of animals) on the I. class road I/75 in the section km 188 - 189
- » Installation of traffic signs (speed reduction, beware of animals) on the III. class road III/2644 in the section km 188 - 189
- » From the viewpoint of preserving the passability of the landscape, it is appropriate to address the necessary fencing in the migration corridor area as well as prevent potential construction with a significantly negative impact on migration in the area.

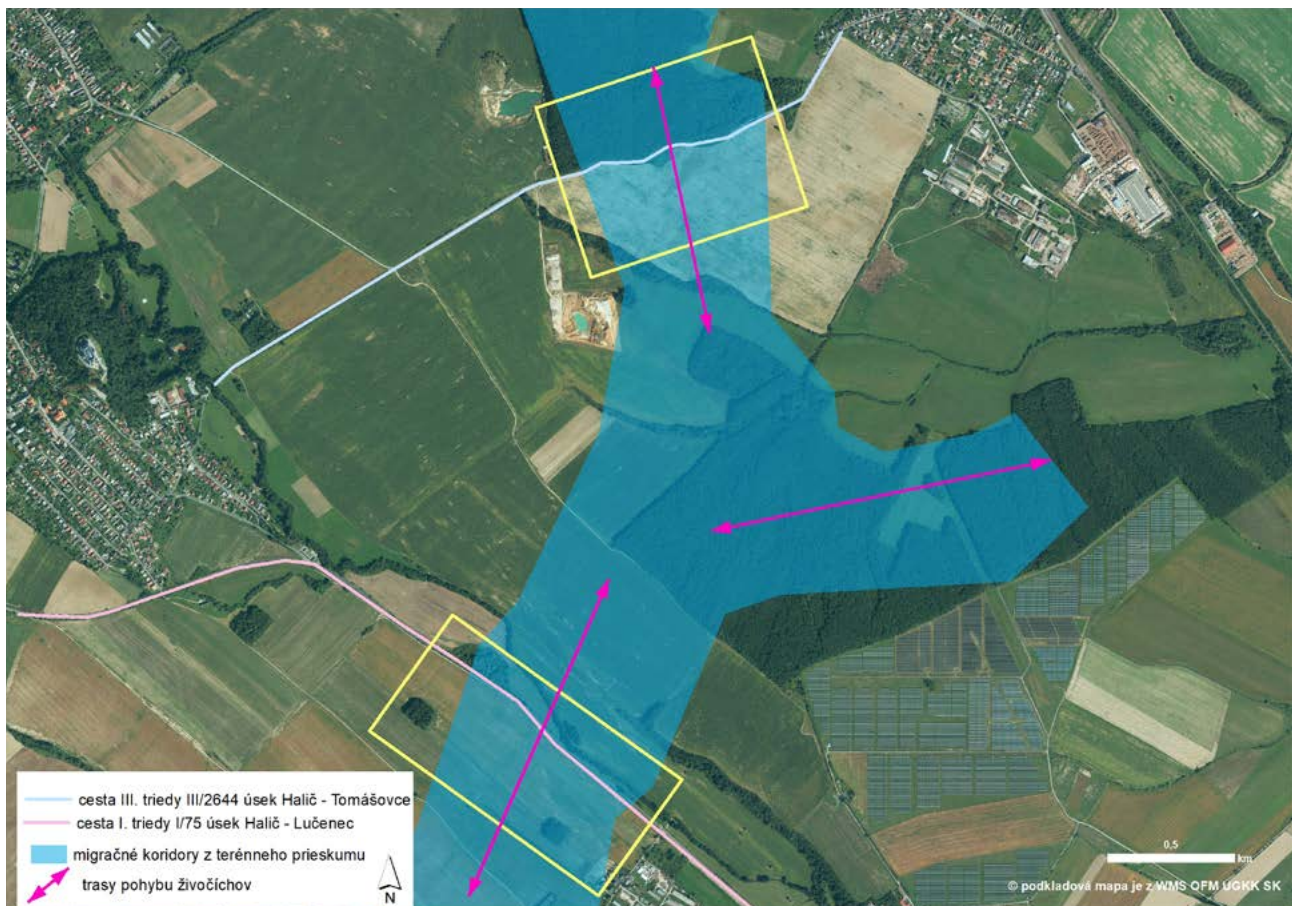


Figure 15 Critical section (yellow rectangle), crossing of the migration corridor, road I/75 and road III/2644 between the village of Halič and the town of Lučenec.

Evaluate activities and development trends in the area and exclude development tendencies with a significant negative impact on the migration of large terrestrial mammals.

- » Where appropriate, introductory greenery (e.g. planting of trees to provide food for animals) may be planted to enhance the attractiveness and functionality of the use of the migration corridor by large terrestrial mammals. Where appropriate, measures such as the creation of marshes and other water areas should be implemented.

Stakeholders:

Banská Bystrica Self-governing Region; National Motorway Company; Slovak Road Administration - Investment Construction and Road Administration Banská Bystrica; Railways of the Slovak Republic; State Nature Conservancy of the Slovak Republic; Protected Landscape Area Cerová vrchovina; Slovak Water Management Enterprise - Banská Bystrica, Upper Hron River Basin Administration Zvolen; District Office Lučenec - Environmental Department; Local Hunting Associations; Police of the Slovak Republic - Traffic Inspectorate Banská Bystrica

Identified threats to the critical site:

- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.
- » **Threat 3:** Linear transport infrastructures (including electric power lines) cause wildlife mortalities

Identified objectives for the critical site:

- » **2.1** Safeguard the permeability of the existing transport infrastructure (including enhancement of permeability of the existing features when possible)
- » **3.2** Direct animals towards functional underpasses

- » **3.3** Warning drivers on road-kill/accident-prone areas

Critical area No 8: Section of the built 2nd class road II/585, II/594 and 3rd class road III/2652 in the section of Panické Dravce - Rapovce

The north-west to south-east oriented migration corridor located in the cadastral territories of the municipalities of Mikušovce, Panické Dravce, Rapovce, Trebeľovce (Lučenec district) connects the forest complexes of the Lučenská kotlina basin with the forests of the Cerová vrchovina upland (Mučínska vrchovina upland). The area is crossed by road II/585, road II/594, road III/2652 and railway line No 161 Veľký Krtíš - Lučenec. In terms of the landscape mosaic, the migration corridor mainly comprises arable land, a mosaic of non-forest woody vegetation - often shrubs and field trees, arable land and grass-herb biotopes, tree plantations, riparian vegetation, wetlands, and the Ipel' River. At present, the migration corridor is functional and passable, but due to the existence of Class II roads II/585, II/594, Class III road III/2652 and railway line No 161, we assess the passability of the corridor as: a migration corridor with slightly limited permeability. A potential risk in the area may occur with the fencing of agricultural land that is not currently fenced. There are three rural settlements in the vicinity of the site - Panické Dravce, Rapovce, and Trebeľovce part of Muľka. In Rapovce, spa tourism is currently on the rise, which results in an increase in traffic frequency.

Proposed measures:

- » Installation of traffic signs (speed reduction; beware of animals) on the II. class road II/585 in the section km 3,7 - 4,7
- » Installation of traffic signs (speed reduction; beware of animals) on the II. class road II/594 in the section km 1,5 - 3,0
- » Installation of traffic signs (speed reduction; beware of animals) on the III. class road III/2652 in the section km 1,0 - 1,6

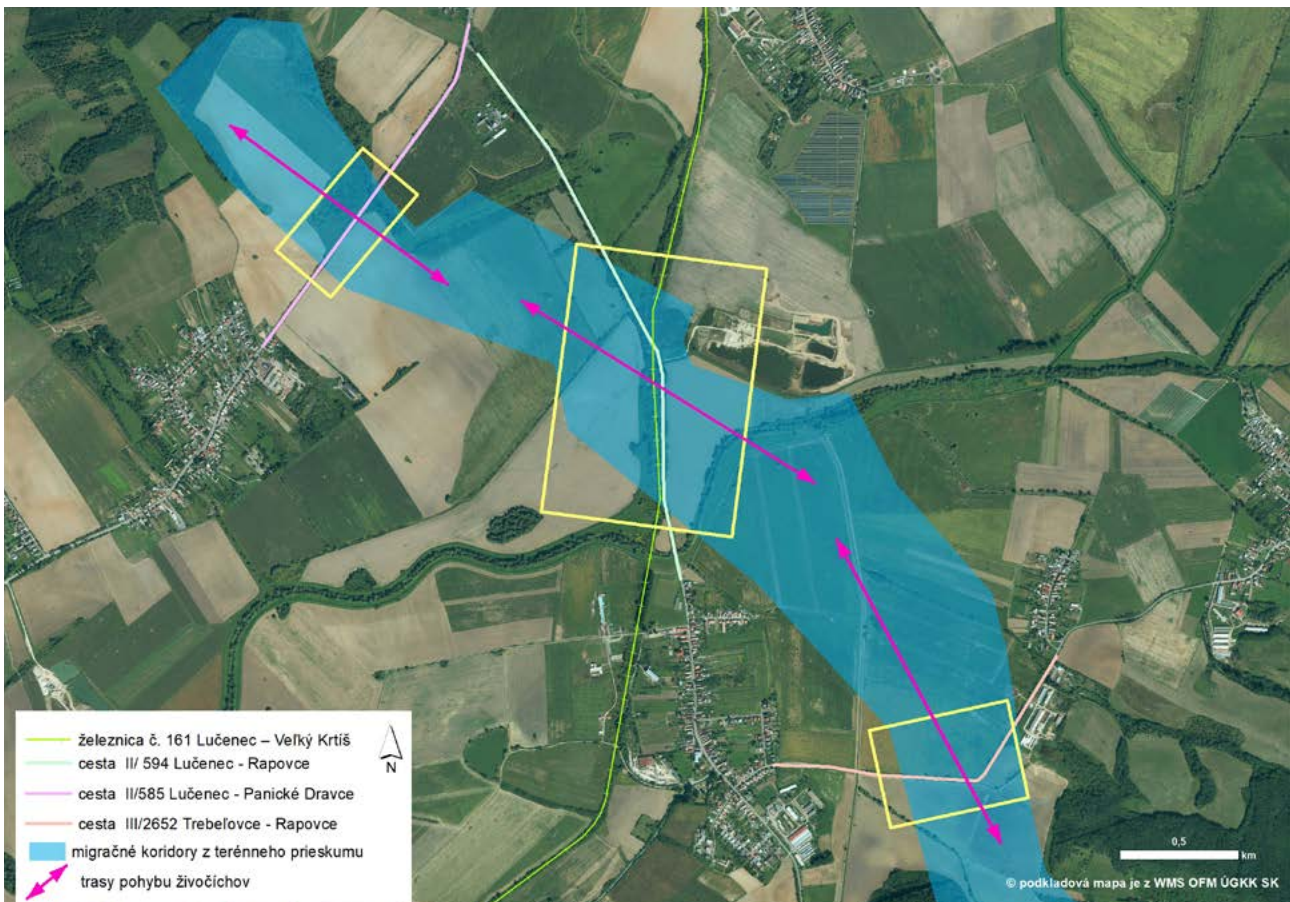


Figure 16 Critical section (yellow rectangle), crossing of the migration corridor, road II/585, road II/594, road III/2652 and railway line No 161, between the villages of Panické Dravce and Rapovce.

- » In case of renewing the line No. 161 Lučenec - Veľký Krtíš, which is currently non-functional, further construction and increase in intensity of railway transport - it is necessary to solve through the railway a suitable way to allow the movement of large terrestrial mammals - including large carnivores - to be solved together with the road II/594.
- » From the viewpoint of preserving the passability of the landscape, it is appropriate to address the necessary fencing in the migration corridor area as well as prevent potential construction with a significantly negative impact on migration in the area. Evaluate activities and development trends in the area and exclude development tendencies with a significant negative impact on the migration of large terrestrial mammals.

- » Where appropriate, introductory greenery (e.g. planting of trees to provide food for animals) may be planted to enhance the attractiveness and functionality of the use of the migration corridor by large terrestrial mammals. Where appropriate, measures such as the creation of marshes and other water areas should be implemented.

Stakeholders:

Banská Bystrica Self - governing Region; National Motorway Company; Slovak Road Administration - Investment Construction and Road Administration - Banská Bystrica; Railways of the Slovak Republic; State Nature Conservancy of the Slovak Republic; Protected Landscape Area Cerová vrchovina; Slovak Water Management Enterprise, Banská Bystrica, Upper Hron River Basin

Administration Zvolen; District Office Lučenec
- Environmental Department

Identified threats to the critical site:

- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.
- » **Threat 3:** Linear transport infrastructure elements (including electric power lines) cause wildlife mortalities

Identified objectives for the critical site:

- » **2.1** Safeguard the permeability of the existing transport infrastructure (including enhancement of permeability of existing features, when possible)
- » **3.2** Direct animals towards functional underpasses
- » **3.3** Warning drivers on road-kill/accident-prone areas

**Critical area No. 9:
Inappropriate municipal development plans - the area between Stožok and Detva - Krné**

Municipal development plans (whether or not consistent with the land-use plans) may threaten the passability of identified migration corridors, including the passability of underpasses and overpasses. In the pilot area, this threat is mainly manifested in the expansion of built-up areas of the municipalities, mainly through the construction of housing or commercial and technical facilities. However, this phenomenon can be encountered throughout the whole territory of Slovakia - change of use of agricultural land to built-up land and is accompanied by intensive fencing without leaving at least minimal free passage not only for animals but also for people.

Often the development around the existing towns and villages is so intensive that it results in 'chaining' of villages, creating a migration barrier in the landscape comparable to a fenced road or a game park. A rather significant phenomenon accompanying intensive construction on land around the villages, which was used for agriculture in the past, is the fact that the built-up area of villages comes into direct contact with forest land. Thus, animals without the buffer effect of fields and meadows penetrate into the immediate vicinity of human dwellings, which increases the likelihood of conflicts between animals and people.

We have encountered this phenomenon in several places in the pilot area; one of the most extreme cases is the area between Stožok and Detva - Krné, where the R2 expressway – the section of Zvolen East - Kriváň - was added in 2017 as a very important barrier, which interrupted an important migration corridor between the large forested areas of Rohy and Siroň. The original state road between Zvolen and Detva and the railway line Zvolen - Filakovo are also synergistic in reducing migration throughout.

As one of the few objects on the motorway usable for migration is a road bridge over an unnamed tributary of the Slatina River. This underpass is still used for migration, although probably to a very limited extent - there is no published data from the period before the construction of the motorway. However, after crossing the triple barrier (road-highway-railway), the animals encounter an area with an ever-thickening development of houses at the foot of the Siroň hill. It can be assumed that in the following years, the area will be closed by continuous development and the migration corridor will disappear.

Proposed measures:

- » Participation in the preparation of new legislation, especially the Act on Nature and Landscape Protection; the Act on Landscape Planning - by monitoring the legislative processes of the relevant ministries in the framework of inter-



Figure 17, 18, 19 GoogleEarth time series images from 2006, 2017 and 2021 document the changes in landscape structure and the gradual densification of development in the subject area.

ministerial commentary procedures to promote the introduction of the concept of a migration corridor and measures for their protection into the legislation.

- » By engaging in the EIA/SEA process when assessing plans and projects that could negatively affect the migration of animals, promote steps leading to the protection and preservation of animal migration routes - within the process of assessing the impacts of plans and projects, or within the process of appropriate assessment of their impact on the NATURA 2000 sites and species of European fauna of European importance, promote steps leading to the protection and preservation of migratory corridors.
- » Ensure protection of identified migration corridors in the spatial planning of affected

municipalities/self-governing regions - review the Detva City Master Plan and the Banská Bystrica Region Master Plan, identify conflicting areas between development plans and important migration corridors, propose changes/measures aimed at preserving and protecting migration corridors through spatial regulations.

- » Through changes in legislation, set up a system of compensation for restrictions on the use of land located in migration corridors for different groups of users.

Stakeholders:

Banská Bystrica Self-governing Region; City of Detva; Municipality Stožok; Ministry of the Environment of the Slovak Republic; The State Nature Conservancy of the Slovak Republic - Protected Landscape Area Poľana

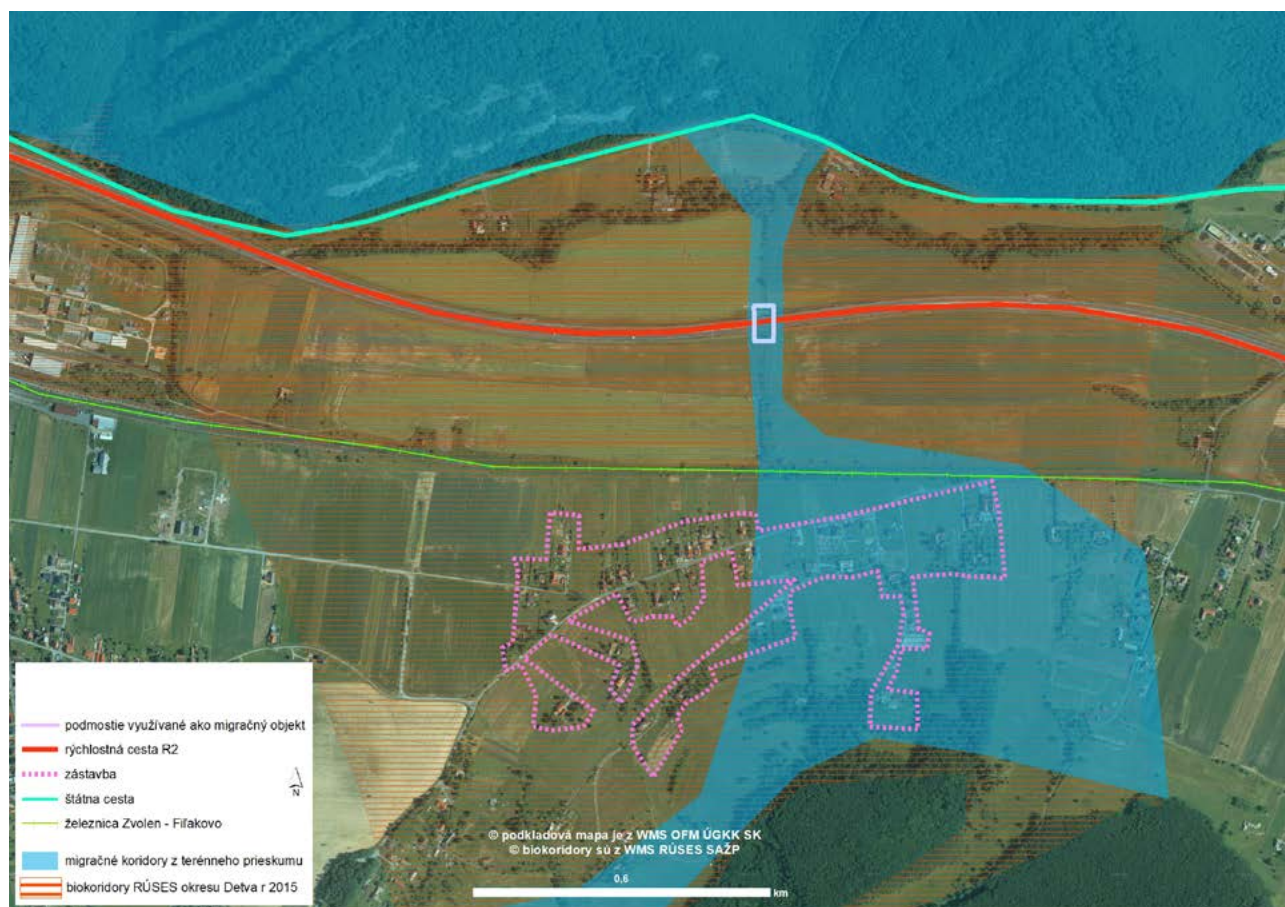


Figure 20 Map of the synergistic effect of barrier elements in connection with the densification of development between Stožok and Detva-Krné

Spatial planning appears to be the most crucial tool for the protection of landscape phenomena, elements, and structures enabling the migration of animals and/or the preservation of existing migration corridors or corridors ensuring the connectivity of the landscape, the so-called biocorridors (TSES), yet this tool is little or not at all used for this purpose, and it is possible to highlight discrepancies and even antagonisms directly in this tool. As an example, we present an extract from the proposed land-use plan of the Municipality of Stožok, where it is obvious that the regional biocorridor RBk4/7 Poľana - Rohy - Ostrôžka - Kukučkov potok brook passes through the area of the densifying development tendencies.

Despite the necessity to respect the superior zoning plan (BBSK zoning plan) and the fact that the TSES is one of the binding bases for the creation of municipal zoning plans, there is in the draft zoning plan of the municipality Stožok further densification of the area planned by individual housing construction. This situation is a clear contradiction and it will be necessary to work on the change of the zoning plan. On the following map, planning of densification of construction directly in the migration corridor but also in the wider surroundings is visible. Such construction will close off the biocorridor completely.

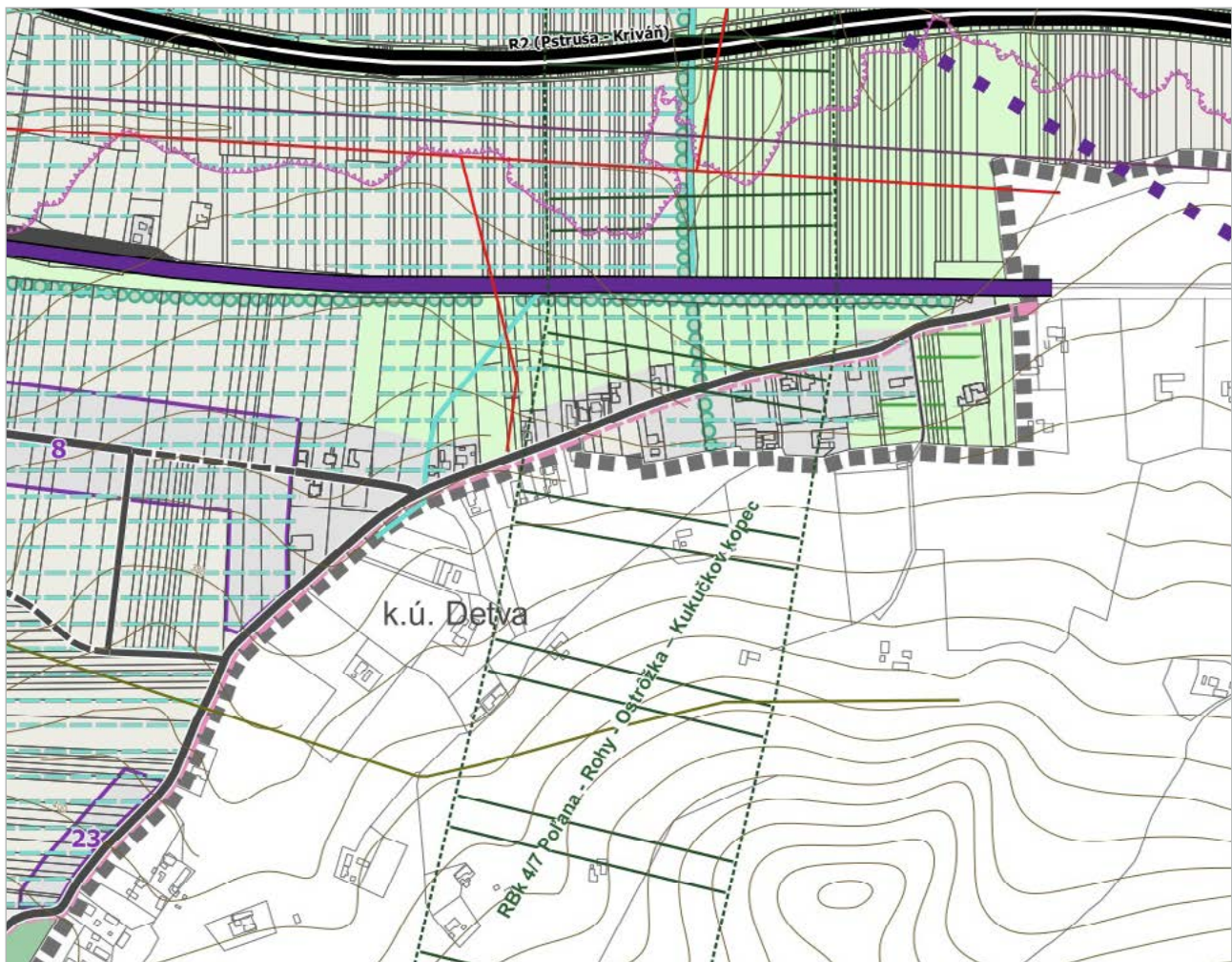


Figure 21 Map of the route of the biocorridor RBk4/7 Poľana - Rohy - Ostrôžka - Kukučkov potok brook (source: <https://www.stozok.sk/clanok/349/novy-navrh-uzemneho-planu-obce-stozok> modified)

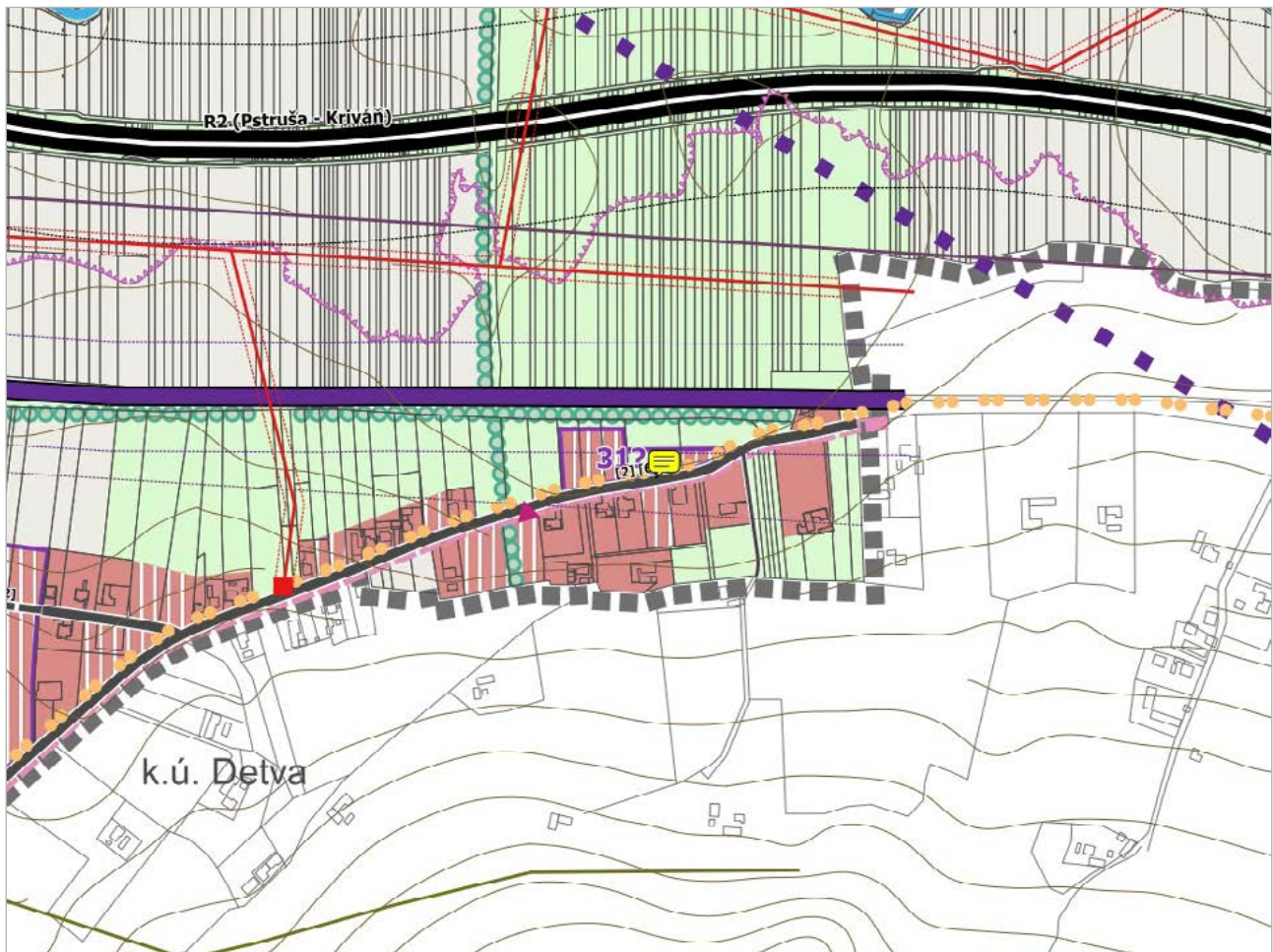


Figure 22 Map of planned densification of existing (red polygons) and proposed development (red polygons with white hatching) (Source: <https://www.stozok.sk/clanok/349/novy-navrh-uzemneho-planu-obce-stozok> modified)

The situation is similar in the next cadastre (Detva-Krné), where the area is also planned for further construction:

In the draft of the Municipality of Stožok we can find other examples of disrespecting the elements of the Regional TSES, the following pictures show the planned construction in close proximity to the Stožocký potok brook, which is also included in the draft of the municipality's master plan listed as a local biocorridor MBk1 - Stožocký potok brook and on its bank lies the local biocentre MBc 2 Jelšový porast (Alder forest). Nevertheless, both housing and sports facilities are planned within a close proximity to the stream. It is incomprehensible that the possibility of flood risk to the buildings was

not considered in the planning, which may lead to requirements for the regulation of the stream in the future.

We assume that after examining the spatial plans of municipalities and towns not only in the pilot area but in the whole of Slovakia, we would find many similar examples. Therefore, a systemic solution is needed - changes in the legislation concerning spatial planning and building regulations. The forthcoming law on landscape planning seems to be important, which could bring about the establishment of a new category of landscape element – a migration corridor, which would enable more effective protection through the setting of spatial regulations.

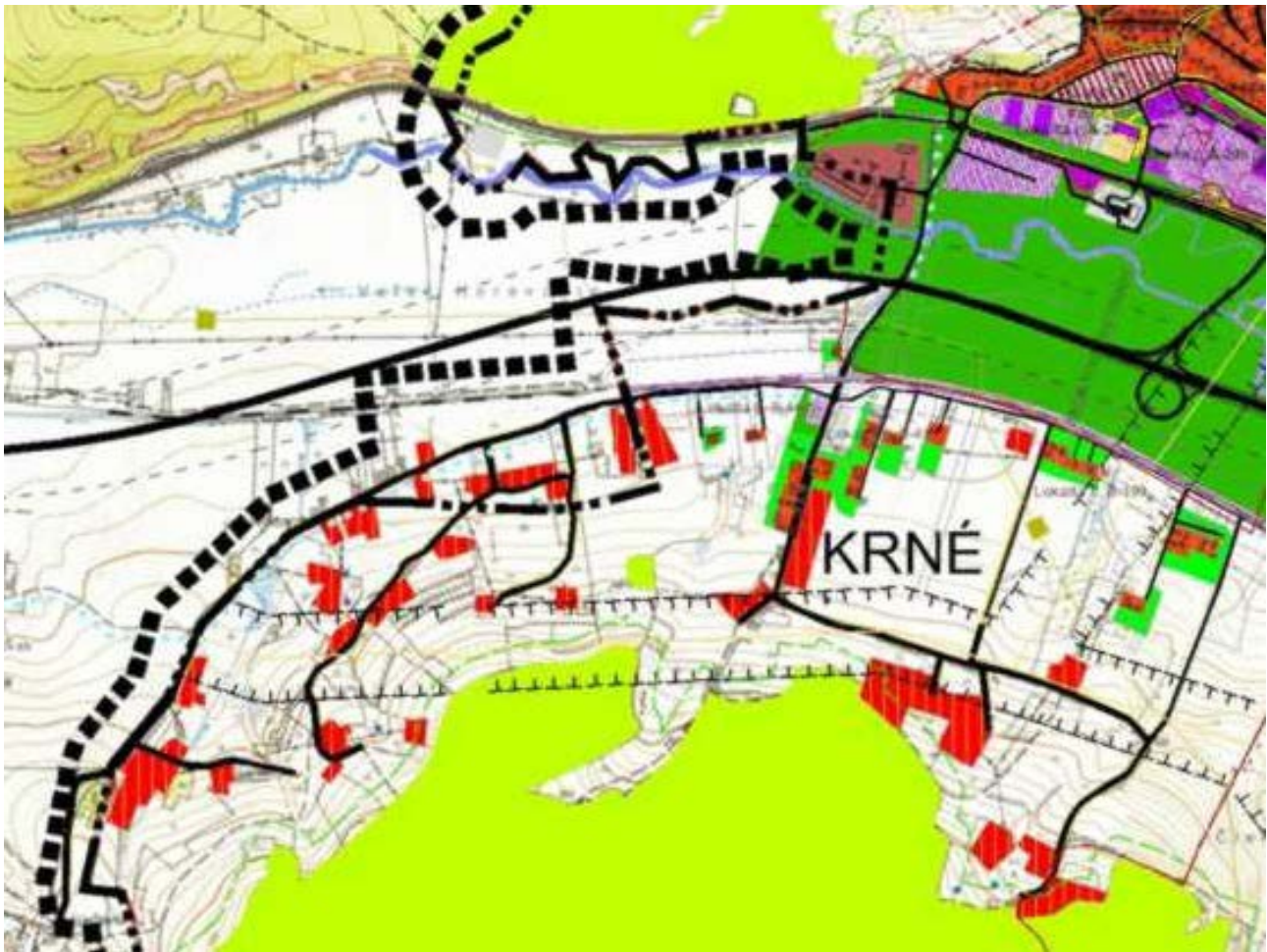


Figure 23 Map of areas allocated for residential development (red polygons), the red rectangle indicates the area in question on the boundary with the municipality. (Source: https://www.detva.sk/?id_menu=67408 modified)

Proposed measures:

- » Participation in the preparation of new legislation, especially the Act on Nature and Landscape Protection; the Act on Landscape Planning - by monitoring the legislative processes of the relevant ministries within the framework of inter-ministerial commentary procedures to promote the introduction of the concept of migration corridor and measures for their protection into the legislation.
- » By engaging in the EIA/SEA process when assessing plans and projects that could negatively affect the migration of animals, promote steps leading to the protection and conservation of animal migration routes - within the process of assessing the impacts

of plans and projects, or within the process of appropriate assessment of their impact on the NATURA 2000 sites and species of European significance, promote steps leading to the protection and conservation of migratory corridors.

- » Ensure protection of identified migration corridors in spatial planning of affected municipalities/self-governing regions - review the Detva City Master Plan and the Banská Bystrica Region Master Plan, identify conflicting areas between development plans and important migration corridors, propose changes/ measures aimed at preservation and protection of migration corridors through spatial regulations.



Figure 24 Map of the current state of the Stožocký potok brook

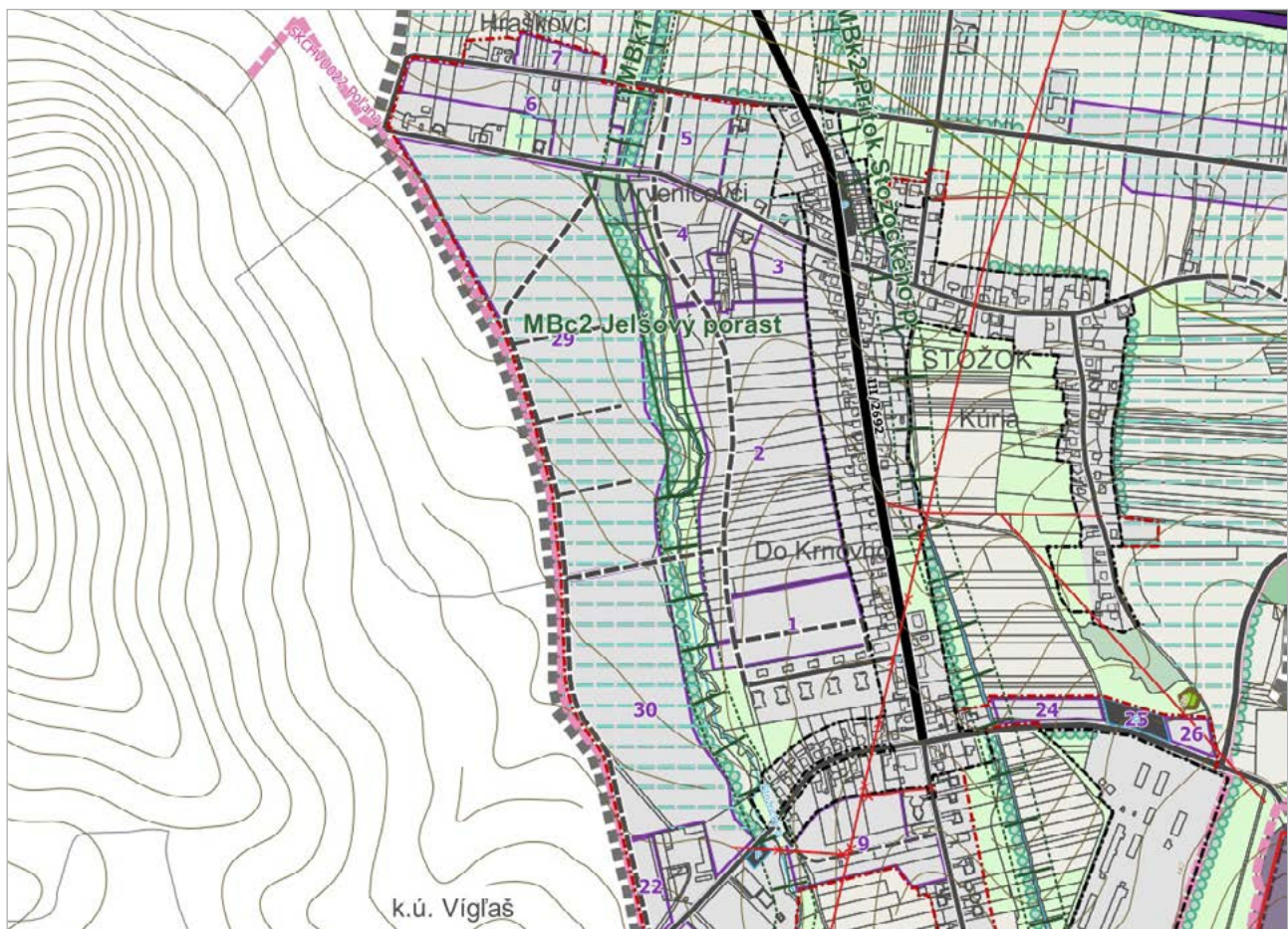


Figure 25 Map of the nature protection drawing of the draft of the Municipality of Stožok - Stožocký potok brook and surrounding vegetation are included among the elements of the TSES (source: <https://www.stozok.sk/clanok/349/novy-navrh-uzemneho-planu-obce-stozok> modified)

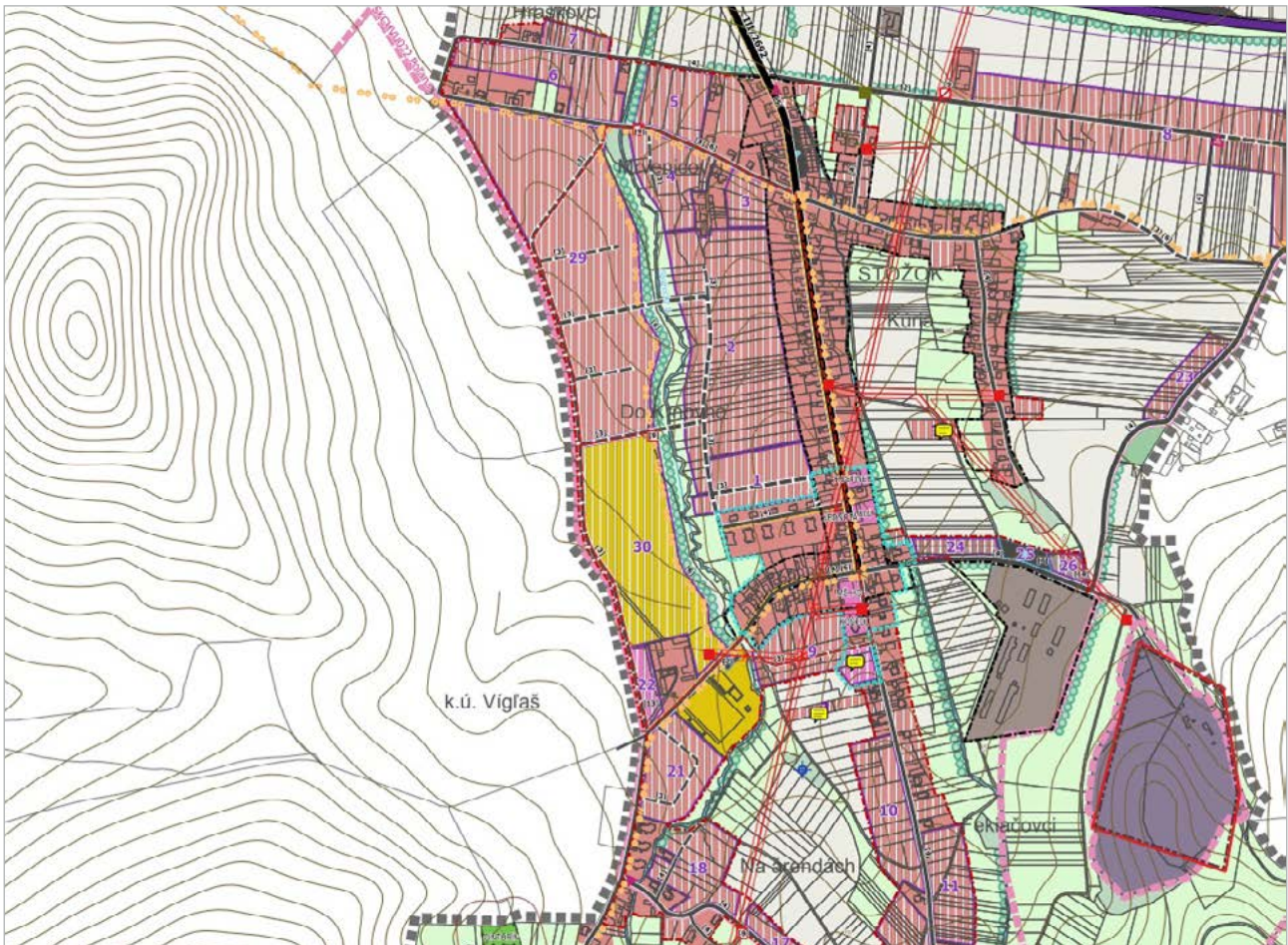


Figure 26 Map of the proposed development (red polygons with white hatching) in close proximity to the Stožocký potok brook (source: <https://www.stozok.sk/clanok/349/novy-navrh-uzemneho-planu-obce-stozok> modified)

- » Through changes in legislation, set up a system of compensation for restrictions on the use of land located in migration corridors for different groups of users.

Stakeholders:

Banska Bystrica self - governing Region; City of Detva; Municipality Stožok; Ministry of the Environment of the Slovak Republic; The State Nature Conservancy of the Slovak Republic - Protected Landscape Area Poľana

Identified threat to the critical site:

- » **Threat 4:** Changes in land-use may reduce landscape permeability

Identified objectives for the critical site:

- » **4.1** Enforce legislation preventing changes of land-use towards less permeable categories (including compensatory measures targeting connectivity)

**Critical area 10:
Extensive fencing of agricultural land**

Fencing of large areas has been a phenomenon in Slovakia in the last decades, which significantly reduces the possibility of free movement in the landscape not only for wildlife but also for humans.

Within the field survey we recorded several fenced sites in the pilot area, which directly affected the identified and survey-confirmed migration routes. In several cases, monitoring was almost impossible due to fencing.

One of the locations where the impact of fencing on the use of migration corridors by animals is significantly clear and the synergy between the absence of targeted measures to ensure the migratory passage of R2 Zvolen - Kriváň and fencing of agricultural and other

land is manifested in a significant limitation of the usability of the migratory potential of the sub-bridge near the village Víglaš - Pstruša. The bridge was built on R2 to span the Slatina River and, given the parameters of the viaduct, and could be used by animals for smooth passage. A significant migration corridor has been mapped in the area in the direction of the Slatina River NW - SE with a significant connection in the direction of Javorie to the south.

This southern branch of the migration corridor is practically interrupted by the fencing of large plots of land in conjunction with significant development (solar power plants and other technical objects). If the fences on agricultural land were removed, southward migration would again be enabled.

The same problem has also been identified around critical sections near the villages:

- » Veľká nad Ipľom
- » Panické Dravce
- » Rapovce
- » Gregorova Vieska
- » Halič
- » Tomášovce
- » Podrečany

Proposed measures:

- » Identify and approach the owners/ occupiers of the land in question with a

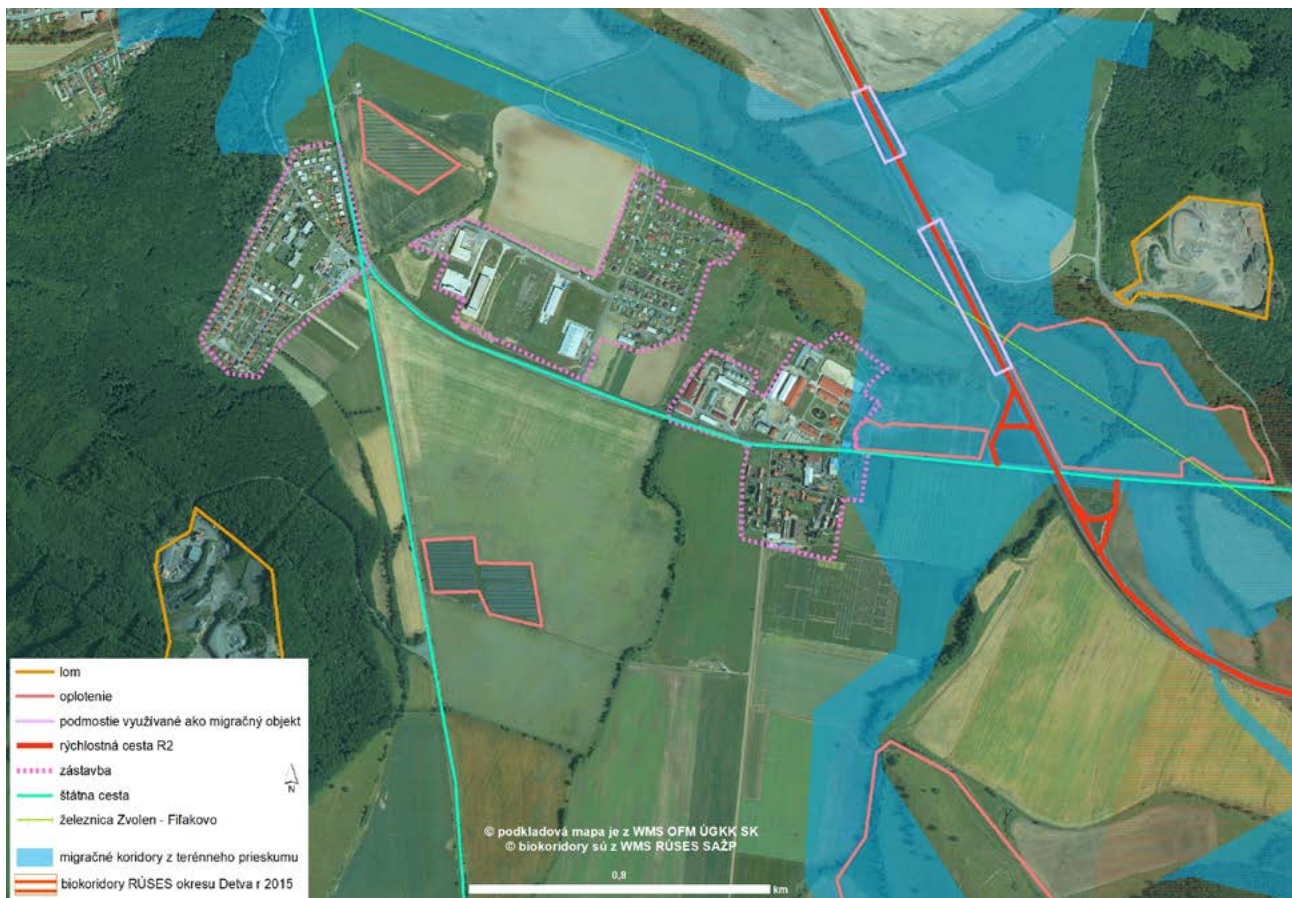


Figure 27 Map of the cumulative impact of fencing on the disruption of the migration corridor near the village of Pstruša.



Figure 28 Example of fencing of agricultural land near Velké Dálovce

proposal to modify/remove the fencing.

- » Prepare a guide/information for land users on the issue of extensive fencing and animal migration.
- » Approach the Agricultural Payment Agency with a proposal to modify the subsidy conditions in order to regulate fencing.
- » Approach insurance companies with a proposal to modify insurance terms and conditions to regulate fencing.
- » Develop a proposal for a set of measures aimed at improving/maintaining the migration potential on agricultural land. The main activities supported are: building a varied mosaic agricultural landscape with plenty of linear and insular non-forest scrub vegetation and the use of agroforestry land

management systems with a minimum area of fenced land.

Stakeholders:

users/owners of the land concerned; Ministry of Agriculture and Rural Development of the Slovak Republic; Agricultural Payment Agency; municipalities concerned; insurance companies; The State Nature Conservancy of the Slovak Republic - Protected Landscape Area Poľana; the National Forest Centre

Identified threat to the critical site:

- » **Threat 5a:** Changes in land management - fencing - may reduce landscape permeability

Identified objective for the critical site:

- » **5a.1** Fencing regulations and promoting non-fenced areas

2. Small terrestrial species associated with non-forest habitats

(*Phengaris teleius*, *Lycaena dispar*)

Critical area No. 11: Meadow vegetation in the vicinity of the river Slatina on the section Hřiňová - Vígláš-Pstruša

In the northern part of the area of interest, the Slatina River not only represents its main hydrological axis, but also, with the accompanying vegetation - riparian vegetation and herbaceous ecotones formed by tall hygrophilous flowering herb species - it means the main pathway for the dispersal of hygrophilous species tied to non-forest biotopes. In the immediate vicinity of the Slatina and its

tributaries, there are several suitable sites where we recorded Scarce Large Blue (*Phengaris/Maculinea teleius*), or at least its food plant - Great Burnet (*Sanguisorba officinalis*) in 2021 and 2022. These sites are linked by the Slatina and its tributaries. It can be said that all sites in the southern foothills of the Polana Mountains gravitate towards the Slatina valley: sites around Hřiňová, Hřiňovské Lazy, Detva and its parts Nemecká, Skliarovo, Kostolná, Dúbravy and its parts of Íviny, Hradná, etc., as well as sites in the northern part of the Ostrůžky Mts.: Detva-Piešť, Stožok, Kriváň. The most numerous populations of Scarce Large Blue were found at sites near Hřiňová, Dúbravy - part of Íviny (Za Stožkom, Močilný vrch), Dúbravy-Hradná (Hradné meadows) and Detva-Kostolná.

The best quality-source localities of the species in the Novohrad project area as a whole are located mainly in the basin of the Dúbravský potok brook, which is a tributary of the Slatina River. However, river Slatina provides a connection between sites with large populations of the species in the north of the

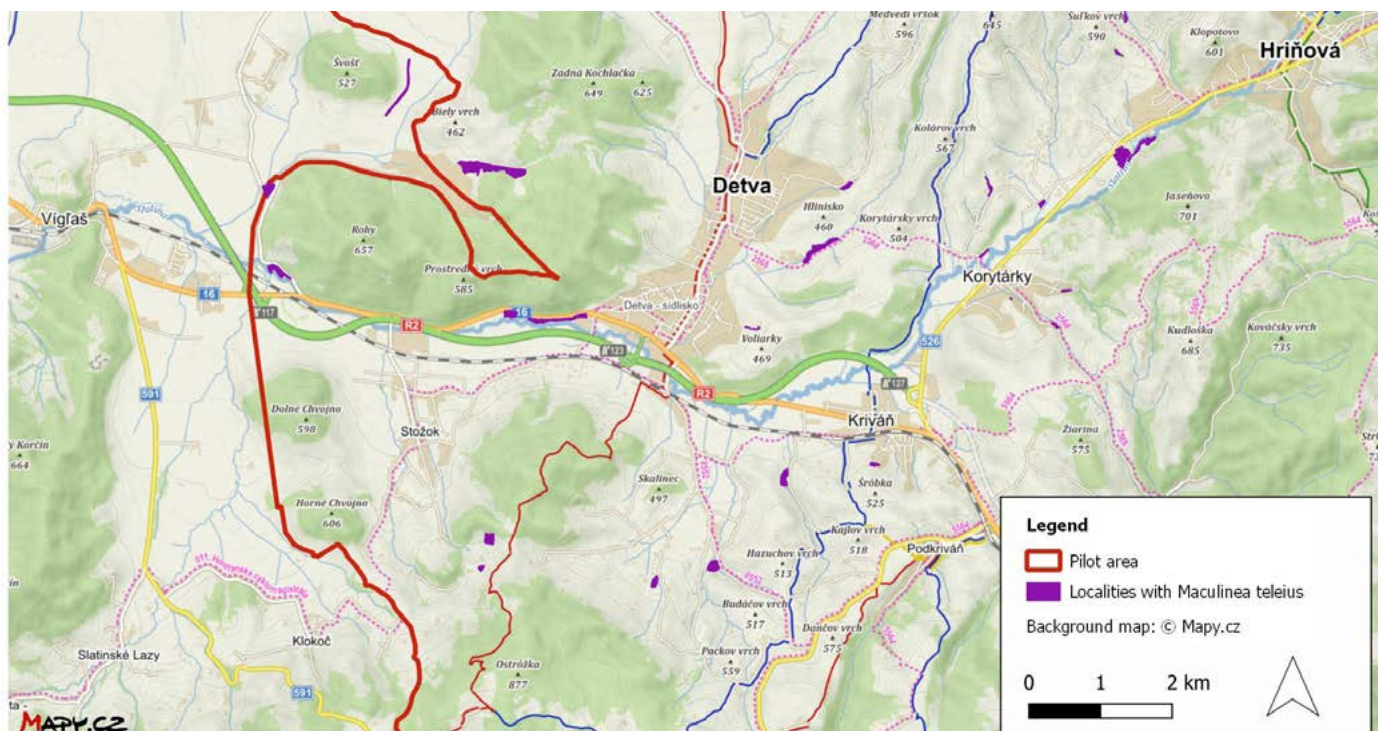


Figure 29 Section of the Slatina River between Hřiňová and Vígláš with mapped localities of Bluethroat (purple polygons) in the basin of the Dúbravský potok brook and the northern part of Ostrůžky Mts. (in the South).

area of interest with lower quality sites in the south (in the northern part of Ostrôžky Mts.) and probably with other sites in other parts of the Slatina catchment and other catchments (e.g. in the catchment of the Krivánsky potok brook). The permeability of the Slatina river as a ecological corridor for non-forest animal species, represented in this case by the Scarce Large Blue, is therefore crucial from a supra-regional perspective. However, this is not only threatened by various construction projects and the taking of natural non-forest habitats for buildings of various kinds, but also by the change (intensification) of agricultural land use.

From this viewpoint, the section of the Slatina river between Detva and Víglaš-Pstruša seems to be critical. Here the Slatina runs in close vicinity with the R2 expressway and the I/16 road. While on the right (northern) bank of the Slatina the stream is neighboured to areas of mown meadows, the southern bank is

mainly adjacent to areas of arable land and the wetland vegetation is only formed by a narrow ecotone of the bankside galleries of trees and shrubs, or along the vegetation in the road ditch by the I/16 road. From the connectivity viewpoint, it is, thus, important to preserve the continuous meadow vegetation on the right bank of the Slatina (see purple polygons), where individuals of Great Burnet (a food plant to Scarce Large Blue) as well as other tall flowering herb are also abundant. However, individuals of Scarce Large Blue have been recorded here only individually, which may be a consequence of inappropriate management of the meadow stands. In fact, the meadows are apparently mowed by machine, in a single date, which causes unification of the surface (alignment of terrain irregularities, including possible anthills) and in combination with inappropriate mowing date this limits the reproduction (survival) of the species at these sites. In addition to inappropriate management, the fragmentation

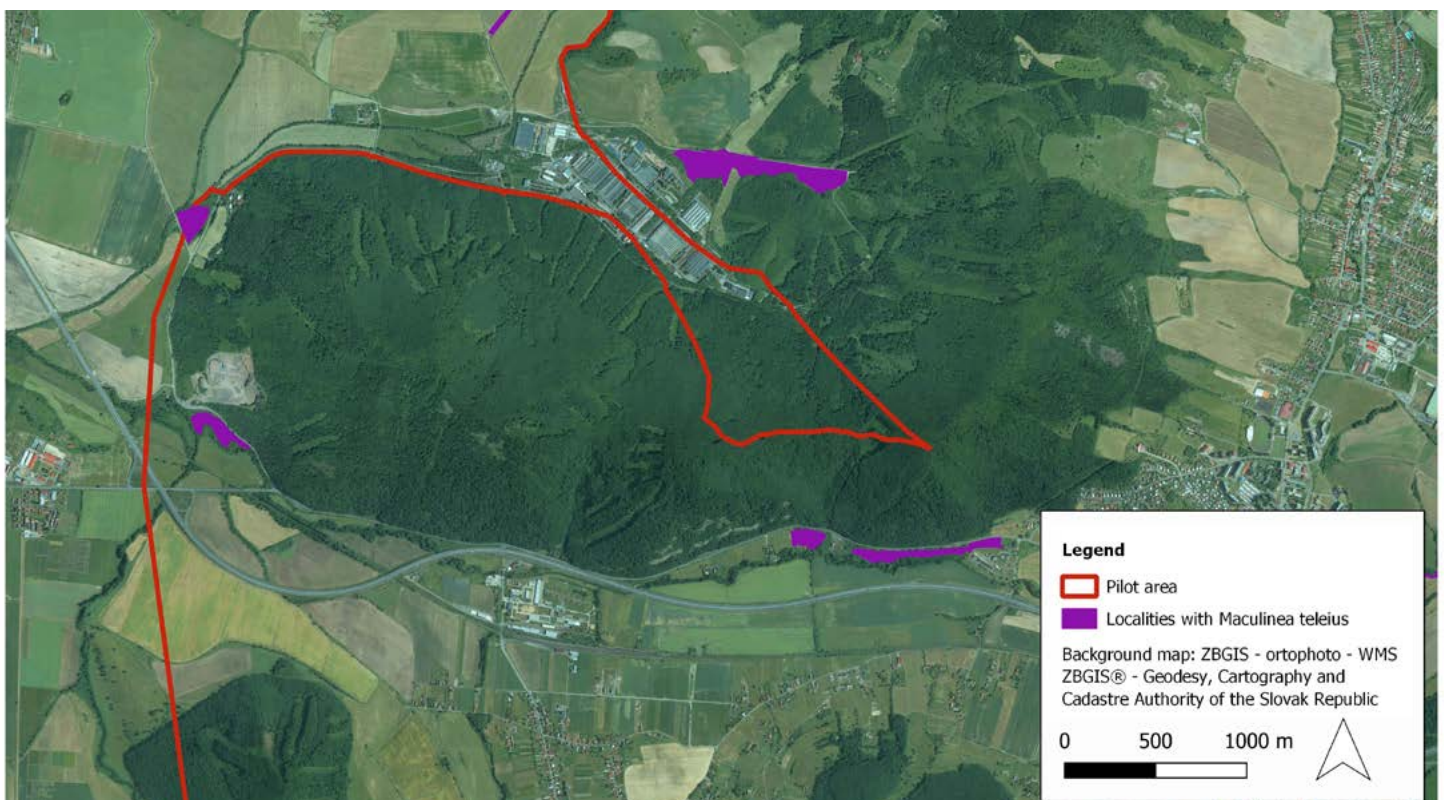


Figure 30 The Slatina River between Detva and Víglaš-Pstruša. Grasslands is located on the right (northern) bank of the Slatina, while the southern bank is mainly adjacent to arable land and the wetland vegetation is only here formed by a narrow herbaceous fringe of the bankside woody vegetation.

of these biotopes by development (Waste Water Treatment Plants, individual housing, etc.) is gradually occurring.

Optimal management would include maintaining mowed meadows in their current extent and setting up mosaic mowing, or at least shifting the mowing date in parts of the areas with suitable conditions for the Scarce Large Blue. If such a scenario is not possible due to spatial development, the minimum solution must be to maintain at least a few meters wide stripe of herbaceous ecotone along the banks of the Slatina as well as the herbaceous stripe along the I/16 road, and possibly also the R2 expressway.

The optimum date for mowing of grassland and herbaceous ecotones is (with regard to the bionomics of *Maculinea teleius* and *Lycaena dispar*) to carry out mowing by 20 May or after 15 August, with the possibility of mosaic mowing or omitting mowing on part of the sites. All other options concerning the extent of grasslands or the adjustment of mowing dates should be considered as partial (suboptimal) solutions.

Stakeholders:

Banská Bystrica Self-governing Region; City of Detva; City of Hriňová; Municipality of Korytárky; Municipality of Kriváň; Municipality of Stožok; Municipality of Víglaš; Slovak Road Administration - Investment Construction and Road Administration Banská Bystrica; National Motorway Company; Slovak Water Management Enterprise - Banská Bystrica, Upper Hron River Basin Administration Zvolen; The Ministry of Environment of the Slovak Republic; The State Nature Conservancy of the Slovak Republic - Protected Landscape Area Poľana

Identified threats to the critical site:

- » **Threat 1:** New Transport and other Linear Infrastructure projects may increase the barrier effect at landscape level.
- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading

without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

- » **Threat 4:** Changes in land-use may reduce landscape permeability
- » **Threat 5b:** Changes in land management - crop cultivation/natural vegetation management - may reduce landscape permeability

Identified objectives for the critical site:

- » **1.1** Maximize the functionality of underpasses (all objects)
- » **1.4** Increase permeability of embankments
- » **2.2** Safeguard the transversal permeability of river banks (including enhancement of permeability of the existing features, when possible)
- » **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)
- » **4.2** Facilitate/support changes of land-use toward more permeable categories, i.e. through agricultural payments
- » **5b.1** Prevent large-scale monocultures and/or facilitate & support mosaic cultivation
- » **5b.2** Support adequate management of natural features & marginal habitats

Critical area No 12: Krivánsky potok brook in the section of Podkriváň - Lovinobaňa-Uderiná

The Krivánsky potok brook represents the main hydraulic corridor in the pilot area of Novohrad in the north-south direction. As indicated by the results of field monitoring, its floodplain also represents an important corridor for wetland species associated with

permanent grasslands, such as the project's model species - the *Phengaris/Maculinea teleius* and *Lycaena dispar* butterflies.

The Krivánsky potok brook springs in the Ostrôžky Mountains, in the vicinity of the Budínske Lazy. It first flows in a north-east direction towards Podkriváň village, near which it turns in a south-east direction towards municipalities of Mýtňa, Lovinobaňa and Lučenec, south of which (near Trebelovce) it flows into the Ipeľ River. In the section Podkriváň - Lovinobaňa (Uderiná), the floodplain of the brook forms a relatively narrow valley, into which the I/16 road has been located running on the surface, similarly as the Zvolen-Lučenec railway line as well as the R2 expressway currently under construction, which will be placed partly on the surface and partly on bridge pillars in this section.

In this section of the Krivánsky potok valley, we recorded one important site of the Scarce Large Blue butterfly (near Píla-Pílské lazy) and one site of the Large Copper (near Lovinobaňa) in this stretch. We assume that these sites in the valley of the Krivánsky potok brook form an important link between the important source sites of Scarce Large Blue in the NE part of the Ostrôžky Mountains (Budínske lazy - Fekiačov vrch, Timravský hill) and the sites located in the vicinity of Lučenec, as well as those, in the valleys of the Krivánsky brook tributaries (Kotmanová, Cinobaňa). Potential connection with the sites in Ipeľ River Floodplain in the South is also possible, which would make the Krivánsky potok brook an important regional ecological corridors for the species mentioned above. We recommend verification of the functionality of the Krivánsky potok brook as a corridor for non-forest fauna species by further monitoring.

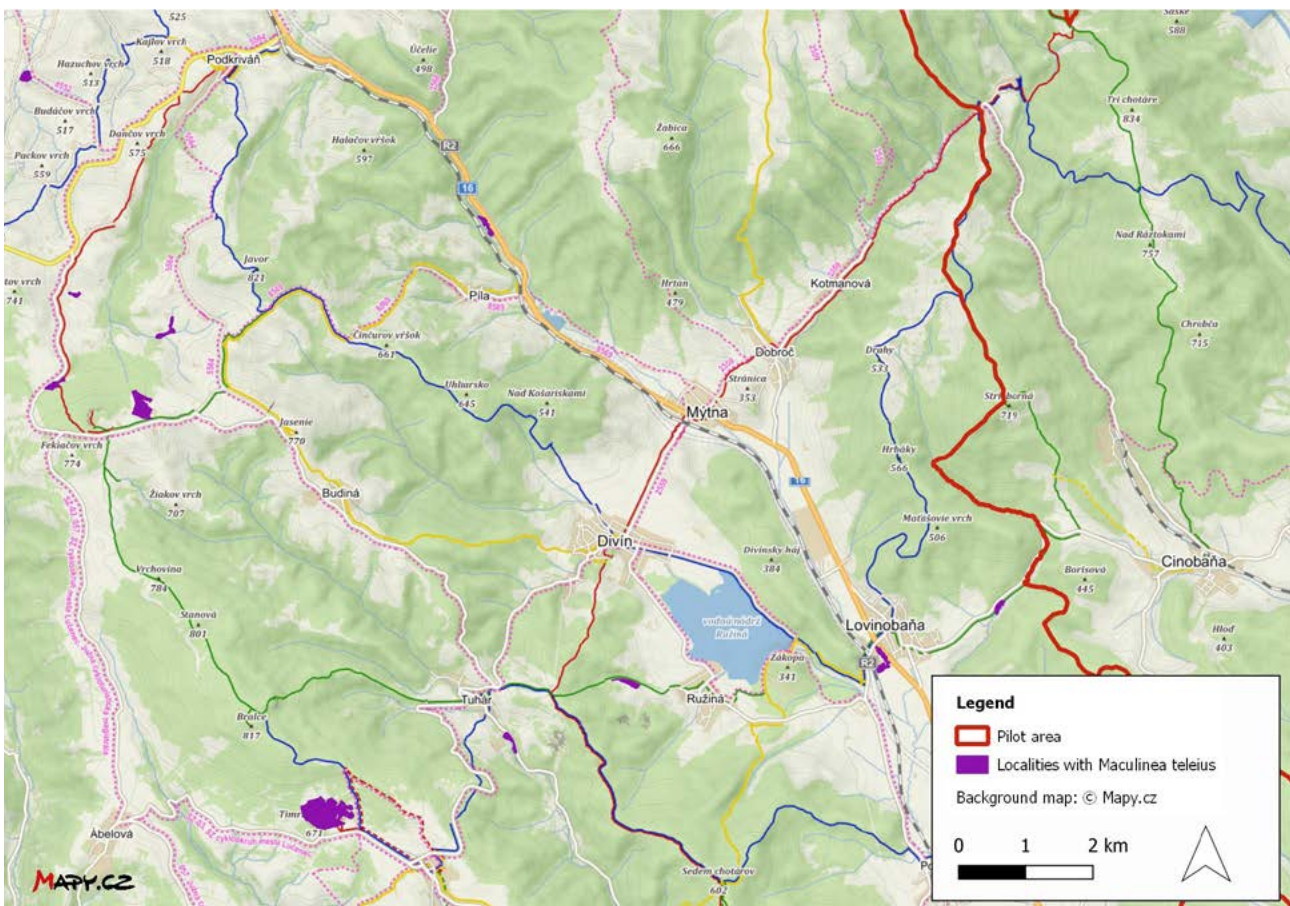


Figure 31 Krivánsky potok brook valley in the section between Podkriváň and Lovinobaňa.

In terms of maintaining the functionality of this corridor for terrestrial species tied to non-forest biotopes, such as the Scarce Large Blue and Large Copper, it is necessary to preserve the areas of meadow habitats lining the Krivánsky potok brook valley in their current extent and restore them where they have been damaged or destroyed (the corridor is interrupted), e.g. during the construction of the R2 express road. As a number of sites show damage from overgrowth by invasive, non-native or weedy plant species, a combination of reseeding with native grasses and herbs with so-called restoration management - more frequent mowing to suppress invasive plant species - is likely to be required.

Where there are no areas suitable for restoration of grasslands (e.g. in the section near the water dam Mýtňa), it is necessary to ensure at least appropriate management of grassland stripes along linear structures - the I/16 road, railway and R2 express road and herbaceous ecotone along the banks of the Krivánsky potok brook. As this is indeed a very narrow floodplain, it is crucial to prevent fragmentation of the natural habitats in this section by further development, whether it be individual housing, industrial or service areas, etc. This also applies to the servicing of road and railway structures (access roads, service areas, etc.).

The optimum date for mowing of grasslands and herbaceous ecotone is (considering the bionomics of *Maculinea teleius* and *Lycaena dispar*) by 20 May or after 15 August, with the possibility of mosaic mowing or omitting mowing on parts of the particular plot. All other options concerning the extent of grasslands preserved compared to the current situation and the adjustment of mowing dates compared to the recommended dates should be considered as partial (suboptimal) solutions.

Stakeholders

Banská Bystrica Self - governing Region; Municipality of Lovinobaňa; Municipality of Mýtňa; Municipality of Píla; Municipality of Podkriváň; Slovak Road Administration - Investment Construction and Road

Administration - Banská Bystrica; National Motorway Company; Railways of the Slovak Republic; Slovak Water Management Enterprise- Banská Bystrica, Upper Hron River Basin Administration Zvolen; The Ministry of Environment of the Slovak Republic; The State Nature Conservancy of the Slovak Republic - Protected Landscape Area Poľana

Identified threats to the critical site:

- » **Threat 1:** New Transport and other Linear Infrastructure projects may increase the barrier effect at landscape level.
- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.
- » **Threat 4:** Changes in land-use may reduce landscape permeability
- » **Threat 5b:** Changes in land management - crop cultivation/natural vegetation management - may reduce landscape permeability
- » **Threat 7:** Lack of coherent monitoring at landscape level and adaptation of solutions
- » **Threat 8:** The support of stakeholders for an cross-sectoral & integrated approach at landscape level is reduced

Identified objectives for the critical site:

- » **1.1** Maximize the functionality of underpasses (all objects)
- » **1.4** Increase permeability of embankments
- » **2.2** Safeguard the transversal permeability of river banks (including enhancement of permeability of the existing features, when possible)
- » **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of

permeability of the existing features, when possible)

- » **4.2** Facilitate/support changes of land-use toward more permeable categories, i.e. through agricultural payments
- » **5b.1** Prevent large-scale monocultures and/or facilitate & support mosaic cultivation
- » **5b.2** Support adequate management of natural features & marginal habitats
- » **7.1** Facilitate implementation of an integrated monitoring programme – procedures, database, indicators, or assessments
- » **8.2** Facilitate information, awareness, education, communication

Critical area No. 13: The Krivánský potok brook in the section Podrečany - confluence with the Ipeľ River

From the village of Podrečany to the confluence with the Ipeľ River near Trebelovce, the Krivánský potok brook is characterised by a regulated, straight channel with a trapezoidal cross section. In addition to the unsuitable river bed morphology, increased organic pollution is probably also a problem.

In the section south of Lučenec town, however, at first glance, the “bankside vegetation” formed by invasive plants, especially buckwheat (*Fallopia sp.*), is particularly striking. These form almost continuous growths, at least from Mikušovce to the confluence of Krivánský brook with the Ipeľ River (see Figure 33). Such vegetation structure of bank stands is also unsuitable for native species

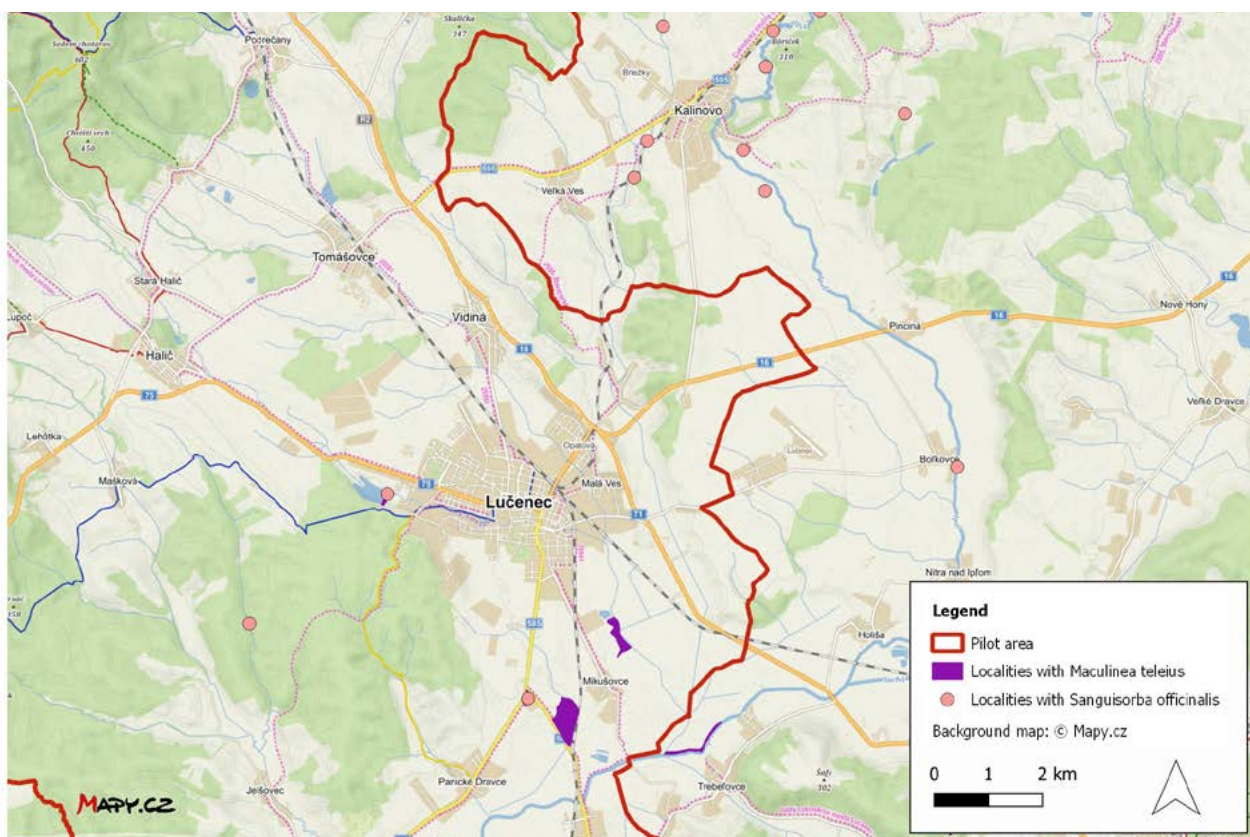


Figure 32 The Krivánský potok brook in the section from Podrečany to the confluence with the Ipeľ River is a regulated, straight stream. Purple polygons represent mapped sites; pink dots represent sites of *Sanguisorba officinalis* - see the sites on Poiplí near Kalinovo (outside the Novohrad project area).

of animals connected to grassland and wetland habitats, such as, for example, the Scarce Large Blue and the Large Copper butterflies.

The optimal solution would be a complex restoration/renaturation of the Krivánsky potok brook in the above-mentioned section, so that the channel shape is restored close to its natural state and the bank vegetation is restored with a preference for alternating grassland sections with dispersed woody vegetation. For the restoration of grass-herb vegetation, it would be advisable to use local seed mixtures or, if such are not available, to use hay from meadows with a natural species composition. As the grassland is heavily infested with invasive, non-native plant species, combining the restoration of the species composition of the grassland (riparian) vegetation with 'restoration management' is likely to be

required – which means more frequent mowing to suppress invasive plant species.

Ideally, suitable plots in the immediate vicinity of the Krivánsky potok brook could be selected for meadow restoration, such as those along the gas pipeline route NE of Mikušovce (Tŕnie site), but for the purpose of restoring conditions in the ecological corridor, it will also be sufficient to restore the vegetation on the immediate vicinity of the riverbanks (at a distance of up to 3 m from the edge of the slope on each bank). However, communication and cooperation with the river basin authority - Slovak Water Management Enterprise - is crucial.

Stakeholders:

Banská Bystrica Region; City of Lučenec, Municipality of Podrečany; Municipality of



Figure 33 Riparian vegetation of the Krivánsky potok brook near Mikušovce formed by buckwheat (Fallopia).

Mikušovce; Municipality of Tomášovce, Municipality of Trebelovce; Municipality of Vidiná; Slovak Water Management Enterprise-Banská Bystrica, Upper Hron River Basin Administration Zvolen; The Ministry of Environment of the Slovak Republic; The State Nature Conservancy of the Slovak Republic - Protected Landscape Area Cerová vrchovina

Identified threats to the critical site:

- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.
- » **Threat 4:** Changes in land-use may reduce landscape permeability
- » **Threat 5b:** Changes in land management - crop cultivation/natural vegetation management - may reduce landscape permeability
- » **Threat 5c:** Land management causing degradation of natural habitats may reduce landscape permeability
- » **Threat 7:** Lack of coherent monitoring at landscape level and adaptation of solutions

Identified objectives for the critical site:

- » **2.2** Safeguard the transversal permeability of river banks (including enhancement of permeability of the existing features, when possible)
- » **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)
- » **4.2** Facilitate/support changes of land-use toward more permeable categories, i.e. through agricultural payments
- » **5b.1** Prevent large-scale monocultures and/or facilitate & support mosaic cultivation

- » **5b.2** Support adequate management of natural features & marginal habitats
- » **5c.1** Prevent/control spreading invasive plant & animal species and renaturation of invaded/degraded lands
- » **7.1** Facilitate the implementation of an integrated monitoring programme – procedures, database, indicators, and assessments

3. Aquatic and water-bound animals

(Natrix tessellata, Astacus astacus, Unio crassus and Lutra lutra)

**Critical area No. 14:
Locality Hriňová above the water reservoir - barrier B1 - Sučí potok brook (The Bitch Creek)(Slatina)**

The Sučí potok brook is an approximately 3 m wide foothill watercourse of medium intensity flow. The Hriňová site above the water reservoir is located in the cadastral territory of the town of Hriňová. Transverse barrier B1 (Figure 35) on the Sučí potok brook, which forms a left-side tributary of the Slatina River, causes a water level difference of approximately 40 cm, disrupts the connectivity of the stream and restricts the migration of fish and other animals. The purpose of the barrier is unknown and we do not consider it to be a flood protection solution. First of all, we recommend assessing the functionality of the cross barrier and evaluating the possibility of fish migration through the barrier (current velocity, gradient, overflow beam, water depth, etc.). Then consider removing it or at least making it passable with a suitable solution for aquatic animals.



Figure 34 The stage on the Sučí potok brook is passable for aquatic animals during higher flows.

Identified target species of European importance: *Lutra lutra*

Suitable habitats for species of European importance: *Astacus Astacus*, *Natrix tessellata*

Recommendation: Examine the purpose of the migration barrier on the Sučí potok brook and consider making it passable with a suitable solution for aquatic animals, possibly removing the barrier to enhance the natural character of this foothill stream. Have an expert assess the function of the migration barrier and discuss the proposed solution with the watercourse manager.

Identified threat to the critical area:

- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of

the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

- » **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)

**Critical area No. 15:
Snohy site - barrier B2 Hukava (Slatina)**

The foothill stream of Hukava, rising in the Poľana Mountains, forms a right-side tributary of the Slatina River. The Snohy locality is situated in the cadastral territory of the town of Hriňová. The elevation of the water level (approximately 3 metres), which has been created by a transverse stone and concrete barrier, completely prevents



Figure 35 Transverse barrier at Hukava, Hřiňová district, water surface elevation approximately 3 metres.

the migration of fish and other aquatic animals and significantly disrupts the connectivity of this watercourse. As can be seen in Figure 36, in the dry season, water flows through only two narrow openings. Above the barrier, the watercourse has a very slow to stagnant flow (Figure 37). The cross structure lacks a solution for aquatic animals. On the other hand, it should be said that a few metres further on the Hukava it flows into the Hřiňová reservoir, which forms an insurmountable migration barrier in the pilot area, and, thus, it is necessary for the experts and the watercourse manager to consider whether it makes sense to seek a solution for crossing this particular barrier in this case.

Identified target species of European importance: *Lutra lutra*, *Astacus astacus*

Suitable habitat for species of European importance: *Natrix tessellata*

Recommendation: review the purpose and functionality of the migration barrier on the Hukava stream by experts and consider making it suitable for aquatic fauna and consult the watercourse manager on the proposed solution.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



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Figure 36 Above the barrier, the Hukava stream has a still-water nature in places.



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Figure 37 Above the barrier, the Hukava stream has the nature of a natural foothill watercourse.

Critical area No. 16: Locality Hriňová - part Krivec - barrier B3 Slatina

The transverse barrier (Figures 21, 22) on the Slatina River (locality Hriňová - part of Krivec) apparently serves as a small hydroelectric power station (flap dam). We estimated the difference in levels below and above the barrier to be 4 m. A fishway (Figure 41) was constructed near the barrier, which at first glance appears to be non-functional, and on repeated visits to the site we did not observe fish using it. The parameters of the fishway are inadequate for fish migration. The fishway is short and narrow, has unsuitable shallow, smooth concrete bottoms and banks, excessive rainfall and rapid flow can cause the water in the baffles to foam. Consideration needs to be given to whether the impact pool is deep enough and other fishway parameters need to be reviewed. It will, therefore, be important to have the functionality

of the fishway assessed by an expert and, if it is found insufficient for the successful migration of fish (and other aquatic animals as well), reconstruction should be proposed. Alternatively, we recommend that the need for this particular hydropower station be assessed.

Identified target species of European importance: not identified

Suitable habitat for species of European importance: *Lutra lutra*, *Astacus astacus*, *Natrix tessellata*

Recommendation: Primarily, we propose to check the functionality of the building and find its owner. Secondly, we recommend that experts assess the fishway, as it appeared to us non-functional, and propose and discuss with the owner and the stream manager the possibilities of its modification to allow the migration of aquatic animals in this section of the Slatina.



Figure 38 Cross structure on the Slatina River in the town of Hriňová - part of Krivec.



Figure 39 Cross structure on the Slatina River in Hřiňová - part Krivec. In the upper right corner, you can see the outlet of the fish conduit.



Figure 40 View of the inappropriate fishway at the barrier on the Slatina River (Hřiňová - part of Krivec).

Identified threat to the critical area:

- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

- » **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)

**Critical area No. 17:
Locality Hriňová - park, HS
- barrier B4 Slatina**

A group of 12 migration barriers on the Slatina River directly in the town of Hriňová was probably built as an anti-flood measure. The riverbed in this section has been heavily modified, with modified concrete banks

and bottom. We recommend assessing the functionality of the migration barriers and examining the possibilities for fish migration in order to improve their passability. In this stretch of the Slatina, revitalisation of the channel and bank (creation of bank vegetation) would be considered, which would have a positive impact on the connectivity of this important migration corridor in the region.

Target species of European importance identified: not identified

Suitable habitat for species of European importance: *Lutra lutra*, *Astacus astacus*, *Natrix tessellata*

Recommendation: examine the purpose of migration barriers in this section of the Slatina and, if possible, propose solutions for their passage for aquatic animals and consult them with the watercourse manager and the municipality. Additionally, in this case,



Figure 41 Some barriers on the river Slatina (Hriňová).



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Figure 42 Impact beam under the barrier on the Slatina River (Hriňová).

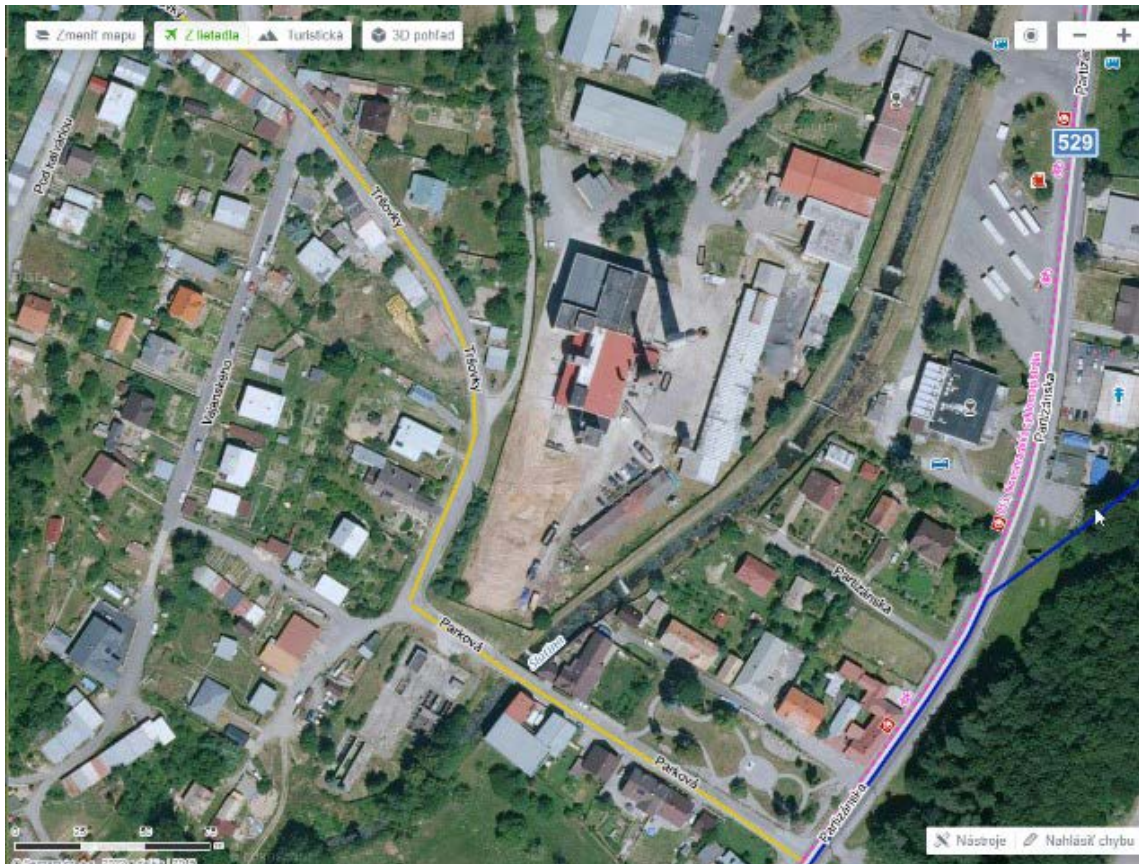


Figure 43 Group of migration barriers (12 in total) on the Slatina River (Hriňová) visible on the orthophotomap.

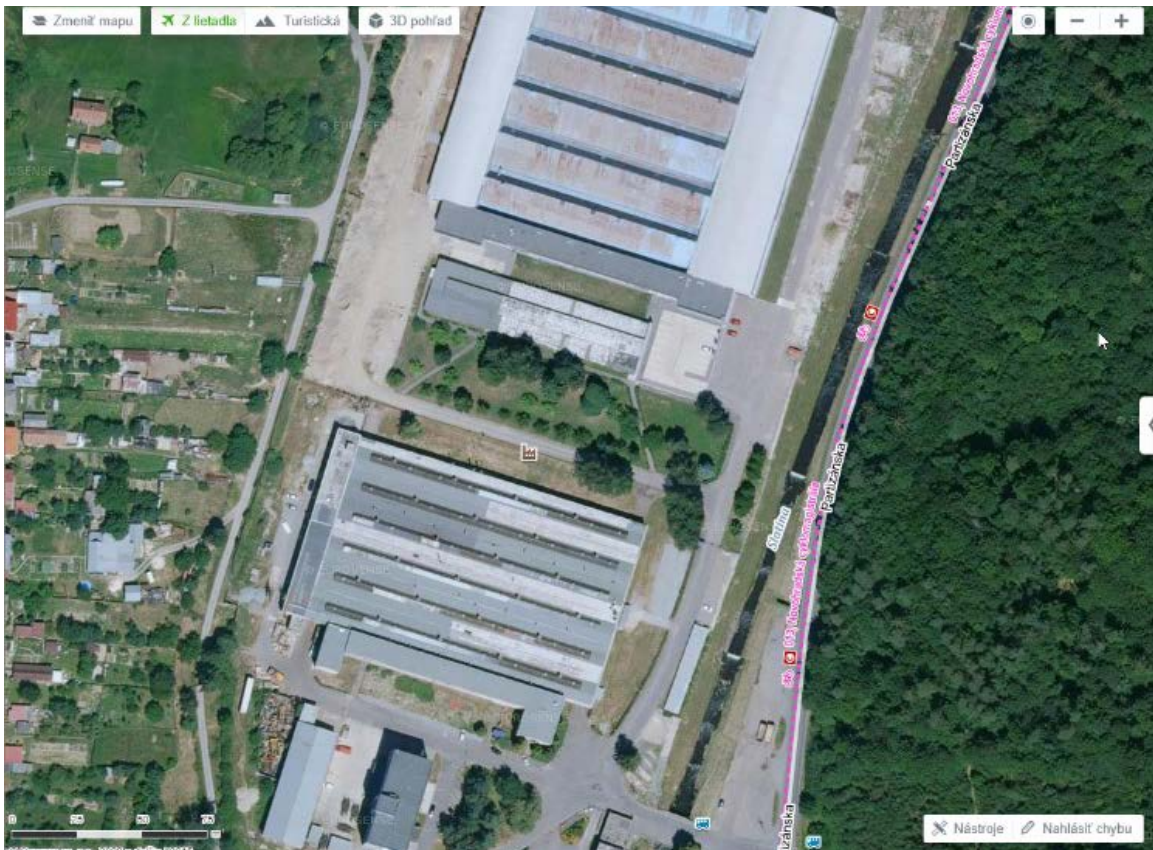


Figure 44 Group of migration barriers (12 in total) on the river Slatina (Hřiňová) visible on the orthophotomap.



Figure 45 Group of migration barriers (12 in total) on the Slatina River (Hřiňová) visible on the orthophotomap.

we would recommend assessing whether revegetation/restoration of the river channel, including planting of riparian vegetation, if at all feasible from the perspective of the surrounding development, would be an appropriate solution to improve river connectivity.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)

**Critical area No. 18:
Locality Hriňová - Murínka housing estate - barrier B5 Slatina**

A similar migration barrier to B4 was probably constructed as a flood-prevention measure. The channel of the Slatina has also been significantly modified in this section, with modified concrete banks and bottom (Figure 47).

Identified target species of European importance: not identified

Suitable habitats for species of European importance: *Lutra lutra*, *Astacus astacus*, *Natrix tessellata*

Recommendation: Investigate the purpose of the migration barrier in this section of the Slatina and, if possible, propose a solution to make it passable for aquatic animals and consult with the watercourse manager and



Figure 46 Migration barrier on the Slatina River.

the municipality. Additionally, in this case, we would recommend assessing whether revegetation/restoration of the river channel, including planting of riparian vegetation, would be an appropriate solution to improve river connectivity, while still considering the current development trends.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)

Critical area No. 19:

Locality Detva - near the amphitheatre - barrier B6 Detsviansky potok brook (Slatina)

The Detsviansky potok brook forms a right-side tributary of the Slatina River with a length of 12.9 km. It rises on the south-western slope of Predna Polana at an altitude of about 1,320 m above sea level and flows into the Slatina at the southern edge of the town of Detva at an altitude of about 369 m above sea level. Tributaries: from the left the Jelšovský potok brook and the Nemecká brook, from the right side the Dolinka brook. Detsviansky potok brook is in many places heavily regulated, the bed is more or less concreted - mainly in the city. The migration barrier in Figures. 48 and 49 was probably built for the purpose of irrigation and mitigation of storm water after excessive rainfall. In the past it was also used for recreational purposes. Today,



Figure 47 Transverse barrier on the Detsviansky potok brook in the old part of Detva.



Figure 48 Transverse barrier on the Detsviansky potok brook in the old part of Detva.

due to climate change, recurrent prolonged droughts have contributed to a change in the perception of this structure - as a barrier that prevents the migration of aquatic animals, as the elevation of the levels is estimated at 3 metres. Revitalisation of the Detsviansky potok brook bed could provide a suitable solution for crossing the barrier in this section. Essentially, however, we suggest a thorough investigation of its functionality and then designing a suitable solution that would improve the migration of aquatic animals in this section.

Identified target species of European importance: *Astacus Astacus*

Suitable habitats for species of European importance: *Lutra lutra, Natrix tessellata*

Recommendation: Expertly assess the purpose and functionality of the migration barrier, especially with regard to climate change and its consequences, consider

making it passable for aquatic animals with a suitable bio-ecological solution, or remove the barrier altogether. The proposed solution should be consulted with the watercourse manager and the municipality; moreover, it is proposed to reconsider the renaturation of the river bed, remove the stone and concrete parts and restore the natural character of the stream, which would not only benefit aquatic species, but would also fulfil an aesthetic and landscaping function as a cultural ecosystem service highly perceived by the population. Appropriate channel restoration would support climate change mitigation.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

- » **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)

**Critical area No. 20:
Locality Hriňová, above the water reservoir, Belovodský bridge - barrier B7 Slatina**

A few metres from the eastern end of the Hriňová reservoir, where the Biela voda (White Water) flows into the Slatina (near the Belovodský Bridge), a concrete barrier has been built, which creates a 4 metre level difference (Figure 51) and thus disrupts the connectivity of the river. Nearby upstream of the Slatina, there is a smaller barrier with a height of 0.5 metres (Figure 50).

A species of European importance has been identified at the site: *Lutra lutra*

Suitable habitat for species of European importance: *Natrix tessellata*, *Astacus Astacus*

Recommendation. Consult the proposed solutions with the watercourse manager.

Identified threat to the critical area:

- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

- » **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



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Figure 49 The grade on the Slatina River (above the water dam Hriňová, near the Belovodský Bridge) creates a level difference of approximately 0.5 metres.



Figure 50 A concrete barrier on the Slatina River (above the water dam Hriňová, near the Belovodský Bridge).



Figure 51 Migration barriers on the Slanec stream (Hriňová – urban part of Slanec).

Critical area No. 21:
Locality Hriňová (above the ski resort Košútka) - barrier B8 Slanec (Slatina)

The Slanec stream, which rises in the Veporské vrchy, flows into the Gondova jama stream, which in turn flows into the Slatina River. In the urban part of Slanec, above the Kosútka ski resort, we observed two stone-concrete barriers (Figure 34) forming a significant migration barrier for aquatic animals. The transverse object lacks a solution for the migration of fish and other water-bound animals.

Target species of European importance identified: not identified

Suitable habitat for species of European importance: *Lutra lutra*, *Natrix tessellata*, *Astacus astacus*

Recommendation: Assess the functionality of the cross barrier on the Slanec stream by

experts and evaluate the possibility of fish migration through the barrier. Then consider removing it or at least making it passable for aquatic animals, which must be preceded by negotiations with the watercourse manager.

Critical area No. 22:
Locality Korytárky - barrier B9 Slatina

The transverse barrier (Figure 53) on the Slatina River (Hriňová - part of Korytárky) probably serves as a flap dam for the Korytárky hydroelectric power station. We estimated the difference in levels below and above the barrier to be 2 metres. A fishway was built around the barrier, which at first sight appears to be non-functional and we did not observe any fish using it during repeated visits to the site. The fishway (Figures 54 and 55) has inadequate shallow, smooth concrete bottom and banks, water in the bulkheads can foam during excessive rainfall and rapid flow, and



Figure 52 Migration barrier on the Slatina River in the village of Korytárky - it is a flap dam for the Korytárky hydroelectric power station.



Figure 53 Beginning of the fish passage - Slatina River, Korytárky, flap dam for Korytárky hydroelectric power station.



Figure 54 Outlet of the fish passage - Slatina River, Korytárky, flap gate for Korytárky hydroelectric power station.

the impact pool does not appear to be deep enough. Therefore, it will be important to monitor and assess the functionality of the fishway by a specialist and if it proves to be insufficient for successful fish migration, to propose its reconstruction. Alternatively, we recommend assessing the need for this particular hydropower plant.

Identified target species of European importance: *Lutra lutra*

Suitable habitat for species of European importance: *Natrix tessellata, Astacus Astacus*

Recommendation: Firstly, assess the current use and need for this particular hydropower plant (the flap dam is part of it) and, once the owner of the structure and the watercourse manager have been identified, discuss the possible reconstruction of the fish passage to allow migration of not only fish but also other aquatic animals.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)

**Critical area No. 23:
Locality Holiša - barrier B10 Ipeľ'**

The Ipeľ' River rises in the Veporské vrchy Hills (central Slovakia) and after about 235 kilometres flows into the Danube, with an estimated 140 kilometres forming the border



Figure 55 View of the migration barrier near the village of Holiša - Ipeľ' River.

with Hungary. Since the 1970s, the Ipeľ riverbed has been regulated and straightened in many places. The Málinec water reservoir is located on the upper course of the river. In the municipality of Holiša, the connectivity of the Ipeľ is disrupted by a transverse barrier (Figures 56 and 57) with a height of approximately 3 metres, which is completely impassable for all local aquatic animals. The fish passage at the barrier has not been recorded. The water below the barrier falls onto a shallow plate and foams.

Target species of European importance identified: not identified

Suitable habitat for species of Community importance: *Lutra lutra*, *Natrix tessellata*, *Unio crassus*

Recommendation: Evaluate the possibility of aquatic animal migration through the barrier and in case of its complete impermeability

(which we also have estimated), it would be advisable to build a fish passage with a natural character, which could not only be used by fish but also by other aquatic animals. We have observed several large transverse barriers on the Ipeľ River, where there is no solution (fish passage) for the migration of aquatic animals. We would like to highlight the need for their construction in order to ensure the connectivity of the river as an important bio-corridor for migrating animals.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



Figure 56 Water impact beam - migration barrier near the village of Holiša - Ipeľ River.

Critical Area No. 24: **Site Muľa - Ráročská pustina** **- barrier B11 Ipeľ**

The iron-concrete migration barrier near the village of Muľa apparently serves to regulate the flow of the Ipeľ River. As can be seen in Figure 58, the height of the barrier can be regulated; however, it is recommended that experts assess whether a suitable natural fish passage would improve the passability of this particular barrier, thereby improving migration passage on the Ipeľ River in the area of interest.

Identified target species of European importance: *Lutra lutra*, *Unio crassus*

Suitable habitat for species of European importance: *Natrix tessellata*

Recommendation: Evaluate the potential for aquatic species to migrate across the

barrier and assess the need for a suitable solution to allow unrestricted migration of aquatic species across the barrier (e.g. a fish passage with a natural character, but which would also be suitable for other aquatic species). We have observed several large transverse barriers on the Ipeľ River where there is no solution (fishway) for aquatic animal migration. We would like to highlight the need for their construction in order to ensure the connectivity of the river as an important biocorridor for migratory animals.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability



Figure 57 Iron-concrete migration barrier on the Ipeľ River near the village of Muľa.

of rivers (including enhancement of permeability of the existing features, when possible)

Critical area No. 25:

Locality Velká nad Ipl'om - barrier B12 Ipel'

Another large iron-concrete mound (Figures 59 and 60) disrupting the connectivity of the Ipel' River was built near the village of Velká nad Ipl'om. This construction lacks a suitable solution to allow the migration of aquatic animals.

Identified target species of European importance: *Lutra lutra*, *Unio crassus*

Suitable habitat for species of European importance: *Natrix tessellata*

Recommendation: Evaluate the possibilities for aquatic species to migrate across the barrier and assess the need for a suitable solution to allow unrestricted migration of

aquatic species across the barrier (e.g. a fish passage with a natural character, but which would also be suitable for other aquatic species). We have observed several large transverse barriers on the Ipel' River where there is no solution (fishway) for aquatic animal migration. We would like to highlight the need for their construction in order to ensure the connectivity of the river as an important biocorridor for migratory animals.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of



Figure 58 The iron-concrete dam on the Ipel' River is another large migration barrier for aquatic animals, where a suitable solution for aquatic animal migration is completely lacking or insufficient.



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Figure 59 Large migration barrier on the Ipeľ River.

permeability of the existing features, when possible)

**Critical area No. 26:
Locality Hriňová - barrier B13 Slatina**

In the places where the Hukava flows into the Slatina River, the Hriňová reservoir was built in the 1960s (Figure 61, officially in operation only in 1998), which serves as a source of drinking water for the adjacent towns and villages (Detva, Hriňová, Lučenec, and Filákovo). The stone dam reaches a height of up to 51 metres and the volume of the reservoir is approximately 7.4 million m³ of water, covering approximately 49 hectares. It is the most extensive migration barrier in the pilot area (outside the pilot area, the Môťová reservoir and the Slatinka waterworks were built on the river).

Identified target species of European importance: not identified

Suitable habitat for species of European importance: *Lutra lutra*, *Natrix tessellata*

Recommendation. On the other hand, it provides a suitable environment for many species of aquatic and water-bound animals (from invertebrates and fish bound to still waters, such as reptiles or amphibians, and a water source for mammals).

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



Figure 60 VN Hřiňová, one of the biggest migration barriers in the region, but at the same time, an important source of drinking water for the inhabitants.

**Critical area No. 27:
Locality Sawmill - barrier B14
Krivánský potok brook (Ipel)**

The barrier is located on the Krivánský potok brook about 500 metres above the Mýtna reservoir, 200 metres below the confluence with the Martinský potok brook, and about 40 metres below the bridge structure over the I/16 road. The function of the barrier is apparently stabilising in relation to the bridge structure. Nevertheless, we consider it to be a suitable candidate for crossing. A suitable solution might not destabilise the bridge, while its passage will allow comfortable migration of aquatic animals between the Mýtna water reservoir and the Martinský potok brook, the boundary of which starts above the bridge structure over I/16.

Species of European importance have been identified at the site: *Lutra lutra*, *Astacus astacus*, *Natrix tessellata*.

Recommendation: Evaluate the stabilising function of the barrier and assess the need for a suitable solution to allow unrestricted migration of aquatic species across the barrier (e.g. a full-corridor ramp with a natural character, which would also be suitable for other aquatic species). Consult and design a solution in conjunction with the watercourse manager and the I/16 road manager.

Identified threat to the critical area:

- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

- » **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



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Figure 61 Partially and seasonally impassable barrier on the Krivánsky potok brook above the Mýtne reservoir and under the bridge structure over I/16.



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Figure 62 The same barrier on Krivánsky potok brook during dry July 2022.

Critical area No. 28:
Locality Sawmill - barrier B15
Krivánský potok brook (Ipel)

The barrier is located on the Krivánský brook about 300 metres above the Mýtina reservoir, opposite the turn-off to the village of Píla from the I/16 road. The probable function of the barrier is probably to stabilise the banks and to store timber. The banks have a semi-natural character, but without bank vegetation of mature trees, and are, therefore, heavily colonised by the invasive species Japanese knotweed (*Fallopia japonica*). Above the barrier there is a slowing of the flow and deposition of fine sediment (silt) over a stretch of about 100 metres.

3 target species of European importance have been identified in the vicinity of the site: *Lutra lutra*, *Astacus astacus*, *Natrix tessellata*.

Recommendation: Evaluate the stabilising function of the barrier and assess the need to

construct a suitable bio-ecological solution that would allow unrestricted migration of aquatic animals across the barrier (e.g. a full-corridor ramp with a natural character). Consult and design the solution in cooperation with the watercourse manager, the I/16 road manager and the builder of the R2 expressway, which will cross the flyover in this area (on piles).

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



Figure 63 The relatively new, slightly impassable barrier on the Krivánský potok brook above the Mýtina reservoir is problematic for fish and aquatic animals, especially during low water levels.



Figure 64 Side view of the same barrier above VN Mýtina.

**Critical Area No. 29:
Mýtina Reservoir Site - Barrier B16
Krivánsky potok brook (Ipel)**

The barrier is located on the Krivánsky potok brook between the villages of Mýtina and Píla and serves to transfer part of the flows to the Ružiná reservoir and to partially reduce flood flows. The water depth reaches 1 to 5 metres, but it is currently drained due to the construction of R2. The bank is not very rugged. A water diverter for a small hydroelectric power plant has been built at the outlet. For this reason, the water level fluctuates frequently. It is an attractive fishing ground with carp, perch, pike, pikeperch, roach, roach, perch and other fish species.

3 target species of European importance have been identified in the vicinity of the site: *Lutra lutra*, *Astacus astacus*, *Natrix tessellata*.

Recommendation. Nevertheless, we propose to assess the need and possibilities of a

bio-ecological solution for migration, for example by a bypassing arm, which would allow upstream and downstream migration of aquatic animals. The solution needs to be consulted and designed in cooperation with the watercourse manager, the waterworks, the municipality, the manager of the I/16 road and the R2 expressway, which will cross the flyover in this area (on piles).

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



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Figure 65 The Mýtna reservoir is currently drained due to the construction of the flyover of the R2 expressway Mýtna - Lovinobaňa.

Critical area No. 30: Site Ružiná reservoir - barrier B17 Budínsky potok brook (Ipel')

The Ružiná reservoir is built on the Budínsky potok brook. The dam was built in 1973. The reservoir is also supplied from the Krivánsky potok brook, by a 4.4 km long pipeline from the Mýtna reservoir. The reservoir has the shape of an asymmetrical valley with a relatively gentler right bank and a steeper left bank. The main purpose of the reservoir is to compensate for the uneven flows of the Budatínsky potok and Krivánsky potok brooks. The Ružiná reservoir is declared a fishing ground as off-channel water. It is a breeding ground for many protected waterfowl species. In the vicinity of the reservoir there are two nature reserves, Ružinské jelšiny and Príbrežie Ružinej. A large population of the freshwater bivalve Painter's mussel (*Unio pictorum*) and a smaller population Duck mussel (*Anadonta anatina*) live at the bottom of the reservoir. At the beginning of September

2019, the Ružiná reservoir started to be drained due to the reconstruction of the dam body and the mechanism of releasing water from the reservoir. The total reconstruction and refilling of the reservoir is estimated to take six years, but partial refilling already took place in 2022.

2 target species of European importance have been identified in the vicinity of the site: *Lutra lutra*, *Natrix tessellata*.

Recommendation. The reservoir provides a suitable environment for many species of aquatic and water-dependent animals (birds, invertebrates, fish, reptiles, amphibians, etc.).

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.



Figure 66 The main works on the facilities of the Ružiná reservoir (from 2019) have been completed and the reservoir is gradually being refilled.

Identified objective for the critical area:

- » **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)

Critical area No. 31:

**Site Luboreč reservoir - barrier B18
Luborečský potok brook (Ipel)**

The Luboreč reservoir is located between the villages of Luboreč and Závada. The main purpose of its construction was to accumulate water for irrigation of the surrounding agricultural land. The reservoir is also important for balancing the uneven flows of the Luboreč throughout the year and ensuring a constant flow under the reservoir. Therefore, it also serves as flood-prevention measure, and is also used as a recreational area and for fishing. The average water depth is between 3 and 15 metres, and the banks

are quite rugged. Two streams flow into it: the Luborečský potok and Riečka.

Two target species of European importance have been identified above the Luboreč reservoir on the Luborečský potok brook:
Lutra lutra, *Astacus astacus*

Suitable habitat for species of European importance: *Natrix tessellata*

Recommendation: as this is a large development with important public functions, we are not proposing major solutions to migration throughout.

Identified threat to the critical area:

- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.



Figure 67 South view of water dam of Ľuboreč.

Identified objective for the critical area:

- » **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)

Critical area No. 32:

**Locality Dobroč - barrier B19
Dobročský potok brook (Ipel)**

Dobročský potok brook is a left-side tributary of Krivánsky potok brook. It rises in the Veporské vrchy Mountains, in the Sihlianska planina Plain subdivision, at the western foot of Vrchdobroč. It flows through a forested area and has a character of a mountain brook. Due to this and the shaded wooded valley, no target species of European importance have been identified above the village of Dobroč.

Target species of Community importance:
not identified

Recommendation: In view of the purpose of the stone dams and the poor representation of aquatic fauna demanding the migratory comfort of the 'waterway', we do not propose major changes to the operation of these structures.

Identified threat to the critical area:

- » **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

- » **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



Figure 68 Flood protection dike above the village of Dobroč.



Figure 69 The Dobročský potok brook flowing through the village of Dobroč with straightened and regulated banks and bottom.

Critical area No. 33: Site Béter - barrier B20 Krivánsky potok brook (Ipel')

The slipway on the Krivánsky potok brook is located below the town of Lučenec, opposite the industrial park in the locality of Béter, or at the Béter marsh. The surroundings are important for rare ornithological observations, and the Poiplie Protected Landscape Area is also located nearby. The Krivánsky potok brook flows through its edge, the flow is significantly straightened (regulated), bank vegetation with mature trees is almost absent. On the contrary, the banks are dominated by the invasive species buckwheat (*Fallopia* sp.). There is a rich fish assemblage in the stream. The site was also selected for mapping due to its proximity to the confluence with the Ipel' River.

Target species of European importance: not identified

Suitable habitat for species of Community importance: *Lutra lutra*, *Natrix tessellata*

Recommendation: in view of the potential passability of the slipway for ichthyofauna and aquatic animals, we do not propose major changes to the operation of this structure. The negative impacts of the industrial park are likely to increase due to its planned expansion. Any potential proposal to alter the water regime of the stream must be handled sensitively, considering the ornithological and batrachological importance of the Béter marsh.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



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Figure 70 Regulated Krivánsky potok brook with a slide in the locality of Béter near Lučenec.

Critical area No. 34:
Locality Lučenec, bridge on Športová ulica Street in Lučenec – barrier B21 Tuhársky potok brook (Ipel)

The barrier is located on the Tuhársky potok brook in the town of Lučenec under the bridge on Športová Street. It is a stabilization of the bridge object.

Target species of Community importance:

Natrix tessellata

Suitable habitat for species of European importance: *Lutra lutra*

Recommendation: The stabilising function of the barrier and the limited spatial possibilities of the town of Lučenec are not a suitable prerequisite for the reconstruction or rebuilding of the migration barrier. In

addition, the barrier is located only about 350 metres from another migration barrier and 800 metres from the water reservoir L'adovo (both above the barrier). Thus, the bridging solution would provide relatively low nature conservation benefits.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



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Figure 71 Barrier on the Tuhársky potok brook in the town of Lučenec under the bridge on Športova Street.

Critical area No. 35:
Locality Lučenec, Parný mlyn - barrier
B22 Tuhársky potok brook (Ipel)

The barrier is located on the western outskirts of the town of Lučenec, about 400 metres below the L'adovo water reservoir. Its function is probably flood protection or irrigation. In the past there was a mill here, so its use could have been for this purpose as well.

Identified target species of European importance: *Natrix tessellata*

Suitable habitat for species of European importance: *Lutra lutra*

Recommendation: given the location of the barrier just above the town of

Lučenec, the limited spatial possibilities and especially the proximity of the L'adovo reservoir, we do not attach much importance to the passage of this migration barrier.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



Figure 72 Barrier on the Tuhársky potok brook above the town of Lučenec in the locality of the Parný mlyn.

Critical Area No. 36: Water reservoir ice-barrier site B23 Tuhársky potok brook (Ipel)

Water surface of the reservoir on the Tuhársky potok brook near the town of Lučenec. The water structure Ladovo serves for transformation of flood wave, balancing of flows under the reservoir, sport fishing and recreation, with water depth of 1-5 m and 2.5 m in diameter. The bank is not very indented. In the summer months it suffers from water scarcity and cyanobacteria. It is an attractive fishing ground. In 2021, Slovak Water Management completed the reconstruction and removal of sediments from the reservoir.

Identified target species of European importance: *Natrix tessellata*

Suitable habitat for species of European importance: *Lutra lutra*

Recommendation. Considering the water reservoir's purpose and location above the town of Lučenec, we think removing this migration barrier will be problematic. There are two other impassable barriers (B21 and B22) within 1 km below the HPP in Lučenec.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



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Figure 73 Water reservoir Ladovo above the town of Lučenec after reconstruction.



Figure 74 The grade on the Tuharský potok brook below the village of Tuhár stabilises the bridge structure of the road III/2665.

Critical area No. 37:
Tohár site - barrier B24 Tuharský potok brook (Ipel)

The barrier is located on the Tuharský potok brook below the village of Tuhár. It has a stabilising function, which is also to mitigate the flow under the bridge structure of the road III/2665 between the villages of Tuhár and Stará Halič.

Identified target species of European importance: not identified

Suitable habitat for species of Community importance: *Lutra lutra*, *Astacus astacus*

Recommendation: As this is an upper reach of the stream with a poorer species

representation of fauna, a partially passable barrier and an important stabilising function of the stage, we do not consider the passage of this barrier to be a priority.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)



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Figure 75 Stage on Krivánsky potok brook below the village of Tomášovce with concrete precast features.

Critical area No. 37:
Tomášovce locality - barrier B25
Krivánsky potok brook (Ipel)

The barrier is located on the Krivánsky potok brook below the village of Tomášovce. Its function is probably stabilizing. The bottom and the banks of the watercourse under the bridge leading to the nearby Agrochemical Plant are made of precast concrete. The bank vegetation is well-developed and quite valuable; the great hornbill (*Lucanus cervus*) has been recorded in it. The overflow water beam is mostly insufficiently thin, and there is an inadequate concrete slab above the barrier.

Identified target species of European importance: *Astacus astacus*

Suitable habitat for species of European importance: *Lutra lutra*, *Natrix tessellata*

Recommendation: Investigate the actual purpose of the migration barrier and, if

possible, propose a solution to make it passable for aquatic animals. The revitalisation/renaturation of the stream bed should also be considered. By making this barrier accessible, it may be possible to connect relatively long barrier-free sections of Krivánsky potok brook. Consult with the watercourse and bridge facility manager for a solution.

Identified threat to the critical area:

» **Threat 2:** Structural interventions on the existing Transport and other Linear Infrastructure (maintenance, upgrading without changing the category/class of the infrastructure etc.) and on other linear features may increase the barrier effect at landscape level.

Identified objective for the critical area:

» **2.3** Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)

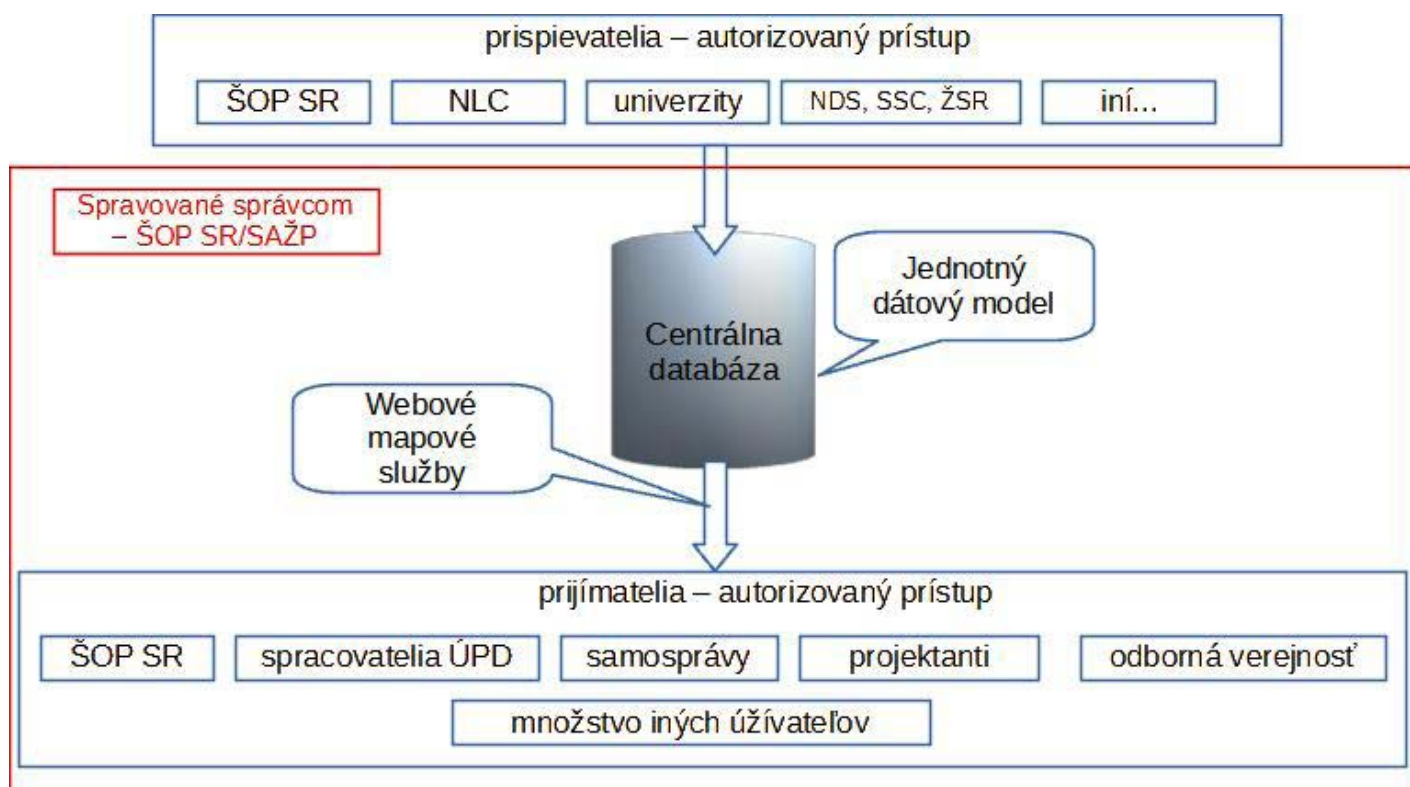


Figure 76 Proposed structure of the central database for data collection

4. Common measure defined for all monitored species

Design of a central database for data collection

One of the main reasons for the lack of protection of animal migration corridors, not only in the pilot area but also throughout Slovakia, is the insufficient knowledge base on the location and quality of migration corridors, which would be available to the professional public. Without the knowledge of the presence of migration corridors in a particular geographical area, it is impossible to ensure their adequate protection.

The first step for the creation of such a database is the necessary definition of migration corridors in legislation (Nature and Landscape Protection Act, Landscape Planning Act, Spatial Planning Act, Building Act) and the anchoring of the concept of animal migration corridor in nature conservation documentation (e.g. Regional TSES, ecological networks, etc.). The second step is to establish rules - regulations that would be easy to implement at different levels of documents, e.g. spatial-planning documentation, documents for zoning and construction procedures, various conceptual and development documents, projects and plans, etc. The third step is to create a single database for collecting, harmonising and publishing data on animal migration routes, conflict points with means of transport, road and rail mortality, barriers and obstacles to migration. The database should be populated with information from various sources known

so far and subsequently, on the basis of authorised access, populated by organisations and persons dealing with the movement of fauna in the countryside (The State Nature Conservancy of the Slovak Republic, National Forest Centre, Slovak Academy of Sciences, universities, hunting associations, traffic police, National Motorway Company and Slovak Road Administration, Railways of the Slovak Republic, contracted natural and legal persons, etc.).

The data in the database would be harmonised by the administrator (The State Nature Conservancy of the Slovak Republic, The Slovak Environmental Agency) into a single data model and published via web mapping services to the recipients of the data (The State Nature Conservancy of the Slovak Republic, processors of spatial documents, planners, municipalities, professional public, land users, processors of migration studies, etc.).

Proposed measures:

- » Legislative anchoring of the project - a number of steps
- » financial anchoring of the project - a number of steps
- » coordination of contributors and designation of a system administrator
- » HW and SW provision of the project
- » data collection, processing and publication
- » maintenance and updating of the system

Stakeholders:

- » All of the above

It falls under threat:

- » **Threat 3:** Linear transport infrastructures (including electric power lines) cause wildlife mortalities

It falls under the objective:

- » **3.12** Develop and use an integrated database as a decision-support tool to address traffic incidents (for implementing/adjusting measures to prevent wildlife traffic-kills/damage/human casualties)



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PILOT AREAS:

Austria

- 1 Kobernausser forest
- 2 Pötsching (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 Sciences

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: National 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

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