



# Catalogue of Measures

## **Beskydy - Kysuce Pilot Area**



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## **Beskydy - Kysuce cross-border pilot area**

(the Czech Republic, Slovakia)

Part of Output 4.1

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

Danube Transnational Programme, DTP1-187-3.1

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### **About TRANSGREEN:**

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

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(the Czech Republic, Slovakia)

Miskolc-Košice-Uzhgorod trilateral pilot area  
(Hungary, Slovakia, Ukraine)

Arad-Deva pilot area  
(Romania)

Tîrgu Mureş - Iaşi pilot area  
(Romania)



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# Introduction

**B**eskydy and Kysuce are two regions located in the northern part of the common state border between the Czech Republic and Slovak Republic. This area is northwest part of the Carpathian mountain range arch, which stretches over seven countries.

The uniqueness of this region lies in its biodiversity, which is still well-preserved, and thus able to support the life of the region as such. The presence of charismatic animal species, the brown bear, the grey wolf and the Eurasian lynx (commonly known as large carnivores) gives this place a sense of special importance.

However, there are also other points of interest related to the fast development of the region, which have a negative impact on the area biodiversity. Development of housing and transport infrastructure is advancing and crosscutting the area into still smaller fragments. These small “islands” are not able to sustain the life of large carnivores and their high demand for space (long distance dispersal especially of young animals), food and reproduction. The balance of their population directly influences the balance of other species populations. Moreover, isolated populations are often predestined to extinction.

In order to preserve the treasures of this region in a fast developing and competitive world, there exist numerous initiatives aimed at preserving this mountain region, from the highest political level represented by the international convention on the protection of the Carpathian Mountains (Carpathian Convention) to local activists in the field.

This document is a result of joint effort and integrative approach of several stakeholders at different level and different focus, from international to national, from political to practical, from Ministries, through expert organisations, to local field mappers.

It provides practical information on how to stop further fragmentation of the area or mitigate its impact on biodiversity while allowing the necessary development in the area.

The document is a product of the INTERREG TRANSGREEN project funded by the Danube Transnational Programme. The aim of the project is to contribute to development of safer and environmentally friendly road and rail networks that already exist or are being developed in the pilot area of Czech Republic, Romania, Slovakia and Ukraine.

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## Kysuce - Beskydy pilot area

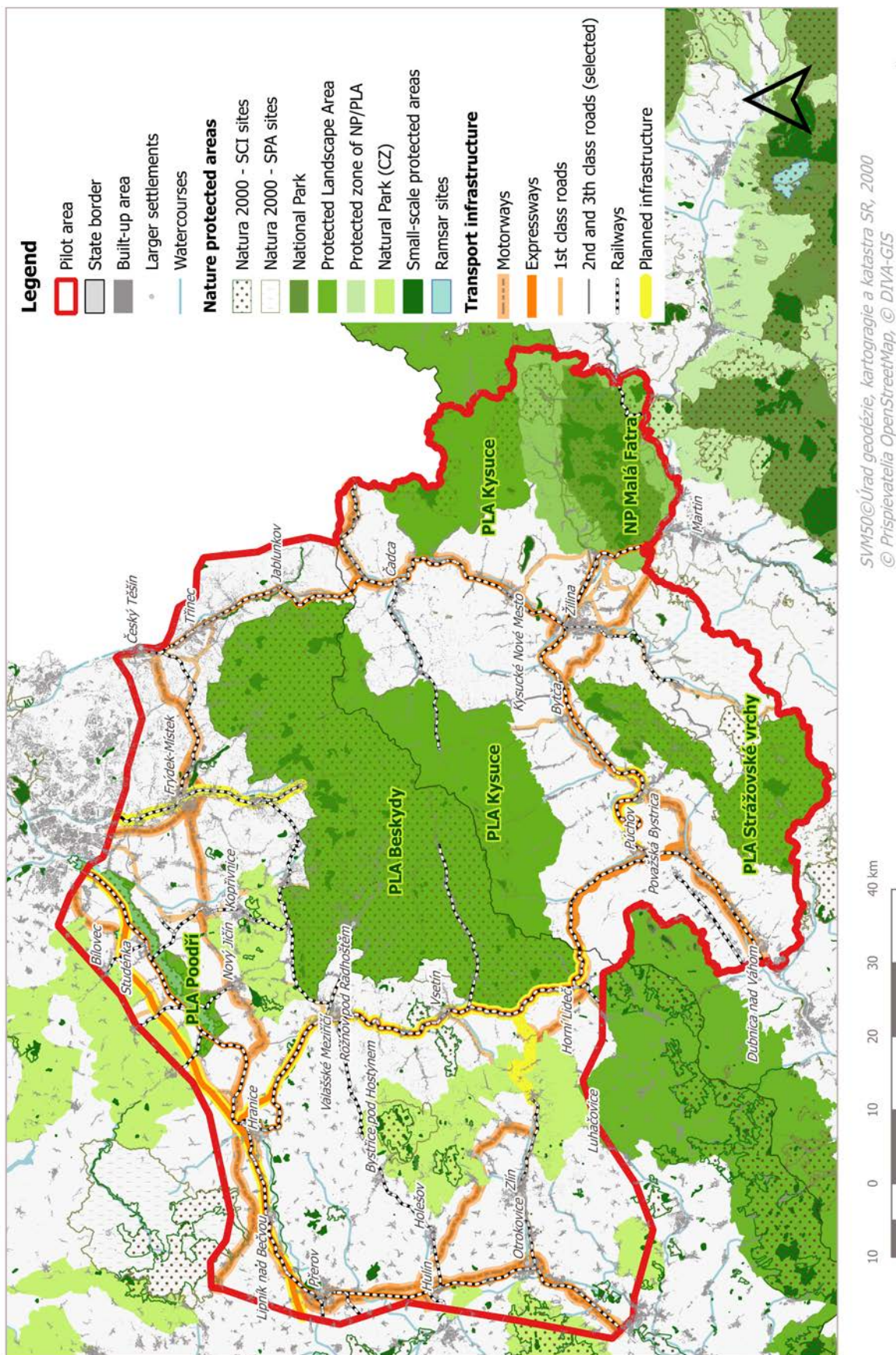


Fig. 1: Beskydy - Kysuce pilot area of TRANSGREEN Project.

SVM50@Úřad geodézie, kartografie a katastra SR, 2000  
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# Aim of the Study



**T**he aim of this document is to provide detailed information on permeability of the pilot area for wildlife and to provide possible solutions for its preservation and / or improvement. For this reason, the most critical places were identified, verified in the field, and mitigation measures were proposed.

### **The main criteria for identification of critical places were:**

- » The absence of urbanization in the transition area of a sufficient width, in the urbanized landscape, taking into account the needs of large carnivores
- » Citation of the site in the literature, or in the documentation on nature conservancy, and especially in the documentation on Regional Territorial Systems of Ecological Stability
- » Documented translocations or collisions of large carnivores with transport infrastructure
- » Threats to the site in connection with the possible planned or unplanned "illegal" urbanization

In the pilot area of Beskydy – Kysuce, the main road and rail infrastructure has already been constructed; however, mostly without any mitigation measures for animal migration. There are also several new roads being planned or under construction. Traffic intensity is an important factor as it influences the area permeability. In many cases, traffic intensity reached more than 5,000 vehicles a day (Dostál 20018 – separate project TRANSGREEN report dedicated to traffic intensity in the pilot area), which creates an impermeable barrier for animals. Barrier effect of roads is also multiplied by the presence of railway and river sections in many places. In addition, intensive and continuous urbanisation of the valleys (often tens of kilometres long) represents a serious problem in the entire area and contributes to the decreased area permeability. Fences and large fields without vegetation create further barriers, which migrating animals must deal with.

Data on road mortality were collected during the field mapping. Railway mortality was recorded by the Slovak Railway Administration and refers to the selected railway sections, which pass through critical places. Monitoring was carried out in the area of PLA Beskydy, NP Malá Fatra, PLA Strážovské vrchy and PLA Kysuce Administration. Photo traps were installed on selected bio-corridors near the roads or in broader areas, where movement of large carnivores or other mammal species was monitored. Certain road sections were

selected to monitor animal mortality and to map animal crossings and animal residence signs near the road.

Information on average daily traffic intensity for all days of the year (AADT) is based on monitoring realised by the Slovak Road Administration in 2015 and by the Czech Road Administration in 1990, 2000 and 2016. Radars placed on selected roads also recorded traffic intensity. Inventory of migration objects (e.g. bridges, underpasses, overpasses) was realized in the entire area.

Based on the information and data accessed, mitigation measures that would help to improve the area permeability for animal species were proposed for each critical place. Some of them are low cost. Others, which usually represent an ideal solution (i.e. ecopassages or underpasses), are more costly and their implementation would be more demanding from the administrative, time, and financial viewpoints. However, even relatively low-cost measures, such as installation of traffic signs, appropriate construction / reconstruction of fences, or planting of natural guiding vegetation can significantly improve landscape permeability or decrease animal mortality.

The document clearly identifies the issue of landscape connectivity in the area and creates a basis for decision-making. It is meant to help the authorities, officers, planners of construction projects and other stakeholders to make decisions, which will benefit both people and nature. There is a lot of experience already in Europe on how to minimize the negative environmental impacts of transport infrastructure. We have a unique opportunity to use this experience to avoid the mistakes of the past and develop transportation infrastructure in a sustainable way.



**Fig. 2:** Animal mortality on roads is a serious problem for many animal populations (Foto: Peter Orolín).



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# Identified critical points and measures proposed



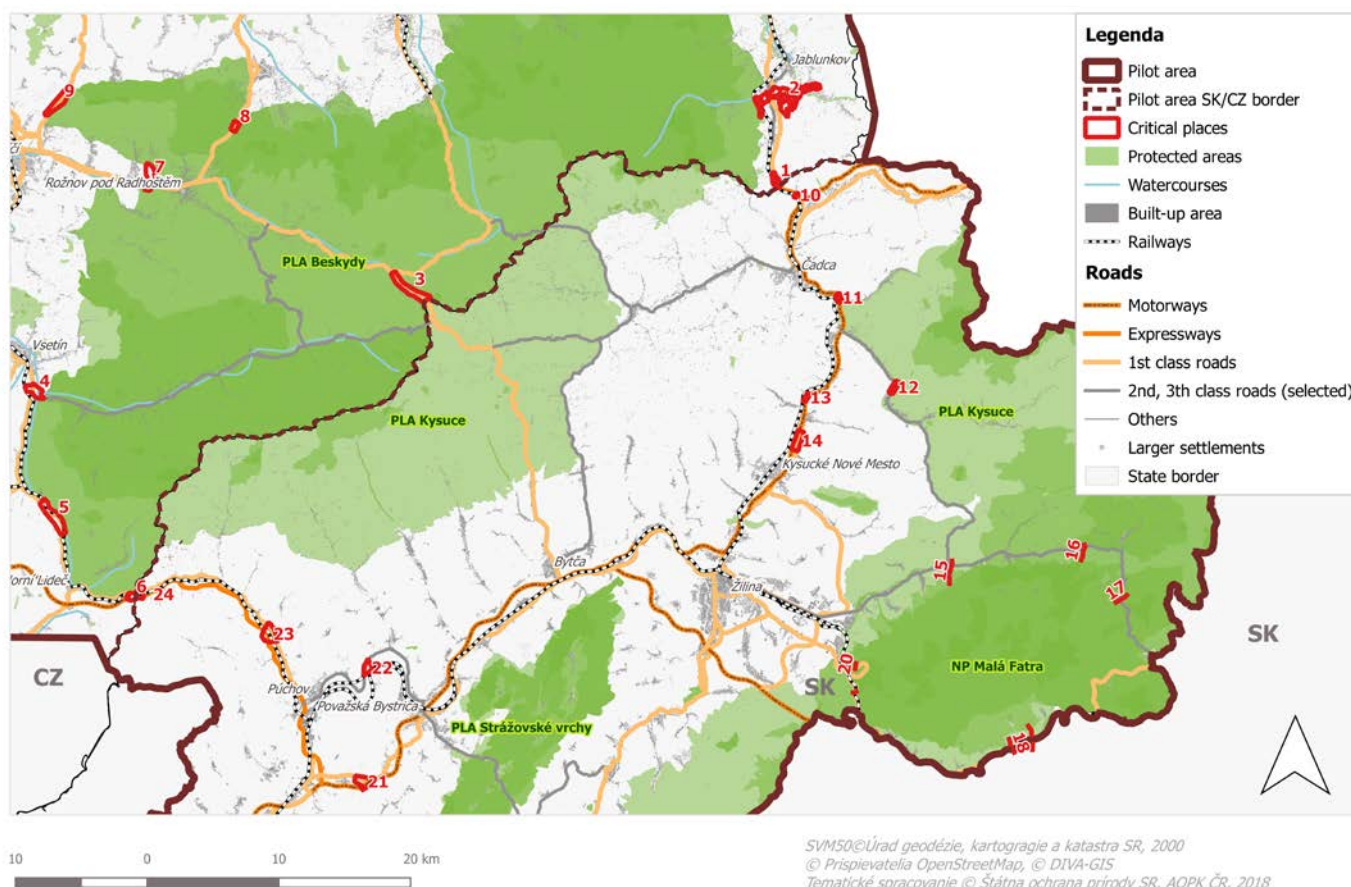
Following is a description of selected identified most important critical points, together with a proposal for possible mitigation measures, which would improve the permeability of these

sites for wildlife. It is absolutely crucial that these areas be maintained permeable to secure the survival of large carnivores in the Western Carpathian mountain range.

**Altogether 24 critical points were identified:**

| CZECH REPUBLIC        |                          | SLOVAKIA        |                      |
|-----------------------|--------------------------|-----------------|----------------------|
| Beskydy PLA           | Kysuce PLA               | Malá Fatra NP   | Strážovské vrchy PLA |
| 1. Mosty u Jablunkova | 10. Svrčinovec           | 15. Bránica     | 21. Visolaje         |
| 2. Jablunkov          | 11. Horelica a Oščadnica | 16. Rovná hora  | 22. Udiča            |
| 3. Horní Bečva        | 12. Klubina              | 17. Sokol       | 23. Mestečko         |
| 4. Vsetín, Janová     | 13. Kysucký Lieskovec    | 18. Turany      | 24. Strelenka        |
| 5. Lidečko, Lužná     | 14. Povina               | 19. Dubná skala |                      |
| 6. Střelná            |                          | 20. Strečno     |                      |
| 7. Zubří              |                          |                 |                      |
| 8. Trojanovice        |                          |                 |                      |
| 9. Hostašovice        |                          |                 |                      |

**Critical places**



**Fig. 3:** Overview of key selected critical places for migration in the pilot area.



## 3.1 Beskydy PLA

### Corridor Number: 1

**Name of the Corridor / source:** Mosty u Jablunkova / biotope of selected and specially protected large mammal species

**Location:** Mosty u Jablunkova Cadastre. Start of the section: 49.4953347, 18.7657836. End of the section: 49.5051175, 18.7585311.

**Linking the geographic unit:** Moravskoslezské Beskydy and Jablunkovské mezioří on both Moravian and Slovak sides

**Transport infrastructure:** roads I/11 (European road E75), II/474, railroad between Mosty u Jablunkova and Čadca (railroad included into TEN-T).

**Traffic intensity (AADT):** roads I/11 – 7,500 (2016), II/474 – 747 (2016), 3,112 (2000), 3,712 – (1990), railway section Třinec – Čadca 61.9 (2016), 89.5 (2000).

**Characteristics:** About 0.5 km wide corridor in SE border of Mosty u Jablunkova along the national border with Slovakia is one of the most important sites for large mammals' migration connectivity. The corridor is located in the flood plain of the Renstok stream. The main barriers here include: the former customs house, vicinity of gas station and

the roads I/11 and II/474, which cross the corridor. In the forest, about 300 m away from the road, there is located a two-track electrified railway line Mosty u Jablunkova-Čadca, where an underpass suitable for large mammals was built.

The annual average daily traffic (AADT) was 7,500 cars per day on the I/11 road sections in 2016, on the road II/474, on the other hand, the intensity dropped to 747 cars per day, i.e. to 20% of the value from year 1990 due to opening of the road I/11. The value of the AADT on the railway line has dropped by about 1/3 since 2000, which in 2016 roughly represented 60 trains per day.

The ecological corridor in Mosty u Jablunkova connects Silesian Beskyds in the east and Moravskoslezské Beskydy in the west. The corridor is characterized by a relatively large proportion of built-up areas in the eastern and central parts.

This corridor has the highest priority for securing large mammals' migration from the east (Poland and Kysuce PLA) to PLA Beskydy, which is also the site of community importance for three species of large mammals (the wolf, lynx and bear).

#### Measures proposed:

Decision has been made to build an ecopassage across the road I/11 in this crucial corridor section. The system of overpasses is planned to be built on Slovak side of the border as well.



Fig. 4: First visualization of the ecopassage from the Czech Road Administration plan.



Fig. 5: Road I/11, location of the planned overpass.



**Fig. 6:** Railway is located on the southern edge of the barrier site.



**Fig. 7:** Ecological corridor in Mosty u Jablunkova, its barrier site along the road I/11 and the railway near CZ- SK border.

## Corridor Number: 2

**Name of the Corridor / source:** Jablunkov / biotope of selected and specially protected large mammal species

**Location:** Cadastres of Jablunkov, Mosty u Jablunkova, Písek u Jablunkova. Start of the section: 49.5568139, 18.7494972. End of the section: 49.5606417, 18.7498406.

**Linking the geographic unit:** Moravskoslezské Beskydy, Milíkovská plošina and Náveská pahorkatina (Jablunkovská brázda), Jablunkovské mezihoří.

**Transport infrastructure:** roads I/11 (European road E75), II/474, III/01149, railway section between Mosty u Jablunkova, Bocanovice (railroad included into TEN-T).

**Traffic intensity (AADT):** roads I/11 – 7 100 (2016); II/474 – 747 (2016), 3 112 (2000), 3 712 – (1990); III/01149 – 290 (2000); railway section Třinec – Jablunkov 79.0 (2016), 95.5 (2000).

**Characteristics:** the corridor is about 5 km long and is located in the cadastre of the town Jablunkov. The corridor lies between the villages of Jablunkov and Písek u Jablunkova, where it crosses the road III/01149 and the river Olše. The corridor further continues along the stream of Liska. It is crossed by road I/11 and road II/474 between towns Jablunkov and Mosty u Jablunkova. In this section, there is a landscape bridge on the road I/11. The critical barrier

site ends after crossing with the electrified two-line railway from Bohumin - Žilina near the PLA Beskydy.

The annual average daily traffic rate (AADT) was 7,100 cars per day on the I/11 road section in 2016, on the other hand, on the road II/474 it dropped to 747 cars per day, i.e. to 20% of the 1990 value due to the operation of the parallel new road I/11. Since year 2000, the value of the AADT on the railway line has decreased by about 20%, and in 2016 it was less than 80 trains per day.

This corridor connects the Jablunkov furrow and the Jablunkovské mezihoří in the NE and the Moravskoslezské Beskydy in the SW. Most of the area in the central part of the corridor consists of meadows and fields with a scattered area of linear bushes and trees along the streams. In the eastern part, the corridor passes from a meadow and then arable land into a forest that separates Jablunkov from the village of Písek u Jablunkova. At the same time, the corridor narrowing to 250 m occurs between Jablunkov and Mosty u Jablunkova and after about 1 km of fields, the corridor continues as a large forest complex to the PLA Beskydy.

### Measures proposed:

1. Create natural guiding vegetation (already partly realized in the western part).
2. Not build another linear infrastructure.
3. Beware of house development / fencing the area.
4. Install the traffic signs "beware of wildlife" in the forested section of the road leading from Jablunkov to Písek (49°33'47.703"N, 18°46'56.275"E).





**Fig. 8:** Middle section of corridor in Jablunkov.



**Fig. 9:** Corridor in the town of Jablunkov.

## Corridor Number: 3

**Name of the Corridor / source:** Horní Bečva / biotope of selected and specially protected large mammal species

**Location:** Cadastres of Bílá, Horní Bečva. Start of the section: 49.4154644, 18.3687236. End of the section: 49.3994431, 18.4092731.

**Linking the geographic unit:** Soláň ridge (Hostýnsko-vsetínská highlands), Mezivodská highlands and Klokočovská highlands (part of Moravskoslezské Beskydy).

**Transport infrastructure:** road I/35 (European road E442)

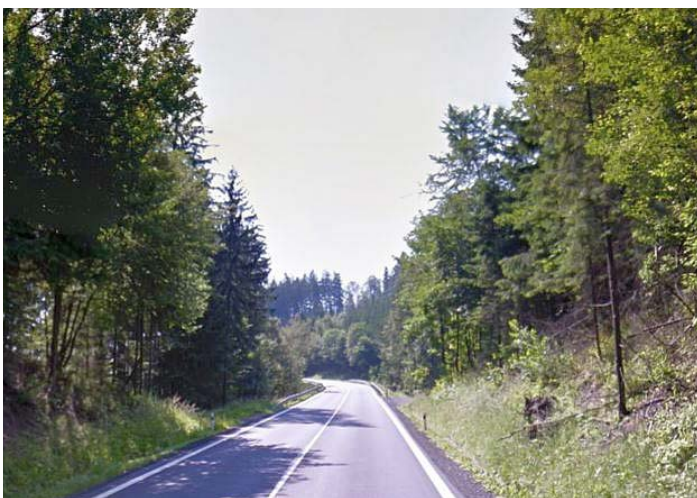
**Traffic intensity (AADT):** road I/35 – 3,280 (2016), 2,722 (2000), 2,133 (1990)

**Characteristics:** The corridor is a wide forested complex between the state border with the Slovak Republic and the SE edge of the cadastral area of the village Horní Bečva. The main barrier is the 1<sup>st</sup> class I/35 road.

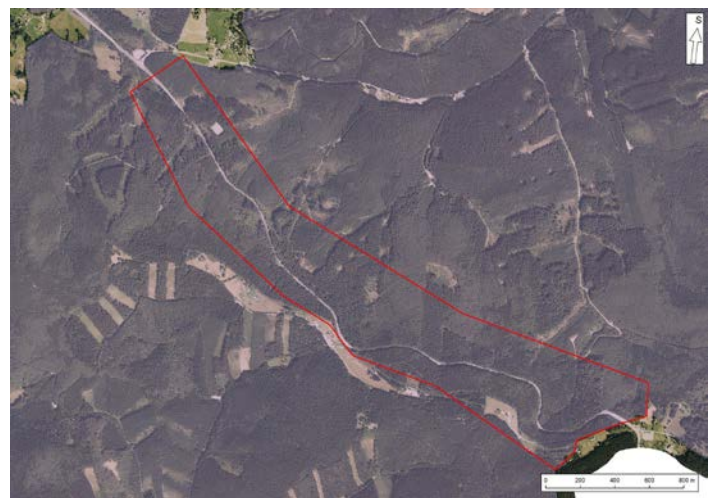
The average daily traffic intensity on I/35 was 3,280 cars per day in 2016, which is an increase by 1/3 compared to 1990. Corridor interconnects the Hostýnsko-Vsetínská highlands with the whole of Moravskoslezské Beskydy to the East-North East.

### Measures proposed:

1. Road verges management – cut trees to make the verge more open (avoid unexpected wildlife intrusion on the road).
2. Install artificial deterrents – light reflectors.
3. Beware of house development / complete fencing of the road (in such cases – over/underpasses need to be built).



**Fig. 10:** 1<sup>st</sup> class road I/35 leads through the corridor.



**Fig. 11:** Location of a barrier site on the corridor (road I/35).

## Corridor Number: 4

**Name of the Corridor / source:** Vsetín, Janová / biotope of selected and specially protected large mammal species

**Location:** Cadastre – Vsetín, Janová, Ústí u Vsetína. Start of the section: 49.3090597, 18.0180367. End of the section: 49.3180125, 18.0044756.

**Linking the geographic unit:** Vizovická highlands, Hostýnsko-vsetínská highlands and Javorníky mountain range

**Transport infrastructure:** road I/57, railway between Ústí u Vsetína and Vsetín (railroad included into TEN-T) and regional railroad between Janová and Vsetín

**Traffic intensity (AADT):** road I/57 – 14,250 (2016), 7,860 (2000), 5,835 (1990), railway: Vsetín-Velké Karlovice – 17.3 (2016) 25.5 (2000), Vsetín-Horní Lideč – 42.3 (2016), 48.0 (2000)

**Characteristics:** A critical site of ecological corridor is located SE from Vsetín, where about 700 m wide flood plain of Vsetínské Bečva is crossed by the I/57 road in the north-south direction. On the left bank of the river, there is a double-track electrified railway

line Horní Lideč-Púchov and a single-track railroad between the municipalities Ústí u Vsetína and Janová.

The annual average daily traffic volumes reached 14,250 vehicles/24 hrs in 2016, representing almost a 2.5 time increase in traffic volume compared to 1990. On the other hand, the transport intensity on the single-track railway dropped roughly by one third between 2000 and 2016. The corridor connects the Vizovice highlands and Javorníky mountain range with the Hostýnsko-Vsetínská highlands. It is a place of contact between two migration corridors in the immediate vicinity of the municipalities of Janová and Ústí. The corridor mainly consists of meadows and arable fields; section of road I/57 is virtually without any accompanying tree vegetation. There is only marginal interference with the built-up area.

### Measures proposed:

1. Create natural guiding vegetation
2. Not build another linear infrastructure and beware of house development / fencing in the area.
3. If the road I/57 is fenced, new mitigation measures must be considered (overpass/underpass according to terrain condition) to maintain the area permeability.



Fig. 12: Section of the road I/57.



Fig. 14: Ecological corridor near Ústí and Janová.



Fig.13: Meadows and fields without scattered vegetation.



## Corridor Number: 5

**Name of the Corridor / source:** Lidečko, Lužná / biotope of selected and specially protected large mammal species

**Location:** Cadasters – Lidečko, Lužná u Vsetína. Start of the section: 49.2173789, 18.0502408. End of the section: 49.2386086, 18.0234831.

**Linking the geographic unit:** Vizovická highlands, Javorníky

**Transport infrastructure:** road I/57, railway between Lidečko and Lužná u Vsetína, (railroad is included into TEN-T).

**Traffic intensity (AADT):** road I/57 – 7,551 (2016), 3,648 (2000), 2,941 (1990), railroad Vsetín – Horní Lideč – 42.26 (2016), 48.1 (2000)

**Characteristics:** The critical site of the corridor is located between the villages of Lidečko and Lužná near Vsetín on the outskirts of the Protected Landscape Area Beskydy. In the space between the settlements of the mentioned villages, there is the 1<sup>st</sup> class road I/57 and the (electrified) double-track railway Vsetín - Horní Lideč. The width of the corridor ranges from 0.4 to 0.7 km and does not interfere with any built-up area.

The average daily traffic volumes averaged 7,551 cars per day in 2016, representing a 2.5-fold increase compared to year 1990. On the contrary, the rail transport intensity has fallen slightly since 2000 and amounted to 42.26 trains per day in 2016.



Fig. 15: Road I/57.

The corridor interconnects the Vizovice Highlands with Javorníky mountain range and is located between the built-up areas of the mentioned municipalities. The corridor consists mainly of forest and meadows. There is also a natural stream of the Senica river. Unfortunately, one Lynx kitten was found dead on road I/57 in this corridor in year 2015.

### Measures proposed:

1. Road verges management – cut off the trees to make the verge more open (thus avoid unexpected wildlife intrusion on the road)
2. Install artificial deterrents – light reflectors on the road I/57 (between 49°13'34.728"N, 18°2'47.889"E and 49°13'7.560"N, 18°3'0.992"E)
3. Install traffic signs "Beware of wildlife" and decrease the speed limit to 70 km/h (in the same road section as above)
4. Beware of house development and complete fencing off the road I/57.
5. If road I/57 is fenced, new mitigation measures should be considered (overpass/underpass according to the terrain condition) to maintain the area permeability.
6. Introduce / agree on obligatory night use of warning siren by trains passing the forested section south of stop Lidečko (between 49°13'6.192"N, 18°3'3.194"E and 49°14'26.859"N, 18°1'32.032"E).
7. It is recommended that a plan to build the water dam not be realized.

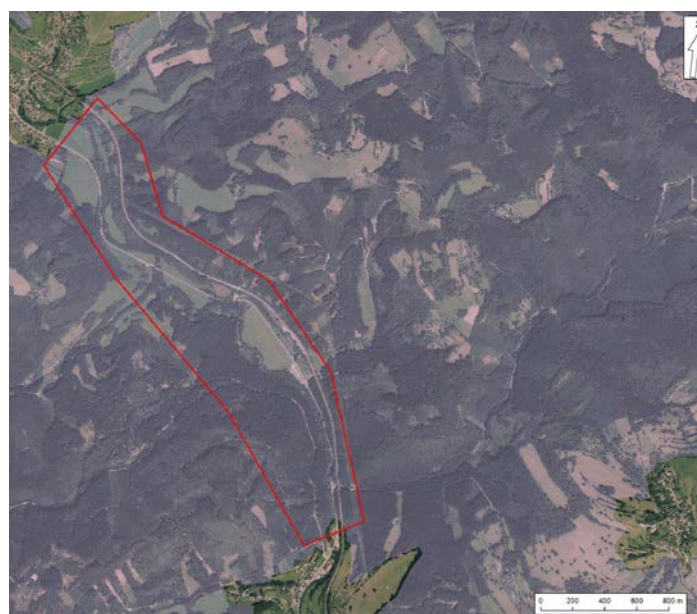


Fig. 16: Critical site on the corridor between Lidečko and Lužná u Vsetína.

## Corridor Number: 6

**Name of the Corridor / source:** Střelná / biotope of selected and specially protected large mammal species

**Location:** Cadastre – Střelná na Moravě. Start of the section: 49.1814361, 18.1228536. End of the section: 49.1824003, 18.1309806.

**Linking the geographic unit:** Študlovská highland (White Carpathians), Strelenecká highland (Javorníky mountain range)

**Transport infrastructure:** road I/49, railway between Horní Lideč and Púchov (SVK), railroad is included into TEN-T

**Traffic intensity (AADT):** road I/49 – 1.665 (2016), 1.406 (2000), railroad Horní Lideč national border – Horní Lideč – 27.89 (2016), 39.7 (2000)

**Characteristics:** The critical site of the corridor is located near the state border with the Slovak Republic in the place of the Lyský Pass at the SE edge of the Beskydy Protected Landscape Area. The main barriers include the 1<sup>st</sup> class road I/49 and the double-track electrified railway from Horní Lideč to Púchov. The width of the corridor is about 0.5 km. South of the railway, there is a fenced game enclosure of Střelná, which is also a migration barrier.

The average daily traffic volumes averaged 1,665 per day in 2016 on road I/49. The corridor of Střelná interconnects Študlovská highlands (White Carpathians) to the southwest with Strelenecká vrchovina (Javorníky mountain range) in the north and separates the built-up area of the municipality of Střelná in the Czech and the municipality of Strelenka village on the territory of Slovakia.

The corridor mainly consists of meadows and fields, further then of smaller forest units and accompanying linear vegetation. On the north-eastern side of the corridor, there is the built-up area of the former customs house. Several buildings are located between the fencing of game enclosure and the river Korytná.

This corridor has the highest priority for large mammals' migration. It connects PLA Beskydy and PLA White Carpathian mountain range and is frequently used by large carnivores on both sides of the national border. A new highway is planned to be built in the future, therefore it is very important to keep this area permeable for wildlife.

### Measures proposed:

1. In case of highway D49 realization, build appropriate underpasses/overpasses/flyover bridge in dimensions for large mammals.

2. Road verges management along the road I/49 – cut off the trees to make the verge more open (to avoid unexpected wildlife intrusion on the road).
3. Install artificial deterrents - light reflectors next to the road I/49 (between 49°10'52.953"N, 18°7'22.267"E and 49°10'56.690"N, 18°7'53.494"E and also on Slovak side of the border (corridor Strelenka) to the point 49°10'59.492"N, 18°8'13.926"E).
4. Install traffic signs "Beware of wildlife" and speed limit to 70 km/h (in the same road section as mentioned above).
5. Beware of house development / complete fencing of road I/49. If road I/49 is fenced than new mitigation measures should be considered (overpass/underpass according to terrain condition) to maintain the permeability of the area
6. Introduce / agree on obligatory night use of warning siren by trains passing the forested section between 49°10'48.737"N, 18°7'17.052"E and 49°10'54.367"N, 18°8'19.971"E (Slovak side of the border).



Fig. 17: Road I/49 leading through the corridor.

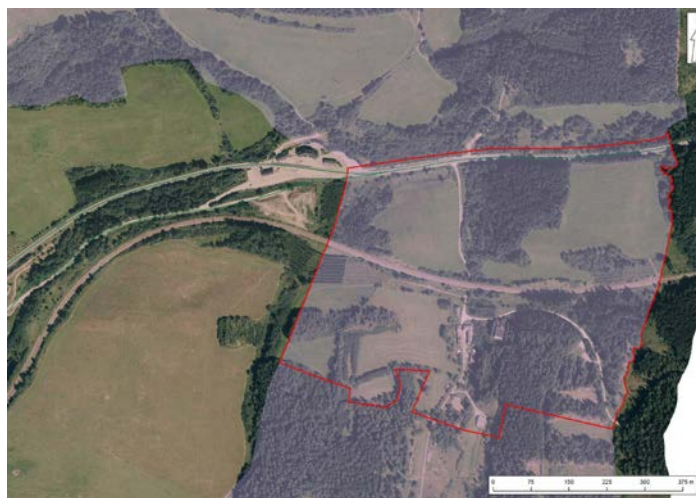


Fig. 18: Migration corridor Střelná with major barriers – road I/49 and railway.



## Corridor Number: 7

**Name of the Corridor / source:** Zubří / biotope of selected and specially protected large mammal species

**Location:** Cadastre – Zubří. Start of the section: 49.4602372, 18.1015381. End of the section: 49.4601953, 18.1094131

**Linking the geographic unit:** Valašskobystřická highland (Hostýnsko-vsetínská highlands), Rožnov furrow and Hodslavický Javorník (Moravskoslezské Beskydy)

**Transport infrastructure:** road I/35, railway between Zubří and Rožnov pod Radhoštěm (regional line).

**Traffic intensity (AADT):** road I/35 (European road E442) – 14,424 (2016), 13,282 (2000), 8,095 (1990), railway Valašské Meziříčí – Rožnov pod Radhoštěm 21.2 (2016), 24.9 (2000)

**Characteristics:** the corridor consists of 2 km arable land between Zubří and Rožnov pod Radhoštěm with the minimum of scattered trees or shrubs. The main migration barrier is the 1<sup>st</sup> class road I/35 and the parallel one-track railway from Rožnov pod Radhoštěm to Valašské Meziříčí. In the narrowest part of the corridor, the built-up areas of both cities are in close proximity.

The average daily traffic volumes averaged 14,144 cars per day on road I/35 in 2016, which represents a 44% increase in traffic compared to 1990. The traffic intensity on the railway dropped by less than 20% between years 2000 and 2016.

The corridor connects the Zašov highland and Valašsko-bystřická highland on south and SW with Hodslavice Javorník in the north/ NW. The corridor

consists mainly of arable land and linear vegetation is present on the right bank of Rožnovská Bečva and around Mlýnský stream. Starozuberský brook, forming the eastern border of the corridor critical place, flows through the forest.

### Measures proposed:

1. Create natural guiding vegetation.
2. Beware of house development between Rožnov and Zubří.
3. The plan to realize industrial zone within the corridor is not favoured.
4. Respect the migration corridor when upgrading road I/35. If road I/35 is fenced, then new mitigation measures must be considered (overpass/underpass according to terrain condition) to maintain the area permeability.
5. Install artificial deterrents – light reflectors next to the road I/35 (between 49°27'36.766"N, 18°5'50.340"E and 49°27'35.938"N, 18°6'34.892"E).



**Fig. 20:** Corridor consists mainly of arable land and accompanying vegetation along the streams.



**Fig. 19:** Migration barriers leading in parallel: 1<sup>st</sup> class road I/35 and regional railway.



**Fig. 21:** Critical barrier site on corridor between Rožnov pod Radhoštěm and Zubří.



## Corridor Number: 8

**Name of the Corridor / source:** Trojanovice / biotope of selected and specially protected large mammal species

**Location:** Cadastre – Trojanovice. Start of the section: 49.5028556, 18.1888828. End of the section: 49.5085683, 18.1934264.

**Linking the geographic unit:** Radhošť ridge, Hodslavický Javorník (Moravskoslezské Beskydy) and Podbeskydská highland

**Transport infrastructure:** road I/58

**Traffic intensity (AADT):** road I/58 – 8,732 (2016), 4,076 (2000), 3,648 (1990)

**Characteristics:** the critical site for migration on the corridor is approx. 0.7 km long section in the forest between Rožnov pod Radhoštěm and Trojanovice municipality. The main migration barrier is the 1<sup>st</sup> class road I/58.

The average daily traffic intensity on road I/58 was 8,732 cars per day in 2016, which represents almost a 2.4-fold increase compared to year 1990. The corridor connects to the Moravskoslezské Beskydy.

This corridor was frequently used by a Lynx female who was tracked thanks to a GPS-radio collar. It crossed the road I/58 several times during the night time.

### Measures proposed:

1. Road verges management – cut trees to make the verge more open (to avoid unexpected wildlife intrusion on the road).
2. Install artificial deterrents – light reflectors next to the road I/58 (between 49°30'7.730"N, 18°11'17.966"E and 49°30'30.579"N, 18°11'36.313"E).
3. Beware of house development / complete fencing of the area. If the road I/58 35 is fenced, then new mitigation measures must be considered (overpass/underpass according to terrain condition) to maintain the area permeability.



Fig. 22: Road I/58 leading through the corridor.



Fig. 23: A critical site for migration on the corridor near Trojanovice.

## Corridor Number: 9

**Name of the Corridor / source:** Hostašovice / biotope of selected and specially protected large mammal species

**Location:** Cadastres – Hostašovice, Krhová, Bynina. Start of the section: 49.5016675, 17.9940311. End of the section: 49.5237219, 18.0156281.

**Linking the geographic unit:** Hodslavický Javorník (Moravskoslezské Beskydy), Veřovice furrow and Helštýn highlands

**Transport infrastructure:** road I/57, railroad between Mořkov and Krhová (railroad is included into TEN-T).

**Traffic intensity (AADT):** road I/57 – 7,398 (2016), 5,960 (2000), 3,979 (1990), railroad Valašské Meziříčí – Veřovice 17.6 (2016), 33.0 (2000).

**Characteristics:** The corridor is located on the westernmost edge of PLA Beskydy between villages Bynina, Krhová and Hostašovice. The migration barriers include the road I/57 and a single-track railway. The forests to the west from the corridor hide an army ammunition warehouse, which is a large, completely fenced and well-guarded area. The annual average daily traffic on road I/57 was 7,398 cars per day in 2016, which represents a nearly 2-fold increase compared to year 1990. The intensity of traffic on the railway fell by almost half between years 2000 and 2016, partly because of a long-term closure of adjacent section due to reconstruction works. The corridor connects the Moravskoslezské Beskydy to the east with the Podbeskyd hills in the west. Road I/57 runs through the forest in the middle and northern part, in the rest of the corridor there are meadows. There is a built-up area at both ends of the corridor

and roughly in the middle of the corridor.

A young wolf female has been found dead on the road in the southern part of this corridor in the cadastre of Krhová in year 2012.

### Measures proposed:

1. Road verges management – cut trees to make the verge more open (to avoid unexpected wildlife intrusion on the road).
2. Install artificial deterrents – light reflectors next to the road I/57 (between 49°30'15.105"N, 17°59'41.734"E and 49°31'25.621"N, 18°0'56.509"E).
3. Beware of house development / complete fencing of the area. If the road I/57 is fenced, then new mitigation measures must be considered (overpass/underpass according to terrain condition) to maintain the area permeability.



Fig. 24: Overall view of the forested part of the corridor.



Fig. 25: Corridor and the 1<sup>st</sup> class road I/57.



Fig. 26: A critical section of corridor near Hostašovice.

## 3.2 Kysuce PLA

### Corridor Number: 10

**Name of the Corridor:** Svrčinovec

**Location:** Svrčinovec Cadastre, 49.491232 / 18.782220 – 49.490015 / 18.784262

**Linking the geographic units of:** Jablunkovské Medzihorie – Moravsko-sliezske Beskydy – Tursovská vrchovina

**Transport infrastructure:** 1<sup>st</sup> class road I/11, train line No. 127 Čadca – Třinec (Czech Republic)

**Traffic intensity (AADT, SSC 2015):** 7,972 vehicles per 24 hours

**Monitoring Period:** 06/2017 – 05/2018

**Characteristics:** The corridor is located 1,880 m from the CZ-SK state border. The width of the corridor is 225 m. Traffic intensity of the 1<sup>st</sup> class road I/11 is 7,972 vehicles/24 hrs. Movement of wildlife is partially hindered by the international train line of Čadca – Třinec, but train related mortality has been low until now. During the monitoring period, 9 traffic related mortalities of smaller wildlife species were recorded. Activity signs of 120 large and middle-size mammals were recorded. Additionally, activity signs of the grey wolf (*Canis lupus*) and the European lynx (*Lynx lynx*) were recorded during the winter monitoring in PLA Kysuce. There is a bridge over the brook between the road I/11 and the train line there in this area, which is permeable for small and middle-sized mammals. In the direction of Svrčinovec, there are other 3 objects which secure better permeability of the area: viaduct No. 237-20, bridge over the railway No. 237-30, and a bridge over the road No. 327-10).

#### Animal mortality on the road, June 2017 – May 2018

| Species                   | Number   |
|---------------------------|----------|
| <i>Anguis fragilis</i>    | 2        |
| <i>Bufo bufo</i>          | 1        |
| <i>Erinaceus concolor</i> | 1        |
| <i>Martes sp.</i>         | 1        |
| <i>Snake sp.</i>          | 1        |
| <i>Small rodent sp.</i>   | 3        |
| <b>Total</b>              | <b>9</b> |

#### Animal mortality on the railway (Čadca – state border, length 6.05 km) during 2016-2017

| Species                    | 2016 | 2017 |
|----------------------------|------|------|
| <i>Capreolus capreolus</i> | 1    | 1    |

#### Animal species or their residence signs observed during June 2017 – March 2018

| Species                    | Number     | Undefined number |
|----------------------------|------------|------------------|
| <i>Capreolus capreolus</i> | 57         | +                |
| <i>Cervus elaphus</i>      | 42         | +                |
| <i>Lutra lutra</i>         | 5          |                  |
| <i>Meles meles</i>         | 2          |                  |
| <i>Sus scrofa</i>          | 5          | +                |
| <i>Vulpes vulpes</i>       | 9          |                  |
| <b>Total</b>               | <b>120</b> | <b>+</b>         |

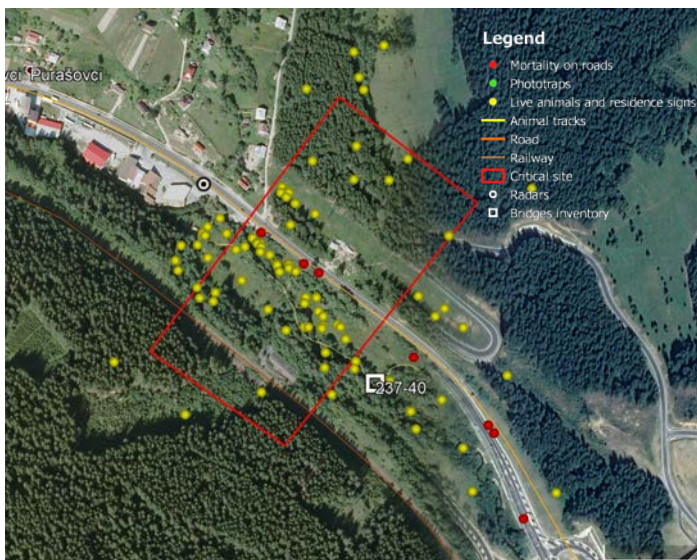
#### Measures proposed:

1. Construction of a green bridge on highway D3 has already been approved and should secure the permeability of this corridor. The surface of the green bridge and its surrounding should be covered in vegetation (native species) which would lead the animals to the bridge and across to the other side. Properly placed fences should support the movement of animals on to the bridge as well. It is important to discourage any building activities and fencing off the plots in the vicinity of the green bridge. Restriction of hunting in the vicinity of the green bridge is also recommended.
2. Up until the bridge has been built, it is recommended to place warning signs (Beware of wildlife crossing, Slow down) to alert the drivers and decrease the speed of the vehicles.
3. There is a bridge (overpass) on D3 near the corridor (bridge No. 237-40) leading over the brook Šlahorov potok, which is permeable for large carnivores. It is recommended that this overpass is kept in the current state.





**Fig. 27:** The corridor and the 1<sup>st</sup> class road I/11.



**Fig. 28:** Map of the corridor with activity signs and animal mortality of wildlife species.



**Fig. 29:** Map of the corridor from a broader perspective.

## Corridor Number: 11

**Name of the Corridor:** Horelica and Oščadnica

**Location:** Horelica Cadastre and Oščadnica Cadastre, 49.425425 / 18.834348 – 49.420362 / 18.837902

**Linking the geographic units of:** Javorníky – Kysucké Beskydy mountain ranges

**Transport infrastructure:** 1<sup>st</sup> class road I/11, 2<sup>nd</sup> class road II/11B, planned highway D3, train line No. 127 Čadca – Krásno nad Kysucou

**Traffic intensity (AADT, SSC 2015):** I/11 – 6,434 – 7,066; I/11A – 15,053; III/2013 – 4,644 vehicles per 24 hours

**Monitoring Period:** 06/2017 – 03/2018

**Characteristics:** This corridor is part of a larger corridor zone, which is about 14.5 km long and leads up to the Polish border. Due to intensive building development, the original length of the functional corridor was reduced from 870 m to just 150 m. Daily traffic intensity on 1<sup>st</sup> class road I/11 reaches more than 7,000 vehicles/24 hrs. Moreover, the local train line section is famous for increased train-related mortality of wildlife. On the train section Krásno nad Kysucou – Čadca, there were 31 wild animals registered as killed on the 9.36<sup>th</sup> km during the last 4 years. The river Kysuca hinders wildlife movement additionally.

During the monitoring process, traffic-related mortality was recorded 45 times, including large game species such as the red deer (*Cervus elaphus*) and roe deer (*Capreolus capreolus*), which indicates a potential suitability of this corridor for large carnivores. In the southern part of the corridor, there is a bridge No. M3135.0 over a brook, which is permeable for mammals of all sizes; however, there is also strong disturbance registered.

### Measure proposed:

The entire corridor zone of 14.5 km (from the town of Čadca to Kysucká brána) is left with only 4 useful and unurbanized sections, where wildlife can cross the road or railways. Their preservation is essential to safeguard the area permeability with a high concentration of large carnivores. The importance of these sections for wildlife has been confirmed by previous studies on the lynx. Several successful crossings were recorded of one lynx in particular by GPS/GSM (Monitoring large predators in the Site of community importance Beskydy, the Czech Republic). Photo monitoring of the occurrence of 3 lynx individuals showed their presence on both sides of the road, which again indicates their successful road crossings (Bojda et al. 2017).

### Animal mortality on the road, June 2017- March 2018

| Species                    | Number    |
|----------------------------|-----------|
| <i>Anas platyrhynchos</i>  | 1         |
| <i>Aves</i>                | 3         |
| <i>Bufo bufo</i>           | 9         |
| <i>Capreolus capreolus</i> | 1         |
| <i>Erinaceus concolor</i>  | 1         |
| <i>Erithacus rubecula</i>  | 1         |
| <i>Falco tinnunculus</i>   | 1         |
| <i>Chiroptera</i>          | 2         |
| <i>Lepus europaeus</i>     | 1         |
| <i>Mammalia</i>            | 1         |
| <i>Martes sp.</i>          | 1         |
| <i>Meles meles</i>         | 1         |
| <i>Mustela putorius</i>    | 1         |
| <i>Parus major</i>         | 1         |
| <i>Rana temporaria</i>     | 15        |
| <i>Sorex minutus</i>       | 1         |
| <i>Sylvia atricapilla</i>  | 1         |
| <i>Sylvia sp.</i>          | 1         |
| <i>Small rodent sp.</i>    | 2         |
| <b>Total</b>               | <b>45</b> |

### Animal mortality on the railway (Krásno nad Kysucou – Čadca, length 9,36 km) during 2014-2017

| Species                    | 2014 | 2015 | 2016 | 2017 |
|----------------------------|------|------|------|------|
| <i>Capreolus capreolus</i> | 1    | 7    | 3    | 6    |
| <i>Cervus elaphus</i>      |      | 3    | 4    | 1    |
| <i>Sus scrofa</i>          |      |      |      | 6    |

### Animal species or their residence signs observed during June 2017 – March 2018

| Species                    | Number    | Undefined number |
|----------------------------|-----------|------------------|
| <i>Capreolus capreolus</i> | 41        | +                |
| <i>Cervus elaphus</i>      | 38        | +                |
| <i>Lutra lutra</i>         | 8         |                  |
| <i>Mustela putorius</i>    | 1         |                  |
| <i>Vulpes vulpes</i>       | 7         |                  |
| <b>Total</b>               | <b>95</b> | <b>+</b>         |

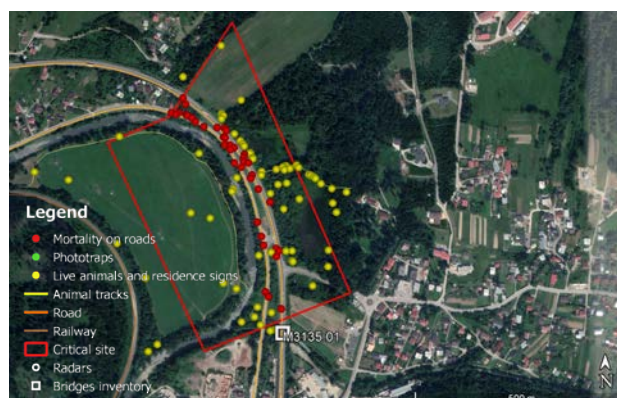


**This area is one of the four areas left unbuilt.**

1. Building a green bridge is the ideal solution in this case for the abovementioned reason. The barrier effect is multiplied by the presence of the road, river and train-line.
2. To place a construction ban in this area and to stop further fencing of the areas nearby.
3. To place warning signs along the road and thus lower the speed of the passing vehicles (Beware of wildlife crossing, Slow down).
4. Due to high railway-related mortality, it is recommended that the critical sections of the railways be located where the collisions take place most frequently. Green bridges with suitably placed fences leading the animals on to the bridge should be built in the identified critical places.
5. On the right side of the river Kysuca, there is an open field. It is recommended that vegetation be planted there, which would lead the animals through the open space to the nearby forest and would offer the animals a hiding place.
6. There is an overpass on the road I/11 leading over the brook near the corridor (bridge No. M3135.01), which is permeable also for large carnivores. It is recommended that the place be kept permeable.



**Fig. 30:** View of the corridor zone and 1<sup>st</sup> class road I/11 and II/11B. Note: the river flows parallel to the road, posing a serious barrier for wildlife movement.



**Fig. 31:** The effective corridor including positions of wildlife occurrence and animal mortality. This is the section which should be protected against further building.



**Fig. 32:** The corridor Horelica-Oščadnica from a broader perspective.

## Corridor Number: 12

**Name of the Corridor:** Klubina, quarry

**Location:** Klubina Cadastre, Zborov nad Bystricou Cadastre, 49.369645 / 18.901652 – 49.360433 / 18.897810

**Linking the geographic units of:** Kysucké Beskydy – Kysucká vrchovina

**Transport infrastructure:** 2<sup>nd</sup> class road II/520

**Traffic intensity (AADT, SSC 2015):** 5,516 vehicles per 24 hours

**Monitoring Period:** 06/2017 – 06/2018

**Characteristics:** The entire corridor zone is 9.5 km long and reaches the state border to Poland. Due to building activities, the functional corridor is about 900 m long. Daily traffic amount on the 2<sup>nd</sup> class road is 5,516 vehicles/24 hrs, which still enables the wildlife to cross. However, the river Bystrica hinders wildlife movements.

During the monitoring period, 29 traffic-related wildlife mortality cases were recorded, including two muskrats (*Ondatra zibethicus*) involved. Wildlife species observed in the vicinity of the road are mentioned in the table below. Out of more than a hundred species, 53 individuals of the red deer and 35 individuals of the roe deer were registered. Approximately 1 km away from the corridor, just behind the village of Klubina, there is a bridge number M2819 over a water stream, which is permeable for middle-sized and small mammals; however, with a strong disturbance.

### Measures proposed:

The corridor is one of the 4 open sections within larger corridor of the river Bystrica valley where wildlife migration is still possible. It is an important connection between the two mountain ranges of Kysucká vrchovina and Kysucké Beskydy, leading up to Poland. In 2017, occurrence of the brown bear was recorded. Once, a bear was directly observed crossing the road. Another bear was hit by a vehicle but was not seriously wounded as it swam off through the river Bystrica (49.364374 / 18.899998). It is essential that the corridor be kept free from any building activities.

1. In case the traffic intensity increases to the point that it would make it difficult for animals to cross (5,000 vehicles/24 hrs), building of the green bridge is recommended.

2. To place a construction ban on this area and to stop further fencing of the areas nearby.
3. To place warning signs along the road and thus lower the speed of the passing vehicles (Beware of wildlife crossing, Slow down).
4. To thin the forest cover in places where forest borders the road in order to safeguard better visibility for drivers as well as for animals.

### Animal mortality on the road, June 2017 – June 2018

| Species                        | Number    |
|--------------------------------|-----------|
| <i>Anguis fragilis</i>         | 7         |
| <i>Apodemus sp.</i>            | 1         |
| <i>Aves</i>                    | 4         |
| <i>Bufo bufo</i>               | 1         |
| <i>Clethrionomys glareolus</i> | 1         |
| <i>Erithacus rubecula</i>      | 1         |
| <i>Mammalia</i>                | 1         |
| <i>Martes foina</i>            | 1         |
| <i>Natrix natrix</i>           | 2         |
| <i>Ondatra zibethicus</i>      | 2         |
| <i>Rana temporaria</i>         | 1         |
| <i>Sylvia atricapilla</i>      | 1         |
| <i>Turdus merula</i>           | 1         |
| <i>Vulpes vulpes</i>           | 1         |
| <i>Small rodent sp.</i>        | 4         |
| <b>Total</b>                   | <b>29</b> |

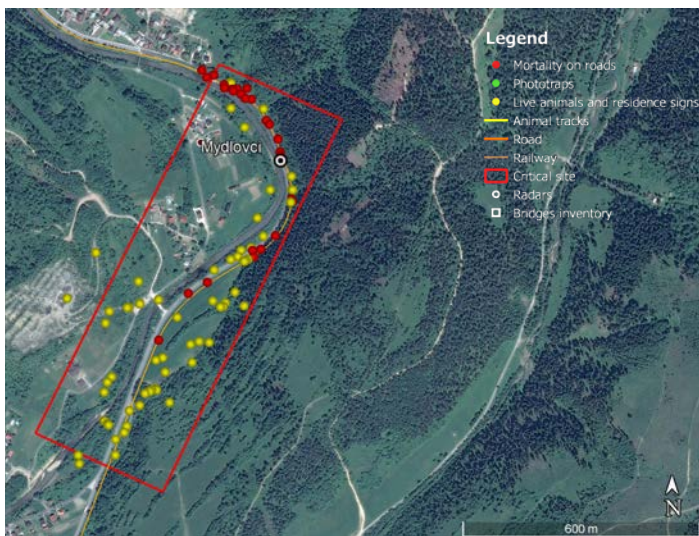
### Animal species or their residence signs observed during June 2017 – March 2018

| Species                    | Number     | Undefined number |
|----------------------------|------------|------------------|
| <i>Capreolus capreolus</i> | 35         | +                |
| <i>Cervus elaphus</i>      | 53         | +                |
| <i>Lepus europaeus</i>     | 3          |                  |
| <i>Lutra lutra</i>         | 1          |                  |
| <i>Meles meles</i>         | 1          |                  |
| <i>Vulpes vulpes</i>       | 8          |                  |
| <b>Total</b>               | <b>101</b> | <b>+</b>         |

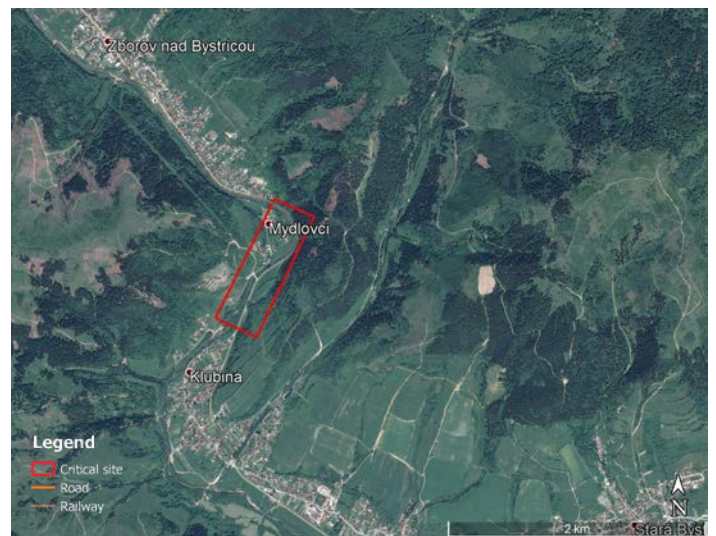




**Fig. 33:** View of the corridor zone intersected by the 2<sup>nd</sup> class road II/520. Note that forests approach the road on both sides of the road, which is very suitable for wildlife movements.



**Fig. 34:** Map of the corridor including the occurrence of wildlife animal road mortality on road. The surrounding area has lacked urbanization so far, which is very useful for wildlife.



**Fig. 35:** The corridor Klubina from a broader perspective.

## Corridor Number: 13

**Name of the Corridor:** Kysucký Lieskovec

**Location:** Kysucký Lieskovec Cadastre, 49.349384 / 18.809301 – 49.356227 / 18.813834

**Linking the geographic units of:** Kysucká vrchovina – Javorníky mountain ranges

**Transport infrastructure:** 1<sup>st</sup> class road I/11, 3<sup>rd</sup> class road, the planned highway D3 and train line No. 127 Krásno nad Kysucou – Žilina

**Traffic intensity (AADT, SSC 2015):** I/11 - 14,176; III/2017 - 666 vehicles per 24 hours

**Monitoring Period:** 06/2017 – 03/2018

**Characteristics:** The length of the corridor is about 1,200 m. Daily traffic on the road I/11 is about 14,176 vehicles/24 hrs, which constitutes a movement barrier for wildlife. Additionally, the river Kysuce is hindering wildlife movement. On the train line between Kysucké Nové mesto and Krásno nad Kysucou, 14 killed ungulates were registered by the Slovak Railways during years 2014 – 2017. Majority of the area is used for agriculture and lacks vegetation where wildlife can successfully hide during road crossings. In the place with a suitable vegetation cover, there is a junction to the village Krásno nad Kysucou.

### Measure proposed:

1. As this place is one of the four open spaces left unbuilt within the larger corridor area with the length of 14.5 km, building a green bridge is an optimal solution for this area. Additionally, the barrier effect of this area is intensified by the presence of several linear barriers – the road, the train-line and the river.
2. To place a construction ban on this area and to stop further fencing of the areas nearby.
3. To place warning signs along the road and thus lower the speed of the passing vehicles (Beware of wildlife crossing, Slow down).
4. Due to high railway-related mortality, it is recommended that the critical sections of the railways be located where the collisions take place most frequently. Green bridges with suitably placed fences leading the animals on to the bridge should be built in identified critical places.
5. It is recommended that vegetation be planted on the left side of the river Kysuca, which would lead the animals through the open space to the nearby forest and would offer a hiding place to the animals.

### Animal mortality on the road, June 2017- March 2018

| Species                    | Number    |
|----------------------------|-----------|
| <i>Aves sp.</i>            | 2         |
| <i>Bufo bufo</i>           | 5         |
| <i>Erinaceus concolor</i>  | 1         |
| <i>Garrulus glandarius</i> | 1         |
| <i>Chiroptera</i>          | 1         |
| <i>Martes sp.</i>          | 1         |
| <i>Sylvia atricapilla</i>  | 1         |
| <i>Small rodents sp.</i>   | 4         |
| <b>Total</b>               | <b>16</b> |

### Animal mortality on the railway (Kysucké Nové Mesto – Krásno nad Kysucou, length 7.6 km) during 2014-2017

| Species                    | 2014 | 2015 | 2016 | 2017 |
|----------------------------|------|------|------|------|
| <i>Capreolus capreolus</i> | 4    | 2    | 1    |      |
| <i>Cervus elaphus</i>      | 3    |      | 1    | 3    |

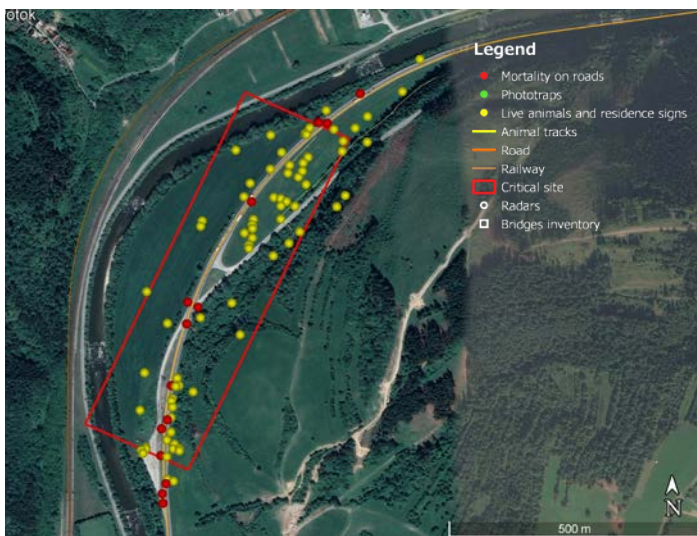
### Animal species or their residence signs observed during June 2017 – March 2018

| Species                    | Number    | Undefined number |
|----------------------------|-----------|------------------|
| <i>Artiodactyla</i>        | 2         | +                |
| <i>Capreolus capreolus</i> | 23        | +                |
| <i>Cervus elaphus</i>      | 20        | +                |
| <i>Sus scrofa</i>          | 38        | +                |
| <i>Vulpes vulpes</i>       | 6         |                  |
| <b>Total</b>               | <b>89</b> | <b>+</b>         |

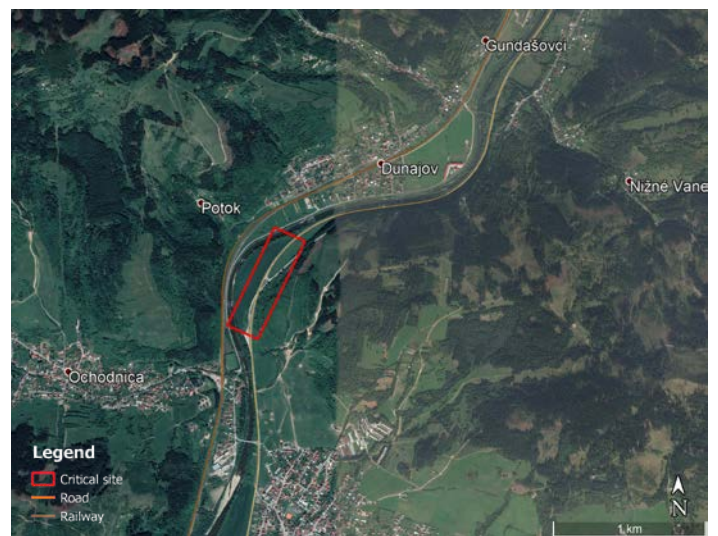




**Fig. 36:** View of the corridor and the 1<sup>st</sup> class road I/11.



**Fig. 37:** Map of the corridor with activity signs of 4 mammal species.



**Fig. 38:** The corridor Kysucký Lieskovec from a broader perspective.

## Corridor Number: 14

**Name of the Corridor:** Povina

**Location:** Povina Cadastre, 49.316315 / 18.804618 – 49.330347 / 18.808478

**Linking the geographic units of:** Kysucké vrchovina – Javorníky mountain range

**Transport infrastructure:** 1<sup>st</sup> class road I/11, planned highway D3, train line No. 127 Krásno nad Kysucou – Žilina

**Traffic intensity (AADT, SSC 2015):** 14,186 vehicles per 24 hours

**Monitoring Period:** 06/2017 – 03/2018

**Characteristics:** the corridor is 2,360 m wide and is intersected by the 1<sup>st</sup> class road I/11 with daily traffic intensity of more than 14,186 vehicles/24 hrs. Such heavy traffic intensity can seriously impede wildlife movement, especially in combination with the local river Kysuca and the train line (Krásno nad Kysucou – Žilina). Probably due to this unfortunate combination of barriers, we recorded a high traffic-related mortality of 59 animal species altogether, even including large mammals like the roe and the red deer. The table below provides an overview of the recorded activity of 6 mammals. Out of 108 individuals, there were 52 red deer and 41 roe deer. 14 animals were registered as killed on the railway line Kysucké Nové Mesto – Krásno nad Kysucou, which is passing through the corridor, during years 2014-2017.

### Measure proposed:

1. As this place is one of the four open spaces left unbuilt within the larger corridor area 14.5 km long, building a green bridge is an optimal solution for this area. Additionally, the barrier effect of this area is intensified by the presence of several linear barriers – the road, the train line and the river.
2. To place a construction ban on this area and to stop further fencing of the areas nearby.
3. To place warning signs along the road and thus lower the speed of the passing vehicles (Beware of wildlife crossing, Slow down).
4. Due to high railway-related mortality it is recommended that the critical sections of the railways be located where the collisions take place most frequently. Green bridges with suitably placed fences leading the animals on to the bridge should be built in identified critical places.

### Animal mortality on the road, June 2017- March 2018

| Species                       | Number    |
|-------------------------------|-----------|
| <i>Apodemus agrarius</i>      | 1         |
| Aves                          | 8         |
| <i>Bufo bufo</i>              | 10        |
| <i>Capreolus capreolus</i>    | 2         |
| <i>Cervus elaphus</i>         | 1         |
| <i>Erinaceus concolor</i>     | 2         |
| <i>Erithacus rubecula</i>     | 5         |
| <i>Fringilla coelebs</i>      | 5         |
| Chiroptera                    | 3         |
| <i>Lepus europaeus</i>        | 2         |
| <i>Martes sp.</i>             | 2         |
| <i>Muscicapa striata</i>      | 1         |
| <i>Parus caeruleus</i>        | 1         |
| <i>Parus major</i>            | 1         |
| <i>Phylloscopus collybita</i> | 1         |
| <i>Rana temporaria</i>        | 1         |
| <i>Salamandra salamandra</i>  | 2         |
| <i>Sturnus vulgaris</i>       | 1         |
| <i>Sylvia atricapilla</i>     | 3         |
| <i>Talpa europaea</i>         | 2         |
| <i>Turdus merula</i>          | 2         |
| <i>Turdus philomelos</i>      | 3         |
| Small rodent sp.              | 26        |
| <b>Total</b>                  | <b>85</b> |

### Animal railway mortality (Kysucké Nové Mesto – Krásno nad Kysucou, length 7.6 km), during 2014-2017

| Species                    | 2014 | 2015 | 2016 | 2017 |
|----------------------------|------|------|------|------|
| <i>Capreolus capreolus</i> | 4    | 2    | 1    |      |
| <i>Cervus elaphus</i>      | 3    |      | 1    | 3    |

### Animal species or their residence signs observed during June 2017 – March 2018

| Species                    | Number | Undefined number |
|----------------------------|--------|------------------|
| <i>Capreolus capreolus</i> | 41     | +                |
| <i>Cervus elaphus</i>      | 52     | +                |
| <i>Lepus europaeus</i>     | 1      |                  |
| <i>Lutra lutra</i>         | 1      |                  |
| <i>Sus scrofa</i>          | 4      | +                |
| <i>Vulpes vulpes</i>       | 9      |                  |



5. It is recommended that vegetation be planted on the right side of the river Kysuca, which would lead the animals through the open space to the nearby forest and would offer a hiding place to the animals.

6. To thin out the forest cover in places where the forest borders the road in order to safeguard better visibility for drivers as well as for the animals.



Fig. 39: View of the corridor Povina and the 1<sup>st</sup> class road I/11.

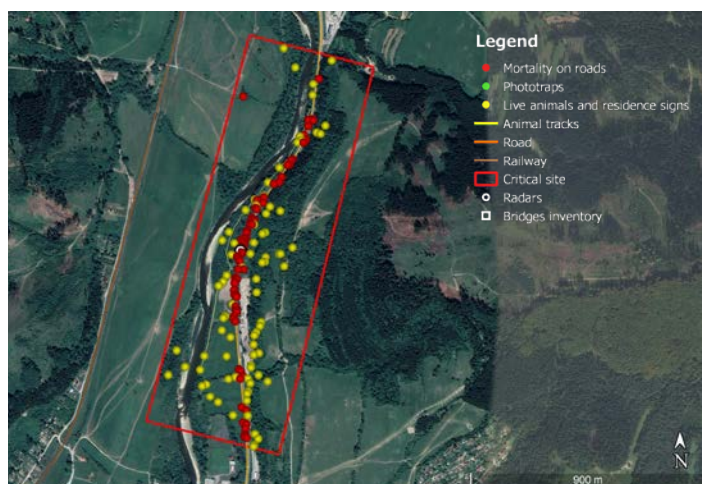


Fig. 40: Map of the corridor with activity signs of mammals and road animal mortality.

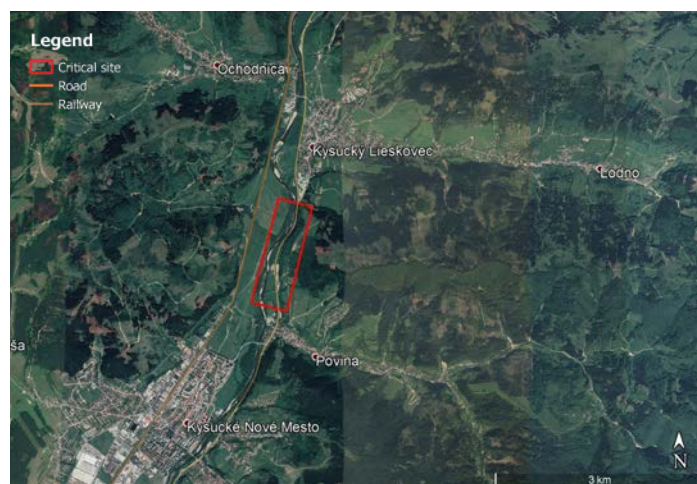


Fig. 41: The corridor Povina from a broader perspective.

# 3.3 Malá Fatra NP

## Corridor Number: 15

**Name of the Corridor:** Bránica

**Location:** Belá Cadastre

**Linking the geographic units of:** Malá Fatra – Žilinská kotlina (Varínske podolie) – Kysucká vrchovina

**Transport infrastructure:** 2<sup>nd</sup> class road II/583, 3<sup>rd</sup> class road III/2035

**Traffic intensity (AADT, SSC 2015):** II/583 – 6,741; III/2035 – 1,838 vehicles per 24 hours

**Monitoring Period:** 04/2017 – 03/2018

**Characteristics:** The corridor is located between the villages of Belá and Terchová and is approximately 300 m long. The eastern edge of the corridor is defined by 40-70 m wide scallop-edged vegetation alongside the bank of the river Bránica. The Western edge of the corridor is defined by shrubs and non-woody vegetation about 60 m wide. This kind of short but dense vegetation constitutes an important part of the corridor site. At the corridor, there are agricultural areas and a small road leading to recreational facilities. Additionally, the 2<sup>nd</sup> class road II/583 transects the corridor in East-West direction. The traffic intensity is about 6,741 vehicles/24 hrs, which means it is still possible for wildlife to cross. The frequent traffic-related mortality of wildlife can be partially explained by the presence of attractive farm crops, which causes high but seasonal occurrence of animals. Throughout the course of one year, 10 animals died on the monitored section of the road. There is a speed limit of 50 km/h set for the area in the direction from the village of Zázrivá.

**Measures proposed:**

1. To maintain the vegetation cover on the west edge of the corridor as a feature contributing to the functionality of this corridor.
2. To avoid planting the nearby fields with the crops attractive to large mammals (e.g. corn) in order

3. Not to support any further development of nearby recreational area.
4. To place further warning signs along the road and thus lower the speed of the passing vehicles (Beware of wildlife crossing, Slow down).



**Fig. 42:** View of the corridor Bránica and the 2<sup>nd</sup> class road II/583. Note: the forest approaches the road on both sides, which is preferred by wildlife for road crossings.



**Fig. 43:** Map of the corridor Bránica.



**Fig. 44:** The corridor Bránica from a broader perspective.

**Animal mortality on the road, June 2017- March 2018**

| Species                    | Number    |
|----------------------------|-----------|
| <i>Capreolus capreolus</i> | 1         |
| <i>Erinaceus concolor</i>  | 1         |
| <i>Lutra lutra</i>         | 1         |
| <i>Martes foina</i>        | 2         |
| <i>Vulpes vulpes</i>       | 5         |
| <b>Total</b>               | <b>10</b> |



## Corridor Number: 16

**Name of the Corridor:** Rovná hora

**Location:** Cadastre Zázrivá

**Linking the geographic units of:** Malá Fatra - Kysucká vrchovina

**Transport infrastructure:** 2<sup>nd</sup> class road II/583

**Traffic intensity (AADT, SSC 2015):** 3,963 vehicles per 24 hours

**Monitoring period:** 06/2017 – 01/2018

**Characteristics:** The 250 m wide corridor is located at the Eastern rise of the saddle of Rovná Hora between the villages of Zázrivá and Terchová. It connects NATURA 2000 sites Zázrivské lazy and Malá Fatra, therefore its protection is very important. The corridor is located in open landscape and defined by a 100 m wide stripe of shrubs and single trees around pastures. The 2<sup>nd</sup> class road II/583 with traffic intensity of 3,963 vehicles / 24 hrs transects the corridor.

Top of the saddle is partially built-up by a restaurant and a parking place. In the south, the corridor is limited by a sheep close with electric fencing. Despite these two human structures, the place serves as a place of wildlife movement. However, it is recommended that no new human infrastructure be added to the site.

### Measures proposed:

1. Not to support any further development of nearby human-made structures and to avoid fencing the area off. Permeability of the existing electric fence will be monitored in the near future.
2. To maintain the existing stripe of vegetation and to add further vegetation which would lead the animals across the pastures.
3. To place warning signs along the road and thus lower the speed of the passing vehicles (Beware of wildlife crossing, Slow down).

### Animal mortality on the road June 2017 - January 2018

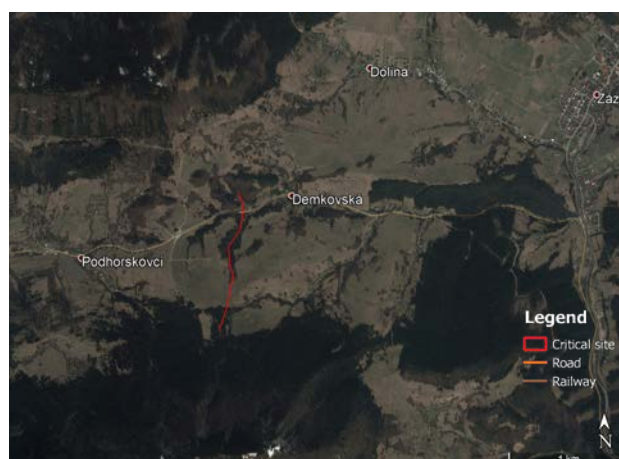
| Species                   | Number |
|---------------------------|--------|
| <i>Erinaceus concolor</i> | 2      |
| <i>Vulpes vulpes</i>      | 2      |



**Fig. 45:** View of the corridor Rovná hora. It is a quite open landscape but can be used by animals due to small forest stripes that connect the continuous forests.



**Fig. 46:** Map of the corridor Rovná hora.



**Fig. 47:** The corridor Rovná Hora from a broader perspective.



## Corridor Number: 17

**Name of the Corridor:** Sokol

**Location:** Párnica Cadastre

**Linking the geographic units of:** Malá Fatra – Malá Fatra

**Transport infrastructure:** 2<sup>nd</sup> class road II/583

**Traffic intensity (AADT, SSC 2015):** 3,991 vehicles/24 hours

**Monitoring Period:** 06/2017 - 06/2018

**Characteristics:** The corridor Sokol is located in the valley of the small river Zázrivka, within the NATURA 2000 site called Malá Fatra. This river separates certain parts of the Malá Fatra National Park (Lysica, Hrčová Kečka, valley Čremoš) from its central parts. Still, the corridor is 5 km long and connecting several mountain ranges (Oravská Magura, Kysucká vrchovina, Malá Fatra, Chočské vrchy).

The road II/583 leads through a very narrow valley where further expansion is not expected and the speed limit is naturally restricted, which is positive for wildlife movement. Daily traffic is around 3,991 vehicles/24 hrs, which means it is possible for wildlife to cross the road. Eight killed animals were recorded on the road within a year.

### Measures proposed:

1. Due to natural conditions of the area where the speed limit is naturally restricted, the only recommendation is that the current state of the road be maintained, and warning signs be placed along the road to alert the drivers of the possibility of wildlife crossing (Beware of the wildlife).

### Animal mortality on the road July 2017 - June 2018

| Species                      | Number   |
|------------------------------|----------|
| <i>Lutra lutra</i>           | 1        |
| <i>Martes sp.</i>            | 2        |
| <i>Mustela putorius</i>      | 1        |
| <i>Salamandra salamandra</i> | 1        |
| <i>Sciurus vulgaris</i>      | 1        |
| <i>Turdus merula</i>         | 1        |
| <i>Vipera berus</i>          | 1        |
| <b>Total</b>                 | <b>8</b> |



Fig. 48: The corridor Sokol with registered animal mortality.

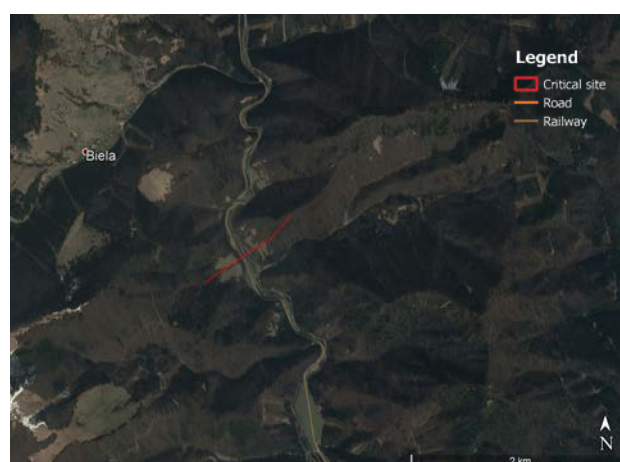


Fig. 49: The corridor Sokol from a broader perspective.



Fig. 50: View of the corridor Sokol and the 2<sup>nd</sup> class road II/583. The area is densely forested and facilitates frequent wildlife movement.

## Corridor Number: 18

**Name of the Corridor:** Turany 1 and Turany 2

**Location:** Turany Cadastre

**Linking the geographic units of:** Malá Fatra – Martinská kotlina – Veľká Fatra Mts.

**Transport infrastructure:** 1<sup>st</sup> class road I/18, Highway D1, Train line No. 180

**Traffic intensity (AADT, SSC 2015):** I/18 - 5,286; D1-11,047 vehicles per 24 hours

**Monitoring Period:** 036/2017 – 01/2018

**Characteristics:** These two corridors are located in the north of the Turčianska kotlina valley, which connects the mountain ranges of Malá and Veľká Fatra. Majority of bear traffic-related mortality in Malá Fatra is located at Turany 1, which can be partially explained by I/18 high daily traffic volume of 17,005 vehicles/24 hrs. Before the construction of D1 highway, these two corridors could be considered as one united corridor. Now they are separated by the motorway infrastructure.

Wildlife is lured close to the I/18 road by crops planted on the nearby fields. Enlargement of nearby industrial area along the I/18 road can also worsen the situation. Furthermore, wildlife movement is limited by the 1<sup>st</sup> class road I/18, train lines, a canal and the river Váh.

Otherwise, the area is characterised by pastures, although restricted by several settlements (Šutovo, Ratkovo, Turany).

During the monitoring, 14 killed animals were recorded (mainly on the road I/18) during the period of ten months. There is quite a high animal mortality on the train line Kral'ovany – Turany, which crosses the area. During the years 2014-2017, the Slovak Railway registered 16 killed animals, including one bear individual. There are 2 bridges over the road, one bridge over the highway and one channel in the monitored area. All of them are permeable for animals and thus increase the permeability of the area.

### Measures proposed:

The appropriate assessment recommended the construction of a 250 m green bridge in this area as a mitigation measure during the construction of the highway section D1 Turany – Hubová. However, currently, only a 100 m wide green bridge is planned, which is stated in the EIA Final Report.

Green bridge could safeguard the area permeability; however, it is difficult to confirm this at this stage due to high concentration of collision features in this area (highway, road, two-lane railway, derivation water channel, stone pits). Enlargement of industrial park near the road I/18 can worsen the situation even further.

1. The surface of the green bridge and its surroundings should be covered in vegetation (native species), which would lead the animals to the bridge and across to the other side. Properly placed fences should support the movement of animals on to the bridge as well. It is important to discourage any building activities and fencing off the plots in the vicinity of the green bridge. Restriction of hunting around the green bridge is also recommended.
2. Until the bridge has been built, it is recommended that warning signs be placed in the area (Beware of wildlife crossing, Slow down) to alert the drivers and decrease the speed of the vehicles.
3. To avoid planting the nearby field with crops which attract wildlife (bears and ungulates) as this is one of the most problematic section in connection with the collisions with the brown bear.
4. Three bridges were found in the vicinity of these two corridors. It is thus recommended that their current state be maintained, and their permeability be kept:
  - » On the right side of Turany 1 there is a permeable underpass
  - » Between the corridors of Turany 1 and 2 there is a permeable underpass
  - » On the left side of Turany 2 there is a permeable overpass

### Animal mortality on the road between March 2017 – January 2018

| Species                       | Number    |
|-------------------------------|-----------|
| <i>Bufo bufo</i>              | 2         |
| <i>Capreolus capreolus</i>    | 3         |
| <i>Lepus europaeus</i>        | 2         |
| <i>Lutra lutra</i>            | 1         |
| <i>Martes foina</i>           | 1         |
| <i>Mustela nivalis</i>        | 1         |
| <i>Nyctereus procyonoides</i> | 1         |
| <i>Pica pica</i>              | 1         |
| <i>Vulpes vulpes</i>          | 2         |
| <b>Total</b>                  | <b>14</b> |

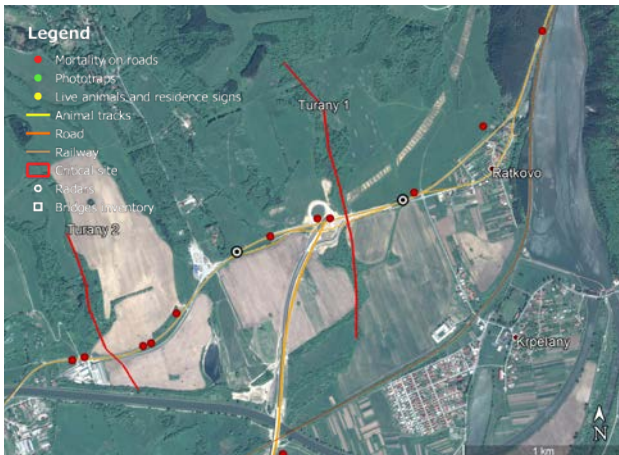
### Animal mortality on the railway (Kral'ovany – Turany, length 8,67 km) during 2014-2017

| Species                    | 2014 | 2015 | 2016 | 2017 |
|----------------------------|------|------|------|------|
| <i>Capreolus capreolus</i> | 1    | 2    |      | 3    |
| <i>Cervus elaphus</i>      | 1    | 1    | 3    | 3    |
| <i>Sus scrofa</i>          |      |      |      | 1    |
| <i>Ursus arctos</i>        | 1    |      |      |      |





**Fig. 51:** View of the 1<sup>st</sup> class road I/18 at the corridor site Turany.



**Fig. 52:** Map of the corridor Turany. Unfortunately, the area is quite densely built-up by human infrastructure.



**Fig. 53:** The corridor Turany from a broader perspective.



## Corridor Number: 19

**Name of the Corridor:** Dubná skala

**Location:** Vrútky Cadastre

**Linking the geographic units of:** Malá Fatra – Malá Fatra

**Transport infrastructure:** 1<sup>st</sup> class road I/18, train line No. 180

**Traffic intensity (AADT, SSC 2015):** 26,831 vehicles / 24 hours

**Monitoring Period:** 10/2017 - 04/2018

**Characteristics:** The corridor is located on the border of Lučanská Fatra and Krivánska Fatra and includes the river Váh. The surrounding area of the corridor is primarily characterized by continuous forests, although intersected by the river Váh. The steep slopes can hinder wildlife movement. The entire area is additionally fragmented by the 1<sup>st</sup> class road I/18 with high traffic intensity – more than 26,000 vehicles/24h, and the train line Bratislava – Košice. Closeness of these two linear infrastructures is probably the reason for high bear mortality in this area.

The rail line of Dubná Skala – Strečno (11.49 km), which passes through the corridor, is known for its high animal mortality. 24 killed animals were recorded by Slovak Railway in 2014 – 2017.

### Measures proposed:

1. If the highway D1 is constructed in the future, reduced traffic volume can be expected, which will increase functionality of the corridor.
2. Until then it is recommended that warning signs be placed as the very minimum (Beware of wildlife crossing) to alert the drivers.

### Animal road mortality between October 2017 – April 2018

| Species                    | Number   |
|----------------------------|----------|
| <i>Capreolus capreolus</i> | 1        |
| <i>Martes foina</i>        | 1        |
| <i>Martes sp.</i>          | 2        |
| <i>Sciurus vulgaris</i>    | 1        |
| <b>Total</b>               | <b>5</b> |

### Animal railway mortality (Dubná Skala - Strečno, length 11.49 km) between 2014-2017

| Species                    | 2014 | 2015 | 2016 | 2017 |
|----------------------------|------|------|------|------|
| <i>Capreolus capreolus</i> | 4    | 5    | 2    | 4    |
| <i>Cervus elaphus</i>      |      | 1    | 1    | 4    |
| <i>Sus scrofa</i>          |      | 2    |      |      |
| <i>Ursus arctos</i>        |      |      | 1    |      |



Fig. 54: Map of the corridor Dubná skala.



Fig. 55: The corridor Dubná Skala from a broader perspective.

## Corridor Number: 20

**Name of the Corridor:** Strečno

**Location:** Strečno Cadastre

**Linking the geographic units of:** Malá Fatra – Malá Fatra

**Transport infrastructure:** the 1<sup>st</sup> class road I/18, train line No. 180

**Traffic intensity (AADT, SSC 2015):** 26,831 vehicles / 24 hours

**Monitoring Period:** 06/2017 – 05/2018

**Characteristics:** As the above-mentioned corridor Dubná skala, this corridor is located between the mountain ranges of Lučanská Fatra and Krivánska Fatra and includes the river Váh. The surrounding area of the corridor is mainly characterized by continuous forests intersected by the river Váh. The area is additionally fragmented by the 1<sup>st</sup> class road I/18 with high traffic intensity (more than 26,000 vehicles/24 hrs) and the train line Bratislava – Košice. There is high wildlife road mortality, which is most likely the result of the blocked movement route, not only due to the infrastructure, but also due to natural barriers (steep slopes and the river Váh).

The rail line section between Dubná Skala – Strečno (11.49 km), which passes through the corridor, is known for its high animal mortality. 24 killed animals were recorded by the Slovak Railway between 2014 – 2017

### Measures proposed:

1. If the highway D1 is constructed in the future, reduced traffic volume can be expected, which will increase functionality of the corridor.
2. Until then it is recommended that warning signs be placed as the very minimum (Beware of wildlife crossing) to alert the drivers.

### Animal road mortality between June 2017 – May 2018

| Species                    | Number   |
|----------------------------|----------|
| <i>Capreolus capreolus</i> | 1        |
| <i>Erinaceus concolor</i>  | 1        |
| <i>Motacilla alba</i>      | 1        |
| <i>Sciurus vulgaris</i>    | 1        |
| <i>Turdus merula</i>       | 1        |
| <i>Ursus arctos</i>        | 1        |
| <b>Total</b>               | <b>6</b> |



Fig. 56: Map of the corridor Strečno and the 1<sup>st</sup> class road I/18.

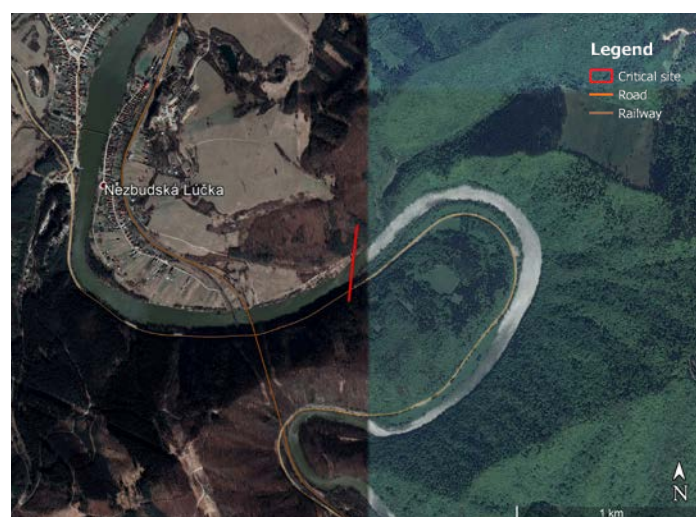


Fig. 57: The corridor Strečno from a broader perspective.



## 3.4 Strážovské vrchy PLA

### Corridor Number: 21

**Name of the Corridor:** Visolaje Cadastre

**Location:** Visolaje Cadastre

**Linking the geographic units of:** Javorníky – Strážovské vrchy mountain range

**Transport infrastructure:** 1<sup>st</sup> class road I/61, 3<sup>rd</sup> class road III/1947, D1 highway

**Traffic intensity (AADT, SSC 2015):** I/61 - 3,557 – 4,861; III/1947 – 3,011; D1 – 21,866 vehicles/ 24 hrs

**Monitoring Period:** 08/2017 – 06/2018

**Characteristics:** The corridor is located between two settlements, Sverepec and Visolaje. The corridor is 1,380 m long and intersected by the 1<sup>st</sup> class road I/61 with a traffic intensity of 3,557 – 4,861 vehicles/24 hrs. Altogether, 18 traffic-related animal mortality cases were recorded, including the European wildcat (*Felis silvestris*). Additionally, wildlife activity signs were recorded (table below).

In the corridor, there is a D1 underpass (D1-164). It is permeable for all mammals and has low disturbance. Two other ones are near the corridor on D1 close to the village of Visolaje. During the inventory, species listed in the table below were recorded near these objects.

The village of Visolaje has an updated spatial plan, according to which there are plans to use this area in the future to enlarge the nearby industrial zone.

#### Animal road mortality between June 2017 – June 2018

| Species                     | Number    |
|-----------------------------|-----------|
| <i>Aves (Passeriformes)</i> | 6         |
| <i>Capreolus capreolus</i>  | 2         |
| <i>Cervus elaphus</i>       | 1         |
| <i>Felis silvestris</i>     | 1         |
| <i>Rana temporaria</i>      | 1         |
| <i>Turdus sp.</i>           | 3         |
| <i>Vulpes vulpes</i>        | 2         |
| <i>Frog sp.</i>             | 2         |
| <b>Total</b>                | <b>18</b> |

#### List of species captured by phototraps August 2017 – June 2018

| Species                     | Number     |
|-----------------------------|------------|
| <i>Capreolus capreolus</i>  | 49         |
| <i>Cervus elaphus</i>       | 60         |
| <i>Dama dama</i>            | 1          |
| <i>Dendrocopos leucotos</i> | 1          |
| <i>Lepus europaeus</i>      | 1          |
| <i>Martes martes</i>        | 7          |
| <i>Meles meles</i>          | 11         |
| <i>Ovis musimon</i>         | 1          |
| <i>Sus scrofa</i>           | 20         |
| <i>Vulpes vulpes</i>        | 59         |
| <i>Non-identified</i>       | 1          |
| <b>Total</b>                | <b>217</b> |

#### Animal species or their residence signs observed during 2017-2018

| Species                    | Number |
|----------------------------|--------|
| <i>Capreolus capreolus</i> | +      |
| <i>Cervus elaphus</i>      | +      |
| <i>Lutra lutra</i>         | +      |
| <i>Meles meles</i>         | +      |
| <i>Vulpes vulpes</i>       | +      |

#### Species observed during the inventORIZATION of bridges

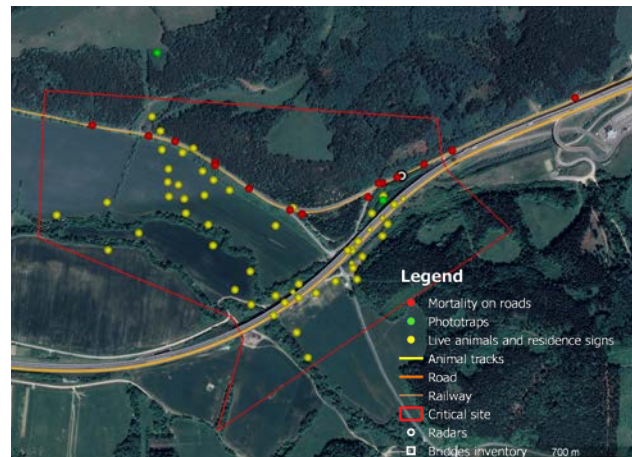
| Bridge evidence number | Date                      | Taxon                      |
|------------------------|---------------------------|----------------------------|
| <b>D1-164</b>          | July 2017 – November 2018 | <i>Cervus elaphus</i>      |
|                        |                           | <i>Vulpes vulpes</i>       |
|                        |                           | <i>Capreolus capreolus</i> |
|                        |                           | <i>Lutra lutra</i>         |
| <b>D1-161</b>          | November 2017             | <i>Martes foina</i>        |
|                        |                           | <i>Vulpes vulpes</i>       |
|                        |                           | <i>Capreolus capreolus</i> |
| <b>D1-162</b>          | November 2017             | <i>Cervus elaphus</i>      |

### Measures proposed:

1. To maintain the corridor free (unbuilt) and to place a construction ban in this area at the next update of the spatial plan of the village of Visolaje.
2. To avoid planting the nearby fields with crops which attract wildlife (to avoid the corn mainly).
3. To plant the neighbouring fields with individual trees and groups of shrubs, which would divide large open areas and serve as hiding for animals while crossing to the forest.
4. To thin the forest cover in places where forest borders the road in order to safeguard better visibility for drivers as well as for animals.
5. Up until the bridge has been built, it is recommended that warning signs be placed in the area (Beware of wildlife crossing, Slow down) in order to alert the drivers and decrease the speed of the vehicles.
6. To manage the area under the D1 viaduct and its surroundings so that it resembles natural conditions of the area (quality soil, grass, bushes) and to restrict hunting activities in its wider area. To check the permeability of this underpass regularly.
7. There is an underpass near this corridor (No. 164), which is permeable even for large mammals. There is an illegal waste pit at the moment. It is recommended that the waste be cleared, and the underpass kept clear of any obstruction and checked regularly.
8. There is also underpass No. 162, from where it is recommended to plant trees leading towards the corridor.
9. There are also several other underpasses on D1 permeable for large or middle-sized mammals; for those it is recommended that they be kept clear, that they be banned as a dumping ground, and that their access by car is banned (install the signs No dumping ground, No entry for cars). Regular checks should be carried out.
10. The areas under the bridges No. 159 and No. 159.1 are used as pastures. It is recommended that no electrical fences be used in these places, as they restrict the wildlife movement.
11. Smaller rivers run under the bridges No. 161 and No. 162. It is recommended that they be kept open and permeable. In case there are plans to regulate them, it is recommended that their size not be decreased in order to keep them permeable for larger-sized animals.



**Fig. 58:** Photo of the corridor and the 1<sup>st</sup> class road I/61. Dense vegetation approaches the road from both sides, which is preferred by wildlife for road crossing.



**Fig. 59:** Animal road mortality, animals or their residence signs in Visolaje.



**Fig. 60:** The corridor Visolaje from a broader perspective.



## Corridor Number: 22

**Name of the Corridor:** Udiča

**Location:** Udiča Cadastre and Milochov Cadastre

**Linking the geographic units of:** Javorníky – Strážovské vrchy mountain range

**Transport infrastructure:** 2<sup>nd</sup> class road II/507, 3<sup>rd</sup> class road III/1983, train line No. 120

**Traffic intensity (AADT, SSC 2015):** 5,012 vehicles /24 hours

**Monitoring Period:** 08/2017 – 06/2018

**Characteristics:** The corridor is located between the settlements of Nimnica, Udiča and Milochov and the water reservoir Nosice is part of the corridor as well. The corridor is 1,350m long and it is intersected by the 2<sup>nd</sup> class road with traffic intensity of 5,012 vehicles/24 hrs and by a traffic line No. 120 (Púchov – Považská Bystrica). Current modernisation of the train line can threaten the functionality of the corridor.

This area is threatened by the development near the village of Milochov. The village of Udiča and the town of Považská Bystrica have an updated spatial plan in order.

This corridor is important for migrating waterfowl. Large water reservoir Nosice serves as a stopover site for exhausted birds.

During the monitoring, traffic-related mortality of wildlife was registered in three cases. Further, the wildlife activity was recorded

### Animal mortality on the road August 2017 - June 2018

| Species                     | Number    |
|-----------------------------|-----------|
| <i>Aves (Passeriformes)</i> | 1         |
| <i>Erinaceus sp.</i>        | 2         |
| <i>Martes sp.</i>           | 2         |
| <i>Meles meles</i>          | 1         |
| <i>Turdus sp.</i>           | 2         |
| <b>Total</b>                | <b>11</b> |

### Animal species or their residence signs observed during 2017-2018

| Species                    | Number |
|----------------------------|--------|
| <i>Capreolus capreolus</i> | +      |
| <i>Vulpes vulpes</i>       | +      |

### Animal mortality on the railway (Púchov – Považská Bystrica, length 11.16 km during 2014-2017

| Species                    | 2014 | 2015 | 2016 | 2017 |
|----------------------------|------|------|------|------|
| <i>Capreolus capreolus</i> | 2    | 3    | 1    | 12   |
| <i>Cervus elaphus</i>      |      |      |      | 5    |

### Measures proposed:

1. Construction of an open-span-bridge or a viaduct.
2. To use low wattage flat lens fixtures on highways, which do not hinder navigation of migrating by stars.
3. To install poles at bridge decks to avoid slamming the migrating birds down on the road by strong winds.
4. To build temporary low fences to encourage higher flight across the road in order to avoid birds crashing into vehicles.
5. To avoid building of support walls which are more than 1 m high.
6. To block the building of fences and small buildings, which do not require building permit (fishermen cottages).
7. To safeguard the functionality of the corridor by keeping it free from any obstruction and to place a construction ban in areas within the corridor in the next update of the spatial plan.
8. To improve the chances of successful crossing of the water reservoir for wildlife by building of peninsulas with suitable vegetation, which would lead the wildlife to the narrowest spot of crossing.



**Fig. 61:** The corridor Udiča is adjusted to an important water reservoir for waterfowl.



**Fig. 62:** Map of the corridor Udiča with animal road mortality.



**Fig. 63:** Map of the corridor Udiča from a broader perspective.



## Corridor Number: 23

**Name of the Corridor:** Mestečko

**Location:** Dohňany Cadastre and Mestečko Cadastre

**Linking the geographic units of:** Javorníky – Bielé Karpaty mountain ranges

**Transport infrastructure:** 1<sup>st</sup> class road I/49, train line No. 125

**Traffic intensity (AADT, SSC 2015):** 5,054-7,234 vehicles/ 24 hours

**Monitoring Period:** 06/2017 – 05/2018

**Characteristics:** The corridor is located between the settlements of Mestečko a Dohňany. It is 1,350 m long and is intersected by the 1<sup>st</sup> class road with a traffic intensity of 5,054-7,234 vehicles/24 hrs. During the monitoring period, 5 traffic-related mortality cases of smaller or domesticated animals were recorded. Furthermore, activity signs of several mammal species were recorded.

Due to the vicinity of two settlements, the corridor is under threat of further building activities. So far, none of the villages has a spatial plan in order.

### Animal road mortality between June 2017 - May 2018

| Species                     | Number    |
|-----------------------------|-----------|
| <i>Aves (Passeriformes)</i> | 1         |
| <i>Bufo sp.</i>             | 2         |
| <i>Lepus europaeus</i>      | 1         |
| <i>Turdus sp.</i>           | 1         |
| <i>Vulpes vulpes</i>        | 1         |
| <i>Zamenis longissimus</i>  | 2         |
| <b>Total</b>                | <b>10</b> |

### Animal railway mortality (Púchov – Lúky pod Makytou, length 12.15 km during 2014-2017

| Species                    | 2014 | 2015 | 2016 | 2017 |
|----------------------------|------|------|------|------|
| <i>Capreolus capreolus</i> | 1    | 3    | 4    | 10   |
| <i>Cervus elaphus</i>      | 1    |      | 1    |      |

### Animal species or their residence signs observed during 2017-2018

| Species                    | Number |
|----------------------------|--------|
| <i>Capreolus capreolus</i> | +      |
| <i>Castor fibre</i>        | +      |
| <i>Cervus elaphus</i>      | +      |
| <i>Lutra lutra</i>         | +      |
| <i>Vulpes vulpes</i>       | +      |

### Measures proposed:

It is recommended that the area be kept free of further building activities as two species of European interest, the European beaver and otter, are living there.

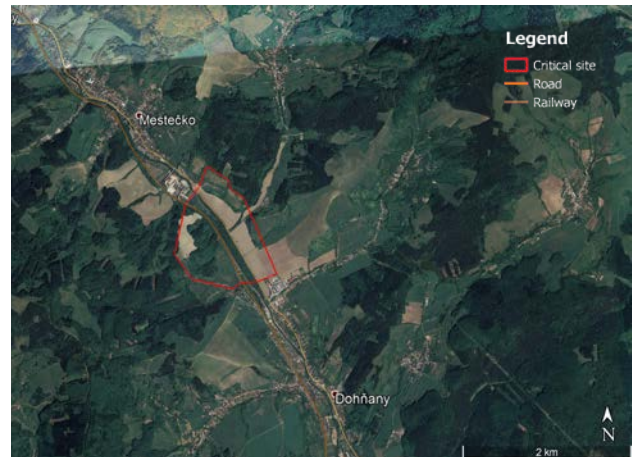
1. To place a construction ban on areas within the corridor during the update of the spatial plan.
2. To avoid planting the nearby fields with crops which attract wildlife (to avoid the corn mainly).
3. To plant the neighbouring fields with individual trees and groups of shrubs, which would divide large open areas and serve as hiding places for animals while crossing to the forest.
4. To thin the forest cover in places where forest borders the road in order to safeguard better visibility for drivers as well as for animals.
5. To place warning signs (Beware of wildlife crossing, Slow down) to alert the drivers and decrease the speed of the vehicles.
6. This corridor is relatively wide and safe for wildlife. Therefore, it is most of all recommended that its current state be maintained.



**Fig. 64:** View of the corridor Mestečko and the 1<sup>st</sup> class road I/49. The place is potentially connecting important forest complexes on both sides of the road.



**Fig. 65:** Corridor place Mestečko: forests and small forest stripes are approaching the road on both sides, which enables the wildlife crossing.



**Fig. 66:** The corridor Mestečko from a broader perspective.



## Corridor Number: 24

**Name of the Corridor:** Strelenka

**Location:** Lysá pod Makytou Cadastre

**Linking the geographic units of:** Javorníky – Bielé Karpaty (White Carpathian mountain range)

**Transport infrastructure:** 1<sup>st</sup> class road I/49, train line No. 125

**Monitoring Period:** 06/2017 – 11/2017

**Traffic intensity (AADT, SSC 2015):** 2,561 vehicles/ 24 hours

**Monitoring Period:** 06/2017 – 05/2018

**Characteristics:** The place is located in Strelenka, in the place between the village of Lysá pod Makytou and the CZ-SK state border. In close vicinity, there is a train line No. 125. The corridor is 470 m long and it is intersected by the 1<sup>st</sup> class road I/49 with a traffic intensity of 2,561 vehicles/24 hrs.

94 traffic-related mortality cases of wildlife were recorded during the monitoring periods, including the Eurasian eagle owl (*Bubo bubo*). Additionally, activity signs of the following animal species were recorded: 10 cases of the red deer (*Cervus elaphus*), 6 cases of the roe deer (*Capreolus Capreolus*), 4 cases of the red fox (*Vulpes vulpes*), 5 cases of the European hare (*Lepus europeus*), 1 case of the marten (*Martes ssp.*), and the European otter (*Lutra lutra*). During the monitoring process, no signs of large carnivores were recorded. On the railway line Lúky pod Makytou – the state border, which also passes through the corridor, the Slovak Railways recorded 6 killed ungulates during 2014-2017.

### Animal road mortality between June 2017 – May 2018

| Species                 | Number   |
|-------------------------|----------|
| <i>Anguis fragilis</i>  | 1        |
| <i>Bubo bubo</i>        | 1        |
| <i>Bufo sp.</i>         | 1        |
| <i>Erinaceus sp.</i>    | 2        |
| <i>Lepus europaeus</i>  | 2        |
| <i>Sciurus vulgaris</i> | 1        |
| <i>Turdus sp.</i>       | 1        |
| <b>Total</b>            | <b>9</b> |

### Animal railway mortality (Lúky pod Makytou – the state border, length 7.33 km) during 2014-2017

| Species                    | 2014 | 2015 | 2016 | 2017 |
|----------------------------|------|------|------|------|
| <i>Capreolus capreolus</i> | 1    | 1    | 1    | 1    |
| <i>Cervus elaphus</i>      |      |      | 1    | 1    |

### Animal species or their residence signs observed during 2017-2018

| Species                    | Number |
|----------------------------|--------|
| <i>Capreolus capreolus</i> | +      |
| <i>Cervus elaphus</i>      | +      |
| <i>Lepus europaeus</i>     | +      |
| <i>Lutra lutra</i>         | +      |
| <i>Martes sp.</i>          | +      |
| <i>Vulpes vulpes</i>       | +      |

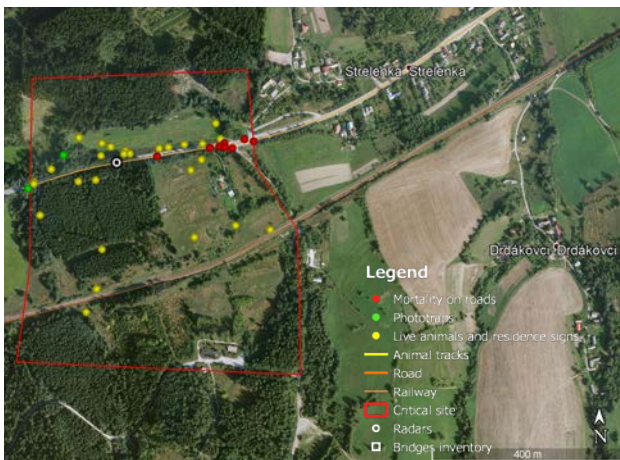
### Measures proposed:

As the corridor is located at the state border, no building activities are planned there, and this was also confirmed in the spatial plan of Lysá pod Makytou. A fenced-off seed nursery is part of the corridor. We would recommend further monitoring in case of a highway construction.

1. To keep this area free of any building activities and to keep this rule in the spatial plan.
2. To avoid further fencing off the plots.
3. To thin the forest cover in places where forest borders the road in order to safeguard better visibility for drivers as well as for animals.
4. To place warning signs (Beware of wildlife crossing, Slow down) to alert the drivers and decrease the speed of the vehicles.



**Fig. 67:** Photo of the ecological corridor with the 1<sup>st</sup> class road I/49.



**Fig. 68:** Monitoring of animal road mortality and results of photo-trap monitoring at Strelenka.



**Fig. 69:** The corridor Strelenka from a broader perspective.



## 4. Conclusions

**F**rom the results of field monitoring presented in this document, it can be seen that Beskydy-Kysuce area is a home to many important species, large carnivores including, and that these animals are many times killed due to high traffic intensity or weak implementation of mitigation measures. Many areas are currently hardly permeable for large mammal migration, and many corridors have already been destroyed in the past.

Safeguarding the landscape connectivity is therefore essential to keep their population balanced and healthy. Connectivity is radically decreasing with the uncontrolled urban infrastructure development. However, there is still a chance to stop the trend of landscape fragmentation and save the few remaining places open and permeable for free wildlife movement.

The change can come not only through corrective and financially demanding measures, such as building a green bridge over the road or a railway, but also through a simple measure, such as installing a warning sign to attract drivers' attention and cause them to slow down. Land use plan decisions made to keep particular areas in the landscape open, undeveloped and undisturbed in order to keep the area free for animal migration are absolutely crucial, especially in critical places. Cooperation of stakeholders involved, which would lead to the protection of such places in land use plans, is therefore necessary.

Catalogue of measures is designed for usage by various stakeholders, administration bodies including, who are involved in landscape planning and preparation of land-use plans as well as to those who assess new building plans, including new transport infrastructure. Their decision is crucial for preservation or improvement of landscape permeability for animal species. Preservation of landscape permeability is crucial if we want to secure survival of large carnivores as well as many other species in this area.

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6

**Annex:**  
In-depth Analysis  
**Beskydy - Kysuce Pilot Area**



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# Introduction

**T**his following Annex provides an overview of major policies influencing the construction of transport infrastructure in the pilot area along with an overview of stakeholders influencing the process of infrastructure development. Furthermore, a detailed description of ecological corridors of the area is included. The aim of the document is to clearly identify the issue of landscape connectivity in the area and to create a basis for decision-making. The document should help the authorities, officers, planners of construction projects and other stakeholders to make a decision that will benefit both people and nature. There is a lot of experience already in Europe on how to minimize the negative environmental impacts of transport infrastructure. We have a unique opportunity to use this experience in order to avoid the mistakes that have been made and develop the transportation infrastructure in a sustainable way.

2

## Geographical description of the area





The Pilot area of Beskydy – Kysuce is situated at the border area between the Czech Republic and the Slovak Republic, in the neighbourhood of Poland. It spreads over 846,180 ha in total, 59 per cent (501,365 ha) of which is situated in the Czech Republic and 41 per cent (344,814 ha) in Slovakia. The core area is mountainous; the rest is highland and

lowland. The altitude ranges between 220 m and 1,709 m ASL. There are 5 large scale protected areas: Protected Landscape Area PLA Beskydy, PLA Poodří, PLA Kysuce, PLA Strážovské vrchy and NP Malá Fatra. Slovak part of the area is an important refuge of large carnivore populations, which also recolonize the neighbouring areas of the Czech Republic.

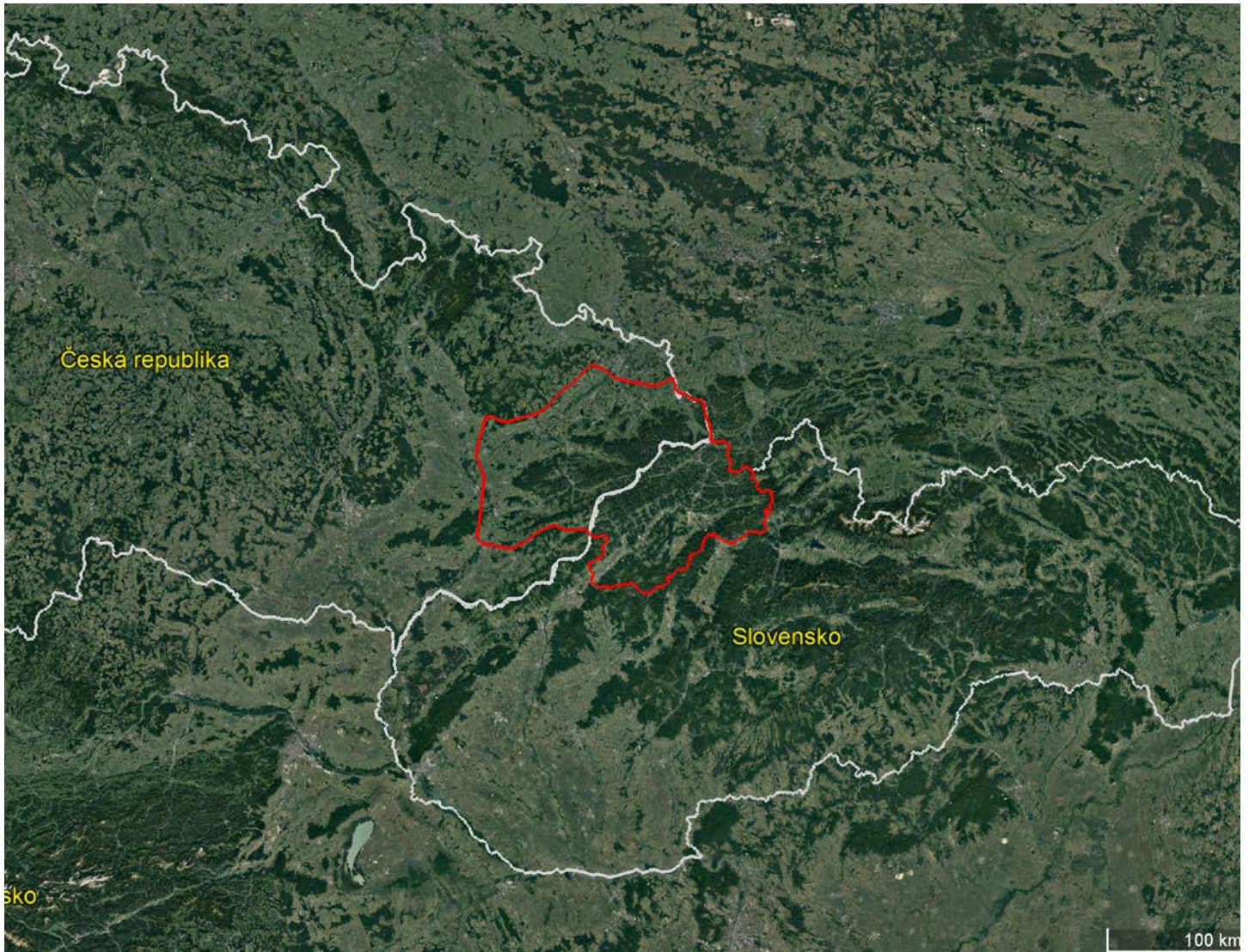


Fig. 1: TRANSGREEN project; CZ-SK focal area.



## 2.1 Czech part of the pilot area

The pilot area is situated in the eastern part of the country on the border with Slovakia and Poland. It can be divided into two main zones. The first one is a mountainous core area with regular or occasional occurrence of all three large carnivores (defined by an area of Site of Community Importance Protected Landscape Area Beskydy). The second zone consists mainly of highland and lowland which serve as a buffer zone that should be overcome by dispersing animals towards the NW where Oderské vrchy mountain range and the Jeseníky mountain range are located.

The core area is equivalent to Protected Landscape Area (PLA) Beskydy, which is the largest among all the PLAs in the Czech Republic. Its counterpart on the Slovak side of the border is PLA Kysuce. In the pilot area, there is also the PLA Poodří (alluvial landscapes along the Odra River) located in the lowland separating Beskydy mountain range from Jeseníky mountain range. On the southern border of the pilot area, there is the PLA Bílé Karpaty.

The Beskydy PLA is also the only Site of European Interest (SCI) in the whole area of the Czech Republic designated for both the wolf (*Canis lupus*) and the brown bear (*Ursus arctos*) and one of four SCIs designated for the lynx (*Lynx lynx*). This uniqueness is above all given by the extent of forest areas and its direct link to continuous areas with a permanent and/or temporary occurrence of these species in the central Carpathian mountain range.

However, due to high spatial demand of large carnivores, the area of Beskydy mountain range does not have a potential to host an isolated population

of these species in the long term. Individuals living in the Beskydy mountain range have always been part of contiguous Carpathian population. In the past there were more regular migrations of individuals which provided necessary gene flow to the peripheral parts of the population in the Czech Republic and complemented losses caused by poaching and other disturbances.

Due to rapid development of transport infrastructure, urban sprawl and other barriers such as fenced pastures, the original migratory routes of large carnivores have been interrupted. Linear transport infrastructure built in the valleys, fenced highways or technically modified watercourses and urban sprawl create a continuous barrier in the landscape for tens of kilometres. Although the effects of landscape fragmentation are well known, planning requirements are not always strictly followed. More detailed analyses show that there are currently only few remaining possibilities for large mammal migration, and these are at risk as well of being disrupted by the construction of new infrastructure. Therefore, strict protection of such migration corridors is very important. The SCI Beskydy is located at the CZ-SK border and hosts a small easternmost population of large carnivores. For maintenance of viable populations in the long term it is inevitable to ensure landscape permeability and to secure migration connectivity, not only in the Czech Republic, but also in Slovakia and Poland. Landscape permeability for animal species should be ultimately taken into account when planning a new transport infrastructure and/or upgrading an existing one.

## 2.2 Slovak part of the pilot area

The Slovak part of the pilot area is located in the north-western part of Slovakia and covers 344,814 ha, which constitutes 7 per cent of Slovakia. In accordance with the geomorphological division of Slovakia, it belongs to the Outer Western Carpathian mountain range.

Starting from the south, the area is made of two mountain ranges (Strážovské and Súľovské vrchy), which do not have one central ridge, but are divided by a number of basins and deep valleys. The rest of the area is represented by the river Váh Basin and the valley of the river Biela

voda. Minimal altitude is 220 m ASL (Dubnické štrkovisko), maximal 1,213 m ASL (Strážov).

Váh Basin is an open landscape especially important for migration of animal species between the mountains of Javorníky, Biele Karpaty and Strážovské vrchy. The longest river of Slovakia, the River Váh, runs through this area; it is surrounded by a few towns (Bytča, Považská Bystrica, Púchov, Ilava a Dubnica nad Váhom) connected by a developed transport infrastructure leading in the north-south direction

– D1 motorway, 1<sup>st</sup> class road I/61, 2<sup>nd</sup> class II/507 and a railway line No. 120. In 1963, Hričovský and Nosický canal were put into operation as part of the Vážska kaskáda, which connects accumulation water reservoirs Hričovská dam and Nosice.

Biela voda valley connects to Váh Basin by the town Púchov and leads in western direction to the Czech-Slovak state border (near the village of Lysá pod Makytou). This valley represents a natural border between Javorníky mountain range and Biele Karpaty mountain range. The 1<sup>st</sup> class road I/49 and a railway line No. 125 cross this valley. Construction of an expressway R6 is planned in this area.

Continuing up the north, the area reaches the zone of National Park NP Malá Fatra, which is an important refuge for large carnivore populations, which might possibly recolonise the nearby areas of the Czech Republic and Poland. The altitude ranges between 305 and 1,709 m ASL. The orographic unit of Malá Fatra is the richest orographic unit of this area from the biodiversity

viewpoint. The whole area belongs to the watersheds of the rivers Orava, Váh and Kysuca. Forest habitats, meadows, pastures as well as arable land make up the varied landscape of this zone belonging to the pilot area. There lie several district towns here, the most important being the industrial town of Žilina.

The northwest part of the area, bordering with the Czech Republic, is represented by the Protected Landscape Area Kysuce. It is made of two independent units – Beskydy mountain range (on the west) and Javorníky mountain range (east). PLA Kysuce is part of Outer Western Carpathian mountain range, and it is mostly made of flysch. Terrain made of erosion ditches and highlands is typical of this area. The highest peak is Veľká Rača (1,236 m ASL). The area is significantly diverse, making it a mosaic of habitats. Geomorphologic diversity, influenced by the past human activity, is shown by the presence of varied meadow and pasture habitats, peatlands and fens. Natural forest communities are preserved in places with little or no human influence.



**Fig. 2:** Súľovské skaly – rocks in Strážovské vrchy mountain range.



3

# Legislative context





# 3.1 National law

## 3.1.1 The Czech Republic

### 3.1.1.1 National biodiversity related law

#### Nature protection

**Act No. 114/1992 Coll. on Nature and Landscape Protection as amended by later regulations** - This Act regulates competencies of state administration bodies and municipalities, and rights and obligations of legal persons and persons in nature and landscape protection. It deals with the issue from the perspective of nature protection, or protection of selected species/populations and habitats that they inhabit. Protection is ensured by means of various instruments included in the law:

#### a) general nature conservation:

- 1) terrestrial system of ecological stability (TSES), which is a system of biocorridors and biocenters that must be proposed and realized at three levels: local, regional and supra-regional
- 2) an important landscape element (all forests, shrubs above defined area, ponds, lakes, rivers and their valleys/alluvium and peat-bogs)
- 3) general plant and animal protection

#### b) territorial protection:

- 1) specially protected areas:
  - a) large-scale protected areas (National parks, Protected Landscape Areas);
  - b) small-scale protected areas (National Nature Reserves/Monuments, Nature reserves/Monuments)
- 2) Natura 2000 sites

#### c) protection of specially protected species, protected memorial trees and minerals

**Forests: Act. No. 289/1995 Coll. on forests as amended by later regulations**

**Hunting: Act No. 449/2001 Coll. on hunting as amended by later regulations**

**Decree of the Ministry of Agriculture of the CR No. 350/2003 Coll. implementing the Act on Hunting**

**Act No. 254/2001 Coll. on waters as amended by later regulations**

**National Biodiversity Strategy** in the Czech Republic valid until 2016-2025 approved by the Czech Government of March 9, 2016, no.193.

**Sustainable Development Plan for the Czech Republic until 2030**

### 3.1.1.2 National transport related law

#### Act No. 183/2006 Coll. on town and country planning and building code (Building Act)

This Act governs, in the matters of town and country planning, particularly the objectives and tasks of town and country planning, the system of authorities of town and country planning, the town and country planning instruments, the assessment of the impacts on sustainable development in the area, decision making processes within the area, possibilities of consolidation of procedures pursuant to this Act with procedures of the environmental impact assessment, conditions for construction, land development and for preparation of the public infrastructure, records of planned activities and qualification requirements for planned activities.

Also, this Act governs, in the matters of the building code, particularly the permission of buildings and their alterations, landscaping and facilities, use and removal of structures, supervision and special competencies of building offices, position and authorisation of the authorized inspectors, system of building offices, duties and responsibilities of persons within the preparation and realization of structures.

Furthermore, the Act governs the conditions for the design activity and the structures realizations, general conditions for construction, purpose of expropriation, entry to the grounds and into the structures, protection of public priorities and some other issues related to the subject-matter of this legislation.

On January 1, 2018 a comprehensive amendment to the Building Act entered into force. The main purpose of this legislative change is to prompt and simplify the procedures for all the necessary approvals/permits, which take extremely long in the CZ. Under the new law, the procedures for spatial permit, EIA and building permit are combined into one coordinated procedure, which will result in a single construction permit.

#### Territorial Development Policy of the Czech Republic

At national level, the main conceptual document is the **“Territorial Development Policy of the Czech Republic, as amended by Update No. 1”** (approved by Government Resolution No. 276 of April 15, 2015). It contains an issue of landscape migration permeability and minimizing the extent of landscape fragmentation states in its national priorities (priorities 20a, 23).

The basic concept of the Ministry of Transport defining priorities and objectives in the field of transport and transport infrastructure development in the medium term of 2020, and both in the long term and up to 2050 is **the Transport Sectorial Strategies, 2<sup>nd</sup> Phase** (SUDOP, NDCon, Mott MacDonald CZ, 2013). This document is based on the transport policy priorities defined by the Transport Policy of the Czech Republic approved by Government Resolution No. 449 of June 12, 2013, which is a generalized strategic document for the Ministry of Transport. The Transport Policy of the Czech Republic presupposes the elaboration of separate follow-up strategies for individual sub-areas, which need to be dealt with in greater detail.

### 3.1.1.3 National spatial-planning related law

#### **Act No. 183/2006 Coll. on town and country planning and building code (Building Act)**

This Act governs, in the matters of town and country planning, particularly the objectives and tasks of town and country planning, the system of authorities of town and country planning, the town and country planning instruments, the assessment of the impacts on sustainable area development, decision making within the area, possibilities of consolidation of procedures pursuant to this Act with procedures of the environmental impact assessment, conditions for construction, land development and for preparation of the public infrastructure, records of planned activity and qualification requirements for planned activity.

#### **Decree No. 500/2006 Coll. on Territorial Analytical Documents, Territorial Planning Documents and on the Means of Registration of Territorial Planned Activities**

Territorial analytical documents include, *inter alia*, so-called limits of land use, which are various restrictions on changes in the territory due to the protection of public interests, arising from legal regulations or established under special legal regulations or resulting from the characteristics of the territory.

#### **Act No. 128/2000 Coll. on Municipalities**

#### **Act No. 129/2000 Coll. on Districts**

**Spatial Development Principle (ZÚR)** is part of the spatial planning documentation. The principles of spatial development are procured and issued for the whole district. Their adoption is mandatory.

#### **Act No. 256/2013 Coll. on Land Properties**

#### **Act No. 334/1992 Coll. on the Protection of Agricultural Land**

## 3.1.2 The Slovak Republic

### 3.1.2.1 National biodiversity related law

#### **Nature protection**

**Act No. 543/2002 Coll. on Nature and Landscape Protection** of June 25, 2002 as amended by later regulations. This Act regulates competencies of state administration bodies and municipalities, and rights and obligations of legal persons and natural persons in nature and landscape protection with the aim to secure preservation of natural balance and conservation of diverse living conditions and life forms on Earth, nature values and beauties to create conditions for long-term sustainable use of natural resources and for providing ecosystem with services, taking into account economic, social and cultural needs, as well as regional and local conditions.

Decree of the Ministry of the Environment of the SR No. 24/2003 Coll. implementing the Nature Conservation Act.

#### **Forests**

**Act. No. 326/2005 Coll. on Forests** of June 23, 2005 as amended by later regulation and Decree of the Ministry of Agriculture of the SR No. 12/2009 Coll. on Forest Land Protection in the Spatial Planning

#### **Hunting**

**Act No. 274/2009 Coll. on Hunting** of July 10, 2009 as amended by later regulations and Decree of the Ministry of Agriculture and Rural Development of the SR No. 489/2013 Coll. implementing the Act on Hunting

#### **Act No. 364/2004 Coll. on Waters as amended by later regulations**

#### **Act No. 330/1991 Coll. on Land Reform**

#### **Act No. 24/2006 Coll. on Environmental Impact Assessment**

#### **National Biodiversity Strategy of the Slovak Republic until 2020**

approved by the Decree of the Slovak Government No. 12/2014 of January 8, 2014. The main objective of the strategy is to stop the loss of biodiversity and degradation of the ecosystems and their services in Slovakia until 2020, to safeguard the restoration of biodiversity and ecosystems, and to increase the contribution towards stopping the loss of biodiversity in the world.

**Action Plan for the implementation of the Updated National Biodiversity Strategy until 2020** approved by the Decree of the Slovak Government No. 442/2014 of September 10, 2014.

Strategy, Principles and Priorities of the State Environmental Policy approved by the Decree of the Slovak Government No. 619/1993 of September 7, 1993. And Decree of National Council of the Slovak Republic No. 339/1993.

**National Strategy for Sustainable Development** approved by the Decree of the Slovak Government No. 978/2001 of October 10, 2001.

**Updated Slovak Water Management Plan** approved by the Decree of the Slovak Government No. 6/2016 of January 13, 2016.

### 3.1.2.2 National transport related law

#### Relevant legislation related to road infrastructure:

**Act No. 135/1961 Coll. on Road Network** – This Act regulates the construction, use and protection of roads, the rights and obligations of owners and administrators of roads and their users, as well as the competence of the state administration bodies and the state professional supervision authorities in the field of road communications.

#### **Regulation No. 35/1984 implementing the Act No. 135/1961 Coll. on Road Network**

**Act No. 8/2009 Coll. on transit on land routes** as amended by the most recent legislation – This law regulates road traffic regulations, rights and obligations of persons regarding to road traffic, the competence of public authorities in the field of road traffic management, vehicle management etc.

**Regulation No. 9/2009 Coll. implementing the act on road transit** and on the amendment and supplementation of certain laws, as amended;

#### **Act No. 534/2003 Coll. on the Organization of the State Administration in the Section of Road Transport**

**Act. No. 513/2009 Coll. on railroads and on amendments of some acts.** This Act shall establish e.g. the type of railroads and rules of their construction and operation; the operation of designated technical devices and permission to perform defined activities; the operation of railway infrastructure and the allocation of its capacity; the scope of the State Administration Authorities in the railroad matters.

**Act No. 725/2004 Coll. on Railways and on Operating Conditions for Vehicles in Road Traffic** and on Amendment of Certain Laws, as amended;

**Act No. 56/2012 Coll. on Road Transport,** as amended;

**Act No. 461/2007 Coll. on the Use of Recording Equipment in Road Transport;**

#### Relevant strategic documents:

- » **Strategic Transport Development Plan of the Slovak Republic up to 2030 – Phase II /SEA**
- » **Strategic Development Plan for Transport Infrastructure in the Slovak Republic to 2020 (Phase I) SEA**
- » **Strategic plan for Development and Maintenance of 2nd and 3rd class roads/SEA**

Strategic Transport Development Plan – It is a long-term strategic document that guides effective development of the transport sector and determines the implementation of its development vision. Funding of development activities from EU funds depends on these documents.

### 3.1.2.3 National spatial-planning related law

**Act No. 50/76 Coll. Law on Territorial Planning and Building Code** – The law defines principles, procedures, documentation and other issues dealing with land use. This is the basic law on land-use issues. Basic land-use documentation includes: Spatial development perspective of the Slovak Republic, Land-use plan for the region, Land-use plan for a municipality.

**Act No. 539/2008 on the Promotion of Regional Development** – this law provides a framework for spatial development focused on social and economic development and its planning.

The law defines the following documentation on regional development support at all levels:

- » National regional development strategy,
- » Program of social and economic development of the region,
- » Program of social and economic development of a group of municipalities,
- » Program of social and economic development of a municipality.

**Act No. 369/90 Coll. on Municipalities** – The law only defines responsibilities for planning and land and environment management, but not for sustainable land-use.

**Act No. 221/96 Coll. on Territorial and Administrative Division of the SR and Act No. 222/96 Coll. on Organisation of Local Self Government** – Division of responsibilities for land-use and environment, including the regeneration processes.

**Act No. 330/91 Coll. on Land Consolidation, Settlement of Land Ownership, Land Registries, Farmland and Land Communities.** The law defines the land consolidation procedure, that is rational space ordering of plot ownership in a certain zone and with it connected other immovable agriculture and forestry ownership ordering, which is executed in public interest in line with requests and conditions of environment protection, in line with the idea of territorial ecological stability system, in line with agricultural landscape functions, in line with operational – economical modern agriculture viewpoints and forestry management, and in line with countryside development support.

**Act No. 220/04 Coll. on Protection and Use of Agricultural Land and Directive of the Ministry of Agriculture of the SR to the implementation of**



**the Decrees No. 12/09 on Forest Land Protection in the Territorial Planning – its amendment by the Act No. 219/2008 Coll.**

– The law introduced a fee for transformation of the most valuable soils to non-agricultural land. The directive defines the procedure and precondition for changes in the forest land use.

**Binding documents related to the law (overall binding or binding for public sector):**

**Spatial Development Perspective of the Slovak Republic**

– A document creating a conceptual framework for spatial development at a national level defining basic principles for settlement development, centres and their gravitation areas (practically Functional Urban Area (FUAs)).

**Regional Land-use Plan** – Mid-term to long-term comprehensive spatial planning document at regional level focused on functional organisation of space, determining basic elements of settlement structure and interrelations between them.

**Municipality Land-use Plan** – Mid-term to long-term comprehensive planning document focused on optimisation of organisation of functional and structural elements and systems at a territory of a cadastre of a municipality (built up and surrounding areas).

**Regional Program of Social and Economic Development** – a short-term to mid-term planning and programming document of comprehensive social, economic and environmental development of a region.

**National Regional Development Strategy** – a document on comprehensive social, economic and environmental development at national level.

**Program of Social and Economic Development of a Group of Municipalities** – a short-term to mid-term planning and programming document of comprehensive social, economic and environmental development of a group of communes based on their agreement to procure the program jointly.

**Program of Social and Economic Development of a Municipality** – a short-term to mid-term planning and programming document of comprehensive social, economic and environmental development of a municipality.

**Landscape-ecological plan at the regional and municipal level** – Landscape ecological plan is a document elaborated as part of the procurement of land-use plans at regional and municipal level with the focus on landscape ecologic analyses, assessment and optimisation of functional use of landscape elements in harmony with landscape ecological potentials and limits for the development. Landscape ecological plan is a legal although not binding instrument. It is legally embedded into spatial planning system

as an integrative instrument across all aspects of landscape protection and development from the viewpoint of landscape ecology. Landscape ecological plans are obligatory documents elaborated at a local, regional and state level as background documents for elaboration of municipal master plans, regional development plans or a national spatial development perspective.

**Informal, supporting documents:**

**Cadastre/Land and Property Register/Land Registry**

– Cadastre/Land and Property Register/Land Registry is a public list, which contains a set of data on real property matters containing their list, description, legal functional use, their geometric and positional determination and registration rights to such property.

**Act. No. 275/2006 Coll. on Information Systems of Public Administration in wording of later regulations** – Provides a framework for the registry of underused plots.

**TSES** – The documentation on territorial system of ecological stability is a set of documents mapping and proposing functional territorial system of ecological stability including the biocenters, biocorridors, buffer zones and other elements across different levels of territorial development plans (local, regional, national level) with the aim to protect and support ecosystem important services. Territorial system of ecologic stability identified in specific documentation is reflected in territorial development plans – master plans, regional development plans and a national spatial development perspective.

## 3.2 EU Directives and Strategies, Conventions

### 3.2.1 Natura 2000 Directives and Biodiversity strategy

**The Habitats Directive** – Council Directive 92/43/EEC of May 21, 1992 on the conservation of natural habitats and wild fauna and flora

**The Birds Directive** – Directive 2009/147/EC of the European Parliament and of the Council of November 30, 2009 on the conservation of wild birds

The Habitats Directive forms the cornerstone of Europe's nature conservation policy with the Birds Directive and establishes the EU wide Natura 2000 ecological network of protected areas, safeguarded against potentially damaging developments.

**EU Biodiversity Strategy 2020** – In 2011, the EU adopted an ambitious strategy implementing 6 targets and 20 actions to halt the loss of biodiversity and ecosystem services in the EU by 2020.

### 3.2.2 EU Directives related to transport

**Decision No 1692/96/EC of the European Parliament and of the Council on Community guidelines for the development of the trans-European transport network.**

**Decision No 884/2004/EC of the European Parliament and of the Council amending Decision No 1692/96/EC – revised in April 2004, which brought a fundamental change to TEN-T policies.** intended to accommodate EU enlargement and consequent changes in traffic flows. In 2017, it was decided that the Trans-European Transport Networks would be extended into Eastern Europe and would include Eastern Partnership member states.

There are several European strategic documents related to transport:

**Transport White Paper 2011** – Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, COM (2011) 144 final – The European Commission adopted a roadmap of 40 initiatives for the next decade to build a competitive transport system that will increase mobility, remove major barriers in the key areas and fuel growth and employment.

**European Agreement on Main International Traffic Arteries (AGR)**

Slovakia adopted the proposed international road network "E". There are 11 routes, which are part of this network in Slovakia: E50, E58, E65, E71, E75, E77, E371, E442, E571, E572, and E575.

The Czech Republic adopted the proposed international road network "E". There are 13 routes, which are part of this network in the CZ: E48, E49, E50, E53, E55, E59, E65, E67, E75, E442, E461, E462, and E551.

**Regulation (EU) No 1315/2013 of the European Parliament and of the Council of December 11, 2013 on Union guidelines for the development of the trans-European transport network (TEN-T)** and a repealing Decision No 661/2010/ - Slovakia and the Czech Republic committed to fulfil obligations arising from this regulation.

## 3.3 Environmental procedures

### 3.3.1 The Czech Republic

Any concept or intent that may, independently or in connection with others, significantly affect the Natura2000 site is subject to assessment (Section 45h of the Nature Conservation Act and Act No. 114/1992 Coll. landscape, as amended). This obligation arises from Articles 6 and 7 of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.

Assessment can only be made by persons who hold a special authorization from the Ministry of Environment. More detailed conditions regarding the authorization are stipulated in Article 45i (3) of Act No. 114/1992 Coll. on Nature and Landscape Protection, as amended, and Decree No. 468/2004 Coll. on Authorized Persons under the Nature and Landscape Protection Act.

The assessment shall be carried out in accordance with Act No. 100/2001 Coll. on Environmental Impact Assessment, as amended, unless Article 45i provides other procedure. Territorial planning documentation is assessed in accordance with Act No. 183/2006 Coll. on Spatial Planning and the Building Code, as amended.

#### 3.3.1.1 SEA

Strategic Environmental Assessment – is used for evaluation of conceptual materials at national and regional level and for the assessment of spatial plans (that is, set out in §10i – Special Provisions for Assessment of Territorial Development Policy and Territorial Environmental Planning Documentation and Environmental Impact Assessment Act).

Details of established procedures, such as categories of intentions or requirements of different types of applications / notifications / documents are listed in the annexes to the Law on Impact Assessment on the Environment.

In the case of projects such as linear traffic constructions, it is useful to use the so-called migration studies to mitigate the negative effect of fragmentation. Expert evaluation of animal migration in a place of intent can be used according to § 8 for comprehensive environmental impact assessment.

#### 3.3.1.2 EIA

The “new” EIA legislation took effect on May 1, 2004. Among others, this law modified the assessment of environmental impacts and cancelled the previously valid Act No. 244/1992 Coll. concerning the assessment of impacts of developmental plans and programs on the environment.

The objects of compulsory assessment consist of plans for constructions, activities and technologies listed in Annexes No. 1 of Act No. 100/2001 Coll. and changes therein in accord with Article 4 (1) (c). The Ministry of Environment in accordance with provisions of Article 21 or a regional authority in accord with the provisions of Article 22 of this Act provides for assessment of these plans. Objects of compulsory assessment also consist of plans listed in Act No. 100/2001 Coll., Article 10(a) and Land-use Planning Documentation, assessment of which is carried out in accordance with the provision of Article 10(i) of the Construction Act.

The process of strategic environmental impact assessment is based on a systematic examination and assessment of the potential environmental impact. The purpose of this is to determine, describe and perform a comprehensive evaluation of expected impacts of the prepared environmental and public health plans in all the decisive contexts. The process is intended to reduce the detrimental environmental impacts of the evaluated plan.

#### Methodological support from the Ministry of Environment of the Czech Republic

[https://www.mzp.cz/cz/hodnoceni\\_vyznamnosti\\_vlivu\\_koncepci](https://www.mzp.cz/cz/hodnoceni_vyznamnosti_vlivu_koncepci)

- 1) A process of assessing the effects of concepts and intentions on Sites of Community Importance and Special Protected Areas

Methodological Instruction of the Ministry of the Environment of the Czech Republic published in the Government Gazette for Regional Authorities and Municipalities No. 2/2006, regulating the assessment procedure executed pursuant to Section 45i of Act No. 114/1992 Coll. on Nature and Landscape Protection, as amended, within EIA and SEA processes.

- 2) Assessing the significance of the effects of concepts and intentions on Sites of Community Importance and Special Protected Areas



Methodological Instruction of the Ministry of Environment published in Bulletin No. 11/2007, regulating the way of evaluating the significance of impacts of planned concepts and projects evaluated in the SEA / EIA processes from Natura 2000 viewpoint.

3) Handbook on the assessment of impact significance on Natura 2000 sites

Methodological material for the SEA/EIA assessment elaboration, which summarizes problems and evaluation viewpoints of the most problematic species and habitats. It also introduces the rules and solutions and furthermore provides a more detailed methodological guidance on assessing the significance of impacts of the plans.

### 3.3.2 The Slovak Republic

**Act No. 24/2006 Coll. on Environmental Impact Assessment and the Decree No. 113/2006 Coll. of the Ministry of Environment** regulate the details of professional qualification for the purposes of environmental impact assessment.

In the Slovak Republic the assessment has been carried out since 1994 when the Act No. 127/1994 Coll. of the Slovak Republic National Council on environmental impact assessment came into force. In order to provide for the full harmonisation of the Slovak legislation in the field of environmental impact assessment with the European Union legislation, the Act No. 391/2000 Coll. amending and supplementing the Act No. 127/1994 Coll. of the Slovak Republic National Council on environmental impact assessment was adopted in 2000. This Act regulates in detail the process of impact assessment of constructions, installations and other activities on the environment. It simplifies substantially the impact assessment of draft principal development conceptions, land-use planning documentations and generally-binding legal regulations (Strategic Impact Assessment - SEA).

At present, the Act No. 24/2006 Coll. on environmental impact assessment and on amendments and supplements to certain acts applies, entering into force on February 1, 2006. It regulates the process of expert and public assessment of expected impacts of strategic documents on the environment prior to their approval and impact assessment of proposed activities before their permission under special regulations. The Decree No. 113/2006 Coll. of the Ministry of Environment regulates the details of the professional qualification for the purposes of environmental impact assessment. The requirement

to adopt the Act No. 24/2006 Coll. on environmental impact assessment and on amendments and supplements to certain acts as well as its updates ensued from the fact that the European Union has adopted directives concerning environmental impact assessment, namely:

**Directive of the European Parliament and of the Council 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment.**

**Directive 2011/92/EU of the European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment (codification).**

**Directive 2014/52/EU of the European Parliament and of the Council amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.**

4

# Stakeholder analysis



# 4.1 The Czech Republic

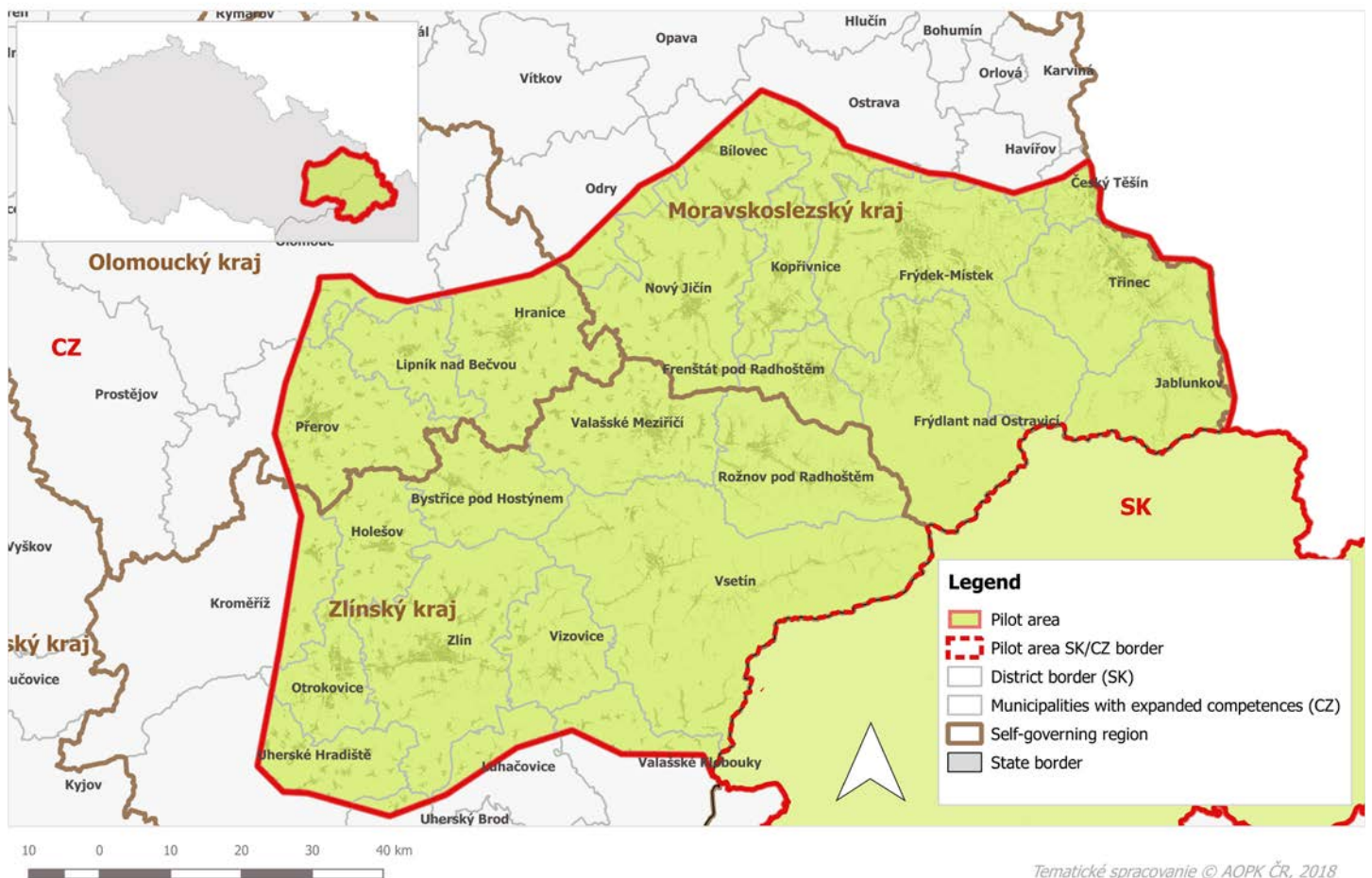
## 4.1.1 Stakeholders involved in nature protection

There are two levels of administrative structures on regional level, which are important from the viewpoint of the goals of the project:

- » The Ministry of Environment of the Czech Republic
- » The Nature Conservation Agency of the Czech Republic (NCA)

- » “kraj” (administrative region) is a NUTS3 level administrative unit. The Czech Republic is divided into 14 units at this level. Pilot area involves three Regional District Administration Offices (Moravskoslezský, Zlínský and Olomoucký kraj) (Fig. 3)
- » “ORP” (administrative area of municipality with extended powers) as a lower administrative unit equivalent to micro regions. There are 30 micro regions (ORP’s) in the pilot area.

**Administrative borders**



**Fig. 3:** Administrative units in the CZ part of pilot area.



## 4.1.2 Stakeholders involved in transport development

### Transport Institutions

- » The Ministry of Transport of the Czech Republic
- » Road Administration of Moravian-Silesian Region
- » Roads Directorate of Zlín Region
- » Roads and Motorways Directorate – Administration Ostrava, Zlín, Brno
- » Railway Infrastructure Administration – General Directorate
- » Railway Regional Directorate Ostrava
- » Railway Regional Directorate Olomouc
- » Civil engineering administration Východ

## 4.1.3 Stakeholders involved in spatial planning

- » The Ministry of Regional Development of the Czech Republic
- » Regional District Administration Offices (Moravskoslezský, Zlínský, Olomoucký)
- » “ORP” (administrative area of municipality with extended powers) as a lower administrative unit equivalent to micro regions
- » All other municipalities

## 4.1.4 Others stakeholders

Hnutí Duha Olomouc – (Friends of the Earth Czech Republic – Olomouc local group) is the biggest Czech FoE local group focused on nature conservation and environmental protection. The main activities in the Carpathian region stem from conservation of large carnivores, which includes monitoring and direct protection against poaching with the help of volunteers, environmental education and public awareness campaigns at national level. Special emphasis is placed on monitoring of wildlife corridors and their conservation.

## 4.2 The Slovak Republic

The Slovak part of the pilot area is situated in the north-west of the country. The area is administrated by two Self-Governing Regions (SGR): SGR Trenčín, SGR Žilina. State administration is represented by two District Offices with regional competences (DORC): DORC Žilina and DORC Trenčín and by

9 District Offices: Bytča, Čadca, Dolný Kubín, Ilava, Kysucké Nové Mesto, Martin, Považská Bystrica, Púchov, and Žilina (Fig. 4).

The departments of SGR, DORC and District Office are responsible for transport, spatial planning and environmental issues.

Administrative borders



Fig. 4: Slovak part of the pilot area - Districts and Self-Governing Regions.

### 4.2.1 Stakeholders involved in nature protection

#### The Slovak Republic Ministry of Environment

» It is a body responsible for processing and, according to § 9 Section (1) a) and p) of Act

No. 543/2002 Coll. on Nature and Landscape Protection as amended by later regulations, for giving comments to the Concept of Terrestrial Development of Slovakia and the National Plan of Regional Development of the Slovak Republic.

» It provides exceptions from territorial protection, e. g. for entering and parking of motor vehicles on the territory of fourth and fifth level of protection (zones A and B of protected areas) according to §§ 15, 16

of Act No. 543/2002 Coll. on Nature and Landscape Protection as amended by later regulations.

- » It provides exceptions from species protection, e. g. for disturbance and damage of habitats of protected animals, especially their dwellings, nests or breeding sites, food acquisition, resting, moulting or wintering according to § 35 Section (1) c) of the Act No. 543/2002 Coll. on Nature and Landscape Protection as amended by later regulations.

### **The Slovak Environmental Inspection**

- » It is a body of the state supervision by which the Ministry of Environment of the Slovak Republic executes the state supervision.
- » It imposes penalties on natural persons, entrepreneurs and other legal persons and informs the Ministry of Environment about their imposing according to Act No. 543/2002 Coll. on Nature and Landscape Protection as amended by later regulations.
- » It orders necessary remedial measures to eliminate detected shortcomings.
- » The Slovak Environmental Inspection in Žilina is a SEI Unit relevant in the pilot area.

### **The State Nature Conservancy of the Slovak Republic**

- » The State Nature Conservancy of the Slovak Republic is an expert organization established by the Ministry of Environment of the Slovak Republic as a statutory organization that covers tasks in the field of nature and landscape protection according to the § 65 a) of Act No. 543/2002 Coll. on Nature and Landscape Protection as amended by later regulations. It prepares expert statements for decision making of the state Administration Bodies.
- » It consists of headquarters and organizational units, which include administrations of NPs and PLAs. There are three SNC SR Units involved in this area:
  - » Administration of NP Malá Fatra
  - » Administration of PLA Strážovské vrchy
  - » Administration of PLA Kysuce

### **District Office with regional competences**

- » In accordance with § 9 Section (1) b) and c) of Act No. 543/2002 Coll. on Nature and Landscape Protection, as amended by later regulations, it issues a land use decision and a building permit for construction, modification of the construction and maintenance works in areas with fourth and fifth level of protection (zones A and B of protected areas).
- » In case some construction work is planned in the area of Natura 2000 network, it issues an expert statement on the impact significance of a plan

or a project on Natura 2000 site (§ 28 of Act No. 543/2002 Coll. on Nature and Landscape Protection as amended by later regulations).

### **District Office**

- » In accordance with § 9 Section (1) b) and c) of Act No. 543/2002 Coll. on Nature and Landscape Protection as amended by later regulations it issues a land use decision and a building permit for construction, modification of the construction and maintenance works in areas with first and second level of protection (zones C and D of protected areas).
- » It issues an approval of interventions to natural habitat of European or national interest and specifies details of revitalisation measures or financial compensation according to § 6 Section (2) of Act No. 543/2002 Coll. on Nature and Landscape Protection as amended by later regulations.

### **Municipality**

- » It issues an approval for tree cutting on non-forest land and defines the execution of adequate replacement planting, its following management or financial compensation according to § 47 Section (3) of Act No. 543/2002 Coll. on Nature and Landscape Protection as amended by later regulations.

## **4.2.2 Stakeholders involved in transport development**

### **The Ministry of Transport and Construction of the Slovak Republic - Department of Traffic Infrastructure**

- » The Ministry is one of the biggest public institutions in the country, which harbours transport, construction, regional development, post offices and telecommunications, public works and tourism agenda.
- » In the area of transport, the Ministry is responsible for transport infrastructure policies related to motorways, expressways and main roads (called also 1<sup>st</sup> class roads or state roads), railways, airways, and waterborne transport infrastructure.

### **National Motorway Company (NDS)**

- » NDS is a proprietor and a manager of motorways, expressways and roads, and develops transport infrastructure objective following the motorway and expressway development plan.

### **Slovak Road Administration (SSC)**

- » SSC is an independent organization established by



the Ministry of Transport and Construction of the Slovak Republic.

- » Professional activities of SSC include investment preparation and construction of the 1<sup>st</sup> class roads, administration and maintenance of the 1<sup>st</sup> class roads, central technical register of roads, determination of routes for abnormal transport, bridge management, traffic engineering, traffic census, road traffic-safety etc.
- » SSC has its regional representation through organizational units deployed under a single name Investment Construction and Management of Roads.
- » Road administration in the pilot area is summarized in the Table 1 below.

### Railways of the Slovak Republic (ŽSR)

- » Railways provide transport and transport services that correspond with the interests of the state transport policy. The main scope of activities includes the management and operation of

infrastructure, provision of services related to operation of infrastructure, establishment and operation of railway telecommunication and radio networks, etc.

### Transport Research Institute (VUD)

- » The institute is focused on research in the area of transport. It also works as an advisory institute and offers certification services. As an institute it also provides an independent expert and service support for the ministries.

### Self-Governing Region (SGR) - Department of Transport

- » Within its transport competency, the SGR is responsible for administration of the 2<sup>nd</sup> and 3<sup>rd</sup> class roads. It issues a statement for the construction activities on roads owned by SGR.
- » It elaborates informative proposals of solutions for elimination of road accidents in SGR's ownership, participates in consultations or public hearings concerning new traffic-related plan development.

| County           | Motorway and motorway feeder  | Expressway and expressway feeder                            | 1 <sup>st</sup> class road  | 2 <sup>nd</sup> class road   | 3 <sup>rd</sup> class road   |
|------------------|---|---|---|--|--|
| <b>ŽILINSKÝ</b>  | NDS, a.s.: SSÚD Liptovský Mikuláš, SSÚD Mengusovce, SSÚD Martin, SSÚD Považská Bystrica, SSÚR Čadca | NDS, a.s.: SSÚD Liptovský Mikuláš, SSÚD Martin, SSÚR Zvolen | NDS, a.s.: SSÚR Čadca<br>SSC: IVSC Žilina<br>Customs office                             | SSC: IVSC Žilina<br>SGR Žilina:<br>SC ŠSK-Horné Považie<br>SC ŽSK-Kysuce<br>SC ŽSK-Liptov<br>SC ŽSK -Orava<br>Sc ŽSK-Turieč<br>ZA - INVEST<br>Customs office | SGR Žilina:<br>SC ŽSK-Horné Považie<br>SC ŽSK-Kysuce<br>SC ŽSK-Liptov<br>SC ŽSK-Orava<br>SC ŽSK-Turieč<br><br>Customs office<br>Railways of SR |
| <b>TREŇANSKY</b> | NDS, a.s.: SSÚD TRENČÍN, SSÚD POVAŽSKÁ BYSTRICA   | NDS,a.s.: SSÚD POVAŽSKÁ BYSTRICA, SSÚD TRENČÍN              | NDS, a.s.: SSÚD TRENČÍN<br>SSÚD Považská Bystrica<br>SSC: IVSC Žilina<br>Customs office | SGR Trenčín:<br>SC TN SK - SÚ Považská Bystrica,<br>SC TN SK - Trenčín<br>SC TN SK - Prievidza   | SGR Trenčín:<br>SC TN SK - SÚ Považská Bystrica<br>SC TN SK - SÚ Trenčín<br>SC TN SK - SÚ Prievidza<br>Railways of SR<br>Customs office        |

Tab. 1: Road administration competencies in the pilot area (SSC, 2017)

### **Municipal Office - Department of Transport**

- » In relation to transport, the municipality is responsible for planning, preparation and construction as well as for administration of roads owned by the municipality.

### **District office with regional competences - Department of Transport**

- » A body which executes state administration on the 1<sup>st</sup> class roads.

### **District offices - Department of Transport**

- » A body which executes state administration on the 2<sup>nd</sup> and 3<sup>rd</sup> class roads.

### **Police - Regional offices - Department of Transport**

- » The police organize, coordinate and control the measures focused on safety and traffic flow in the territory of the region.
- » It deals with accidents and collects information on safety and traffic fluency.
- » It issues statements on building projects, on proposals to use traffic signs, on matters relating to the construction, reconstruction, closure of communications, etc. and provides exceptions from traffic rules.
- » Regional offices in following cities are relevant to the project area: Žilina a Trenčín

### **Police - District office - Department of Transport**

- » District office deals with road accidents on all roads, except for highways. It watches over safety and traffic fluency on roads (except for highways), it approves the placement of traffic signs and use of traffic equipment, it issues statements in relation to the construction, reconstruction, closure, obstruction and diversion of roads; it monitors and evaluates traffic safety situation, causes of accidents and participates in the organization of preventive and educational activities focused on road users.

## 4.2.3 Stakeholders involved in spatial planning

### **The Ministry of Transport and Construction of the Slovak Republic**

- » The Ministry is one of the biggest public institutions in the country, which is harbouring

transport, construction, regional development, post offices and telecommunications, public works and tourism agendas.

- » In the area of spatial planning it is responsible for construction and regional development.

### **Self-Governing Region (SGR) - Department of Spatial Planning**

- » It issues statements on territorial plans of cities and municipalities. In the area of landscape planning it negotiates, discusses and approves territorial planning documents of self-governing region and territorial plans of the region, and issues a statement on EIA and SEA.

### **District office - Department of Spatial Planning**

- » It cooperates on preparation of planning documentation and approves it.

### **Municipal Offices - Department of Spatial Planning**

- » Municipalities are self-governmental units and subjects of territorial sovereignty and represent a state government at local level (e.g. building offices). Municipality cooperates on elaboration of the planned documentation and approves it (territorial plan for municipality and territorial zone plan)

### **Regional Development Agency**

- » Non-governmental agency supporting spatial development at local and micro-regional level.

## 4.2.4 Other stakeholders

### **Hunters Association in Regions**

- » Hunters are responsible for management and monitoring of game populations. They are informed by the police on any traffic accident caused by game.
- » Several hunting associations and NGOs which are associated in the Slovak Hunting Associations and Slovak Forestry Chamber operate in the pilot area.

### **NLC - National Forest Centre**

- » A forestry agency established by the Ministry of Agriculture and Rural Development. It is responsible for research in forest ecosystems and biodiversity, remote sensing & GIS and monitoring of forests.

### **Owners & land users - Farmers and Entrepreneurs**

- » Land owners and land users give permission to activities realized on their land. It is farmers who decide about a type of crops cultivated in the fields.
- » Land owners and land users can play a role by implementing mitigation measures. Removal or installation of fences, changing the cultivated crop, etc. can influence permeability of migration corridors. They also give permission to installing photo traps on their land.

### **Fatranský spolok**

- » Non-profit NGO focused on observation of wild animals, especially large carnivores in the area of NP Malá Fatra and surrounding mountains. Apart from running educational activities, they have participated in several transnational projects focused on large carnivores' research and monitoring.



# Status of road and railway development in the pilot area



D3  
↑  
Žitina  
Ostrava 11  
Čadca  
Svrčinovec

D3  
↑  
Předložka řízení  
Příkaz st. 50c  
Příkaz správného jízdního

A\* 58  
Skalité  
Svrčinovec 11  
12

# 5.1 The Czech Republic

## 5.1.1 Existing transport infrastructure

### The main transport infrastructure corridors

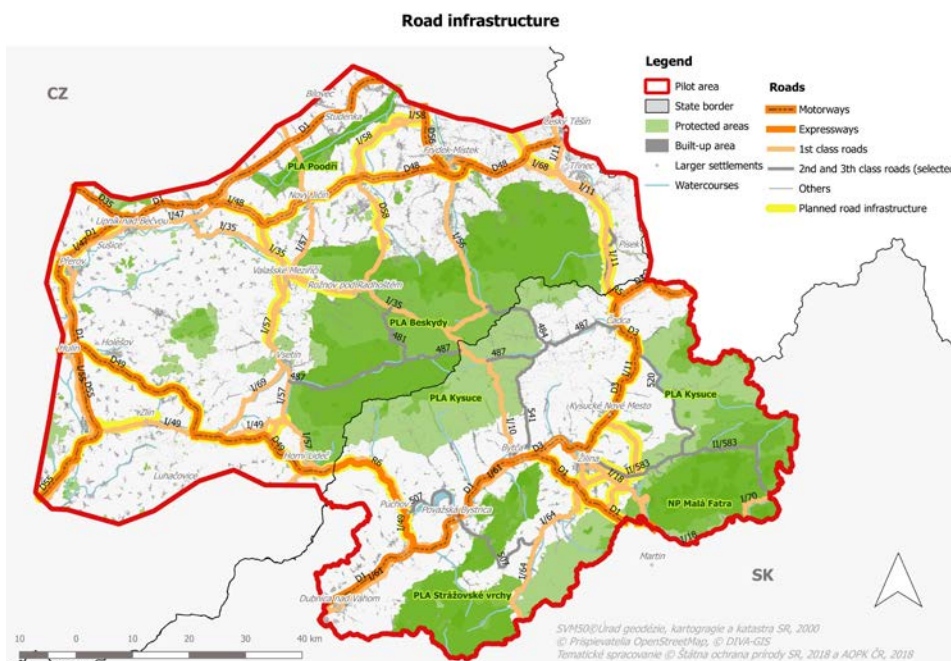
The roads which run through the pilot area belong to the branches of the 6th and 9th Pan-European multimodal corridors, which are part of core TEN-T network. The railways in the area are also included into European framework through the existence of railway freight corridors (RFC5 Baltic-Adriatic and RFC 9 Czech-Slovak). The following transport infrastructure in the Czech part of the pilot area is included in the o TEN-T network (parts of the core network are in **bold** font):

- » **Motorway D1**
- » Motorway D48
- » Road I/11 Třanovice – Nebory – Mosty u Jablunkova – border CZ/SK
- » **Motorway D49**
- » Motorway D55 Hulín – Otrokovice – Břeclav
- » **II. national railway corridor Bohumín – Přerov – Břeclav**
- » III. national railway corridor Bohumín – Mosty u Jablunkova st.hr. and Ostrava – Havířov – Český Těšín
- » **Hranice na Moravě – Horní Lideč – border CZ/SK**
- » **Airport Ostrava-Mošnov**

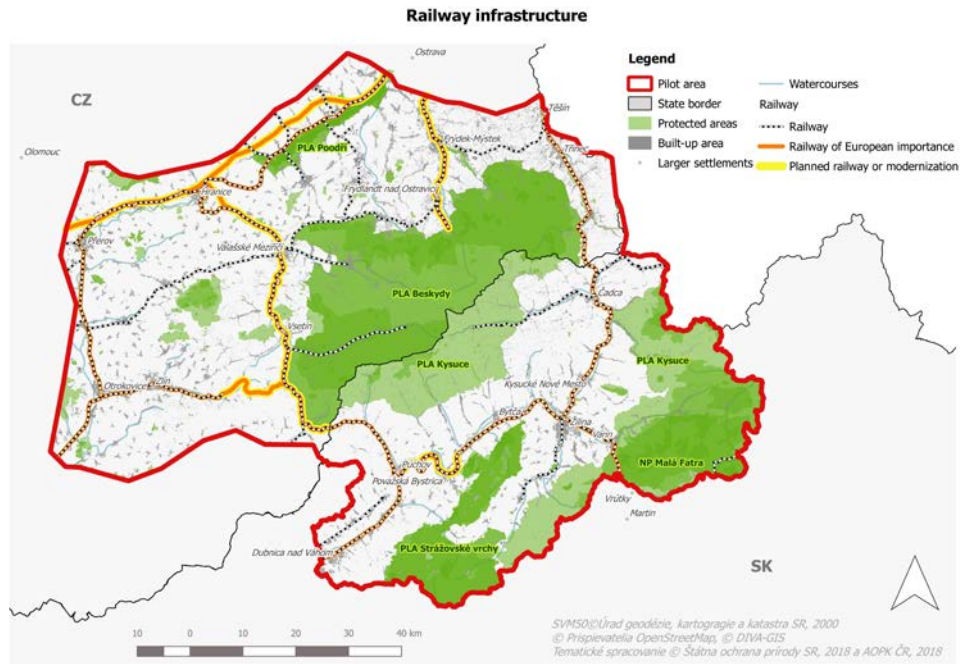
The main transportation corridors are shortly described in the following text:

### Moravian Gate and the river Oder basin

The Moravian Gate and the adjacent lowland along the upper Oder River have been an important migration route for both wildlife and people since ancient times. It forms the most favourable connection between northern and southern Europe; it used to be a part of the so-called Amber Trail. The imperial road (so-called “Těšínská”) has connected Austria to Galicia and Silesia as early as in the middle of the 18<sup>th</sup> century. Approximately 100 years later, the first railway at the territory of the monarchy was added – the Northern Railway of Emperor Ferdinand (KFNB). This laid foundations for linear structures in this exposed area. Density of transport networks has increased again in recent times. Since 1999, it has been possible to reach Lipník nad Bečvou from Olomouc by R35 expressway (now motorway D35), the railway was rebuilt and significantly upgraded in 2002-2004 to a national railway corridor, fitted for the speed of 100 mph. The year 2008 could witness the opening of D1 motorway in the section Lipník nad Bečvou – Ostrava, including the Bělotín bypass at the existing I/48 road. Construction of other linear features may continue in distant future – a territorial reserve for a high-speed railway (Fast Connection Brno – Ostrava – Poland) is being proposed and the idea to build a Danube-Oder-Elbe water channel is also still to be addressed.



**Fig. 5:** Overview of existing and planned road infrastructure in the pilot area.



**Fig. 6:** Overview of existing and planned railway infrastructure in the pilot area.

### Bečva valley

Today's road I/35 has been routed through the northern part of the Bečva valley between Hranice and Valašské Meziříčí (which is common to both its major affluents) since the imperial times; a historic route providing access to the whole Wallachian region. It continues towards Rožnov pod Radhoštěm. This direction has become more important after establishment of Czechoslovakia, where one of the most important transit routes connecting Moravia and Slovakia run through the Bumbálka saddle in the middle of the Beskydy mountain range. In case the traffic intensity increases, widening up to a four-lane expressway will be considered. In the long term; however, a decrease in the traffic intensity can be expected due to the D49 motorway construction, which will allow for a displacement of traffic from the Beskydy Protected Landscape Area.

There is an important railway line between Hranice and Valašské Meziříčí to Vsetín and Lysá pass. Along the Rožnovská Bečva valley, there is also a single-track regional line along Rožnov p/R in parallel with the I/35 road.

### Valley of Vsetínská Bečva

The valley of Vsetínská Bečva can be divided in two parts. First part between Valašské Meziříčí and Vsetín represents a narrow valley intersected by transport networks. There is the I/57 road and a railway. In 1885, it originally was a regional single-track railway to Vsetín. It was rebuilt into a major two-track connection with northern Slovakia after the establishment of Czechoslovakia.

The second part of the valley between Vsetín and Velké Karlovice is wider, followed by the road II/487 and Vsetín – Karlovice regional railway. Virtually all the way along the valley, the transport infrastructure is accompanied by continuous settlement.

### Lysá (Střelná) pass

The first road through the pass was established in the first half of the 19<sup>th</sup> century, its importance being mainly local and regional due to insufficient transport accessibility of the whole territory. Higher traffic load was brought to the railroad built in 1938 from Horní Lidieč to Púchov as another new connection addressing the low capacity of transport routes between Moravia and Slovakia. In the future, this area will be used for the D49 motorway to cross the ridge of the Outer Carpathians, as it is the only place not protected by the PLAs.

### Jablunkov furrow

Territorial Development Policy (PÚR), as amended by the 2015 update (original document 2008), links the metropolitan development areas OB2 (Ostrava region) with the city of Žilina by the development axis OS13 (Ostrava - Třinec - border of CZ/SK - Čadca). It is characterized by a significant connection with the transport routes in the form of the I/11 road; the railway line of European significance no. 320 and the upcoming capacity road S6 Bohumín - Havířov - Třanovice - Mosty u Jablunkova - the border of the Czech Republic - Žilina. The purpose of the S6 capacity road is bound to the development plan of the capacity road on the Slovak side (expressway R5) in the direction of Čadca and to the situation in the Nošovice



industrial zone. These land use requirements were incorporated by Road and Motorways Directorate to their documents such as the Categorization of Motorways and Class I roads by 2040 (Cityplan, 2010). This document verified the required design category and classification based on the national transport model for each section of the road network. In the corridor of the S6 capacity road according to the PÚR, the expansion and widening of the current I/11 road in the S24.5/100 category of the split four-lane is assumed.

The importance of the I/11 and I/68 roads is currently being multiplied in connection with the launch of the Hyundai Motors Company in MSK (Nošovice site) and the requirements for a capacity connection with KIA Motors factory in Žilina. This road is currently

being implemented as a directionally divided four-lane S24.5/100 in the section between D48 and Bystrice nad Olší and further as the category S 11.5/100 (i.e. half of the future four-lane I/11), with the prospective extension to category S22.5/100. The building is territorially protected in The Principles of Territorial Development as a reserve. At present, the entire connection is completed (commissioning of individual sections in 2001-2017), except for the section of Třanovice - Nebory (now designated as road I/68).

Railway line 320 was optimized and rebuilt in line with the modern standards from 2007 to 2016 in the region adjacent to the pilot area, including the reconstruction of the Jablunkov tunnel to the double-track project.

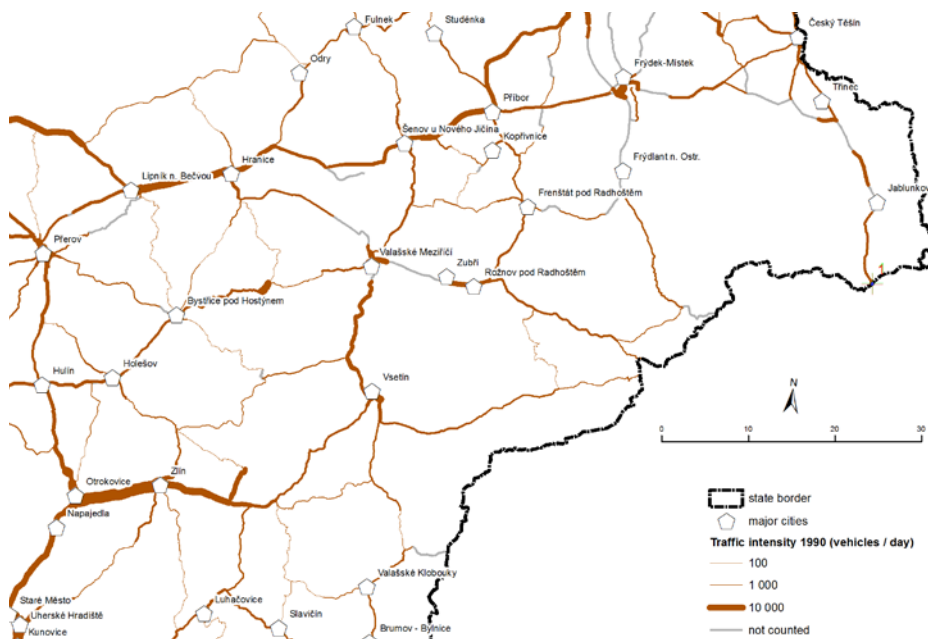


Fig. 7: Traffic intensity in 1990.

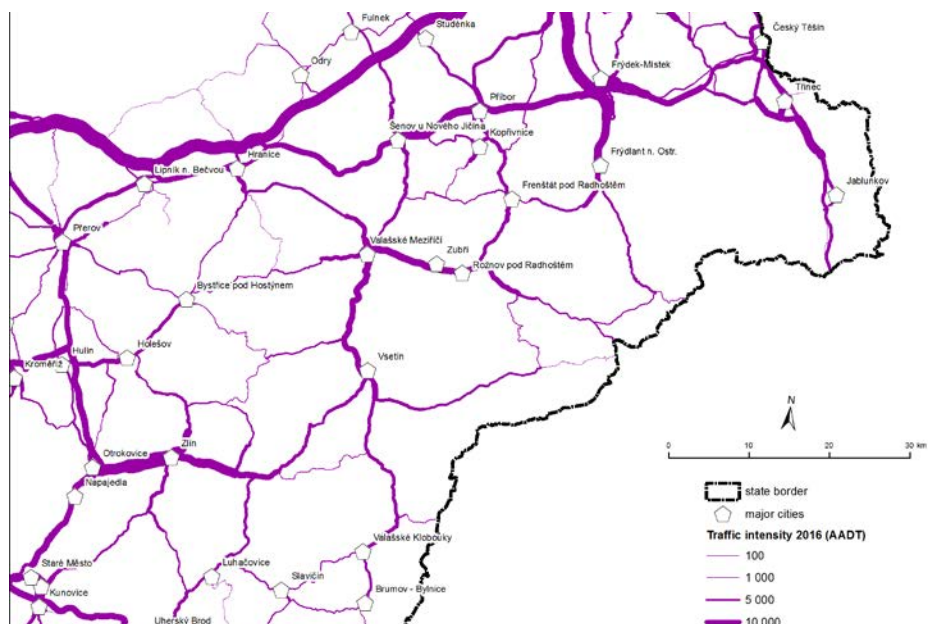


Fig. 8: Traffic intensity in 2016.

The intensity of rail transport is concentrated on railways of European importance; mainly the connection from Ostrava via Hranice to Přerov is a major barrier with high train transfer intensity. For other lines, the intensity is significantly lower and does not represent a significant risk from the barrier effect viewpoint. When comparing different intensity range over the time, a slight decrease on regional lines and

a increase on the core lines can be observed. Certain exceptions are the Frenštát p/R - Valašské Meziříčí (almost 50% decrease) and the cross-border section of 280 at Lyský pass (30% decrease). However, as long-term data are not available, these changes may also be partly caused by intensive line lockouts due to modernization of the railway infrastructure and other construction activities.

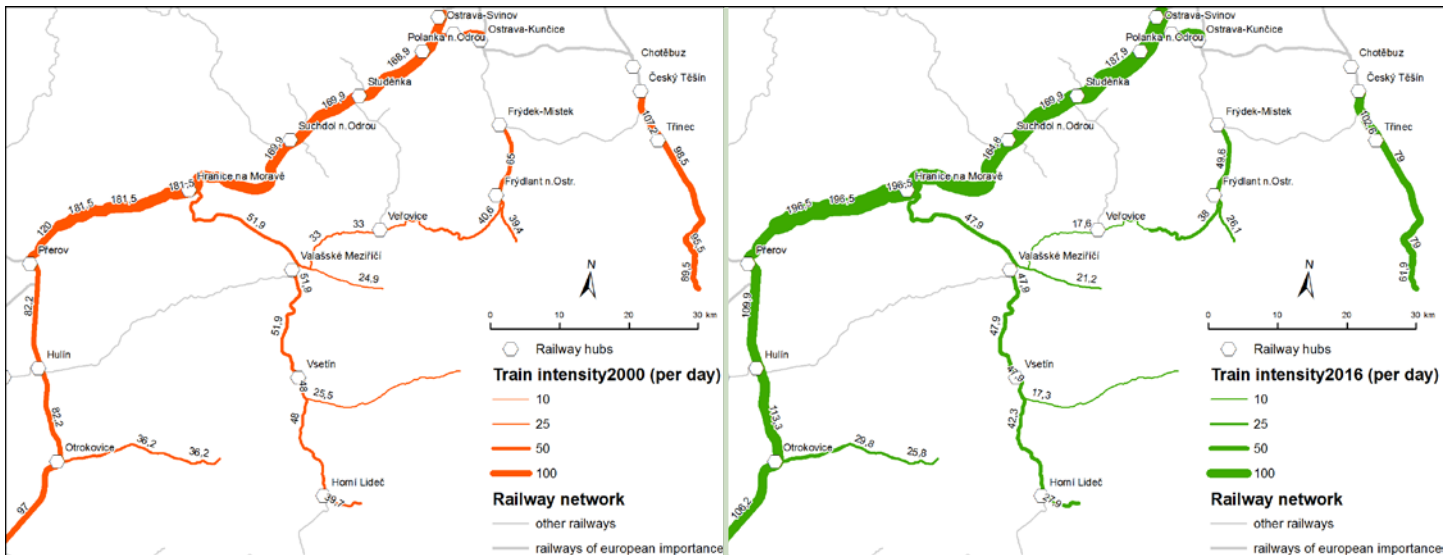


Fig. 9: Intensity of railway traffic flow in year 2000 and 2016 (data source: SŽDC).

## 5.1.2 Planned transport infrastructure

### 5.1.2.1 Planned road infrastructure

#### Road I/68 Třanovice - Nebory

Construction I/68 Třanovice-Nebory solves the relocation of the existing I/68 road outside the densely built-up areas. The relocated road is designed in category S 24.5/100 with the length of 5.4 km. It is the last section missing to complete the Czech part of Ostrava - Žilina route. Some property preparation is to be realized before the actual completion as there was an agreement with the last landowner in May 2018. EIA compliance is verified, and most building permits are issued, although they were challenged in court by environmental activists. The General Road Directorate (ŘSD) is trying to start the construction in 2018 with its expected commissioning in 2022.

This section does not intersect with any of the proposed migration corridors.

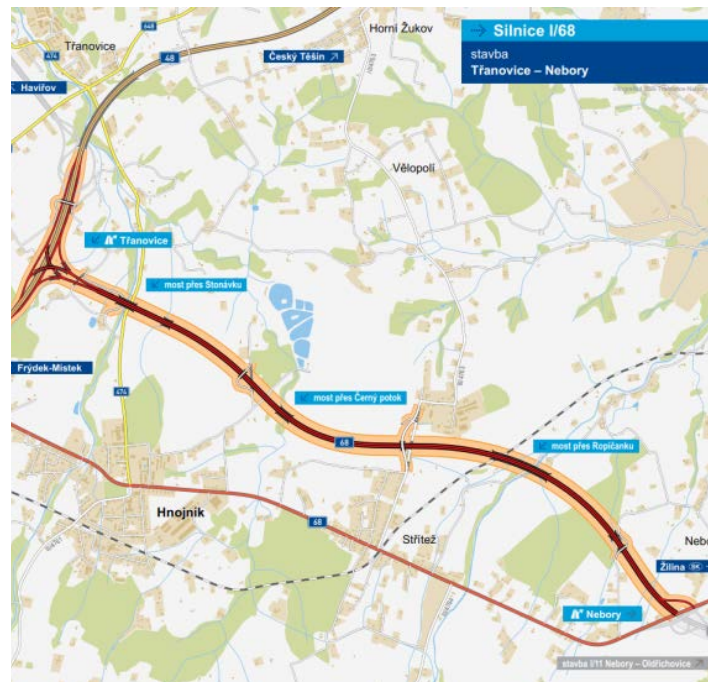


Fig. 10: Road I/68.



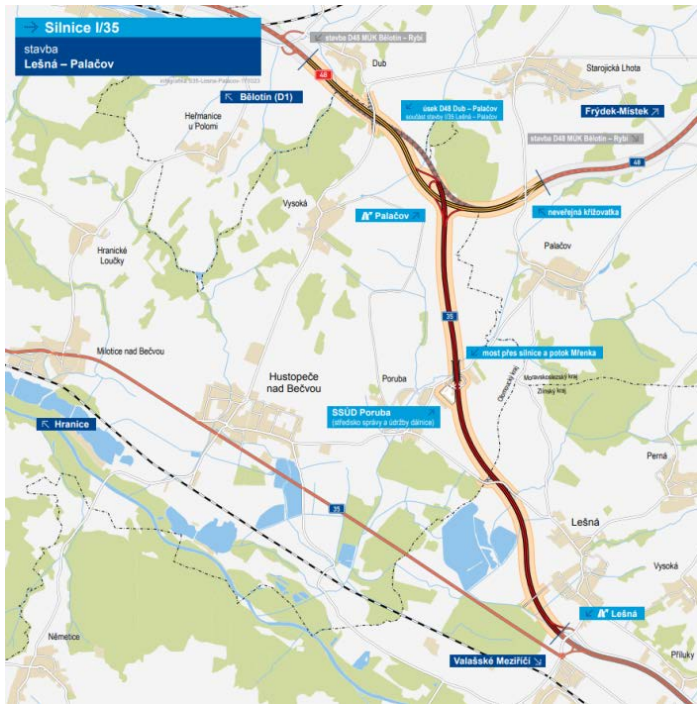


Fig. 11: Road I/35.

### Road I/35 Lešná - Palačov

The purpose of this construction is to relocate the important E-road, which is mainly used for transit traffic, from the existing I/35 route leading through the towns of Hranice and Teplice nad Bečvou to the new four-lane expressway in a new route with connection to the D48 near Palačov. The construction also contains partial modification of the D48 in the Dub - Palačov section, which consists in rebuilding the route from the existing category S 15/100 to the R 25.5/100. The construction of the high-quality and capacitive transport link to the existing D48 (I/48) motorway/road and the D1 motorway is a prerequisite for further development of the Wallachian region.

At present, the documentation for the building permit is under preparation (DSP concept developed). In June 2017, a year-long biological survey was completed, and new EIA documentation is under preparation because the original EIA was processed under the old Act No. 244/1992 Coll. The endorsement of the final opinion is expected by the end of 2018. The construction leads to a significant migration area, crossing two corridors of the Layer of Specially Protected Species (VZCHD), one north and one south of the village of Poruba.

### Set of constructions on road I/57 between Valašské Meziříčí and Vsetín

The axis of regional connection in the valley of Vsetínská Bečva is the existing road I/57. Its construction and technical parameters do not correspond with the requirements of modern traffic, so congestions often occur because the traffic intensity is very high (RPDI 13-14 thousand vehicles/24 hours). The

road is two-lane, without the possibility of overtaking slow-moving vehicles, mostly driven through settlements and with the absence of turning lanes and tight spatial conditions. Crossings with major railway line 280 are equally levelled and cause a safety risk. The set includes the following constructions:

- » I/57 Valašské Meziříčí - Jarcová, bypass - 6.55 km
- » I/57 Jarcová-Bystřička, south - 3.57 km
- » I/57 Semetín-Bystřička, 2. stage - 4.40 km
- » I/57 Semetín-Bystřička, 1. stage - 2.64 km, opened to traffic in 2009
- » there is a two-lane bypass opened on the outskirts of Vsetín in 1990. Construction of a whole set of roads is important for increasing the overall economic potential of the Wallachian region, which is one of the worst accessible regions of the country

The state of preparation of individual buildings is as follows:

#### I/57 Valašské Meziříčí

- Jarcová, bypass - The EIA process was finished, and the project was approved. As part of the preparation of the Territorial decision documentation, flood protection measures are now in place. After elaborating the Flood Control Measures, an engineering activity will be carried out. The expected horizon of construction is between 2021-2025.

#### I/57 Jarcová-Bystřička, South

- the most difficult section of the entire construction process. Two basic variants are considered: basic corridor usage of the current road I/57 and the tunnel one, which undergoes the Kozí hřbet massif to improve the route through a tunnel, which is approximately 1,200 meters long. The basic variant is in contradiction with the current state of the planned documentation and its choice would be to initiate the process of changes of the spatial plans for the municipalities. In case of the tunnel variant, the existing route



Fig. 12: Road I/57.



of the I/57 road is diverted into the area endangered by landslides. An environmental impact assessment is currently under preparation. The construction period has not yet been established.

**I/57 Semetín-Bystřička, 2<sup>nd</sup> stage** - has had a territorial decision since 2002, changes in the standards, proposed changes in the construction and issue of a new territorial decision. Currently, the planners' activity is aimed to complete the Documentation for building permit (DSP). The need of larger land takes was revealed. In terms of property rights, at the end of 2017, 84% of the landowners were settled. Considering this fact, the building had an EIA opinion issued pursuant to Act No. 244/1992 Coll., and a new biological survey was carried out as a basis for re-evaluation of the impact of the construction on the environment. Currently, the missing and refined existing information is complemented for the new EIA. The construction is expected between 2020 and 2022.

The first of the abovementioned constructions is a de facto bypass of Valašské Meziříčí and as such, it does not create any clash for the migration of wildlife. Two other constructions are in collision with the migration corridors, on the one hand, in the Brňov area and further in the area south of the village Bystřička. For these reasons, the tunnel variant is considerably more advantageous.

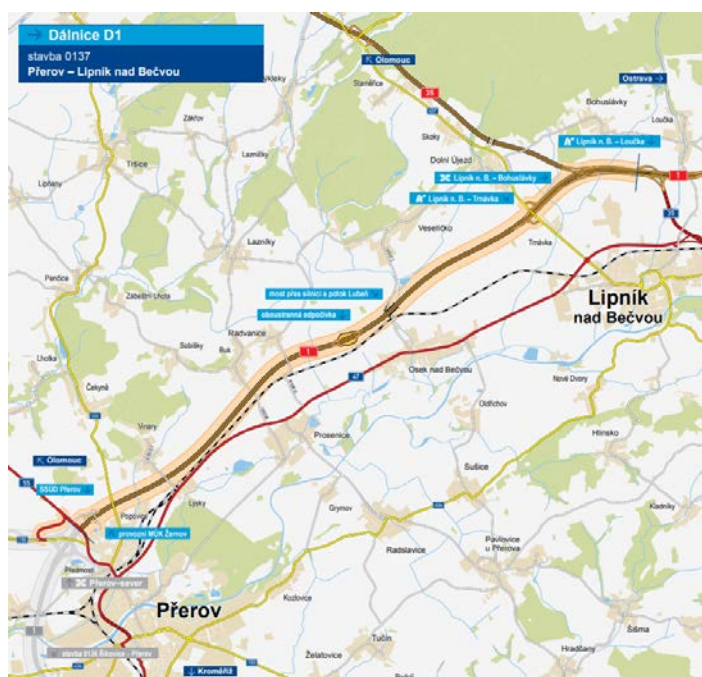


Fig. 13: Motorway D1.

#### Motorway D1 Přerov - Lipník

The currently running construction is the penultimate missing section of the Vyškov - Hulín - Přerov - Lipník nad Bečvou route (existing sections were put into operation between 2005 and 2010). The last missing link is the connected section 0136 Říkovice - Přerov, which is in the process of preparing the Documentation for

Building Permits. Construction started in 2015 and the commissioning is expected in year 2019.

The route itself does not interfere with any of the defined corridors within the layer of biotope with selected specially protected species of large mammals, but it is important for the functionality of the already existing ecopassage on the D35 motorway near Dolní Újezd.

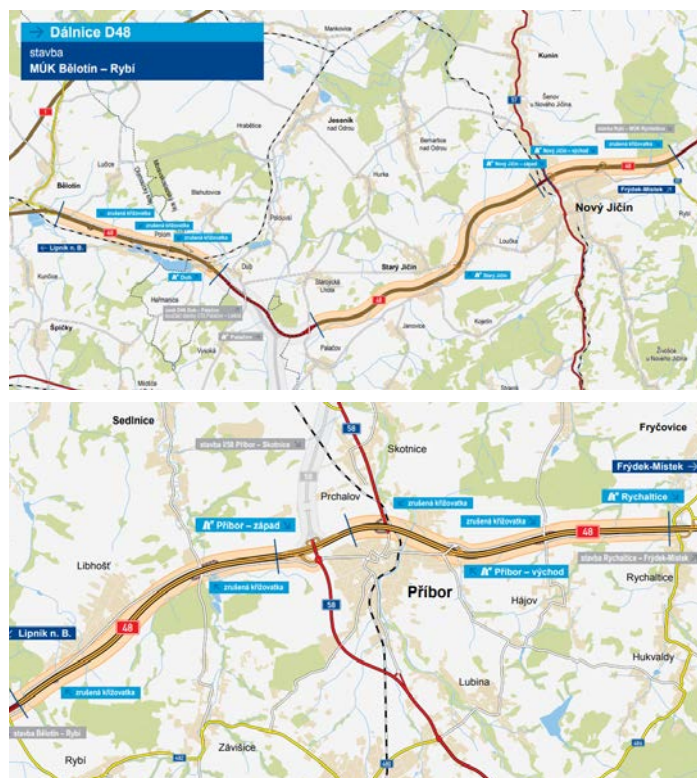


Fig. 14: Motorway D48.

#### Motorway D48 Běloutín - Rybí

The intention is to reconstruct the existing undivided four-lane I/48 road without paved edges on a four-lane motorway, with paved edges and the physical separation of the opposite traffic directions through the middle partition. It is supplemented with the I/35 Lešná - Palačov construction. In the area east of the Dub village, the planned construction crosses a corridor defined within the Layer of Specially Protected Species (VZCHD). The building permit documentation has been completed. There is a property preparation of the construction and applications for building permits are submitted in stages. 88% of the necessary land has been purchased (as of 05/2018). Since April 2018, the construction has been in accordance with the EIA study. Its implementation could be between 2019 and 2023.

#### Motorway D48 Rybí - Rychaltice

Construction of the D48 motorway Rybí - Rychaltice since 2017 solves the reconstruction of the existing road I/48, which was built as a four-lane road (but not directionally separated), on a directionally divided



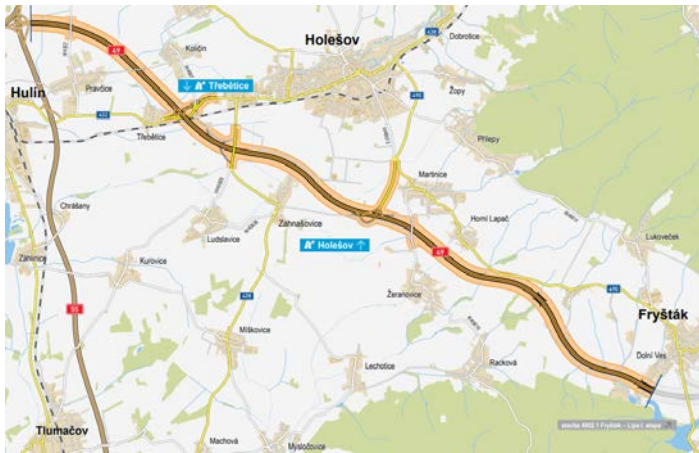


Fig. 15: Motorway D49.

road. The 1<sup>st</sup> class road will become a motorway in the R category 25.5/120. Upon completion in 2020, it will be connected to the section that is already in operation between Rychlatice and Frýdek-Místek. The construction does not intersect any of the defined corridors of the Layer of Specially Protected Species (VZCHD).

#### Motorway D49 Hulín - Fryšták

The first part of the motorway was launched as early as in September 2008, but in July 2010 the Ministry of Transport decided to put a stop to it. It is now in the conservation phase. All the necessary parcels are redeemed as a prerequisite for building permits and only smaller owners are dealt with, where they are mostly to be expropriated. The building has been awarded the EIA verification opinion as the first of the priority constructions proposed by the government. However, the document sets out the conditions, the noise barriers and the low-noise asphalt will be necessary. The Ministry of Environment, in May 2017, granted an exception to more than ten of the protected species who are in the route. This was the last missing document that the General Road Directorate (ŘSD) needed to issue a building permit. The court, following an action by environmental

activists in early June 2017, suspended the exception. The Regional Court of Brno at the end of May 2018 brought decision against Egeria activists off the table. For the restoration of the building, the court must still decide on two further activists' actions.

#### Motorway D49 - other sections

The entire route of motorway has a total length of 59 km. D49 is one of the basic and efficient connections of the state's economy to the other European structures, thus ensuring further development of the Czech Republic and Slovakia. Therefore, this road is included in the core TEN-T network. The construction will contribute to the displacement of traffic from the existing I/35 and I/50 roads overcoming the ridge of the Carpathians on the territory of the Beskydy Protected Landscape Area and the White Carpathian Protected Landscape Area. At the same time, this construction is a prerequisite for improving the accessibility and economic development of the peripheral area on the Moravian-Slovak border. While the construction of the first stretch should start in 2018 or 2019, the other sections have only been approved by a techno-economic study that recommended building only halfway behind Vizovice with a prospective completion, depending on the increase of traffic volume.

The proposed corridor crosses several migration profiles and in the Pozděchov area it passes directly through the core area in the Vizovice Hills. A series of three tunnels, alternatively two tunnels with one being considerably longer, are in question. In the border section at the Lyský Pass, the proposed route crosses another one of the identified migration corridors connecting the Javorníky and the White Carpathian mountain range.

#### Motorway D55

Part of this motorway between Hulín and Otrokovice to I/49 has been in operation since 2010, the preparation of the Otrokovice bypass in its south eastern part will be finished soon and the start of its construction is expected immediately. This section does not affect the limitations of migratory trails of animals. Other

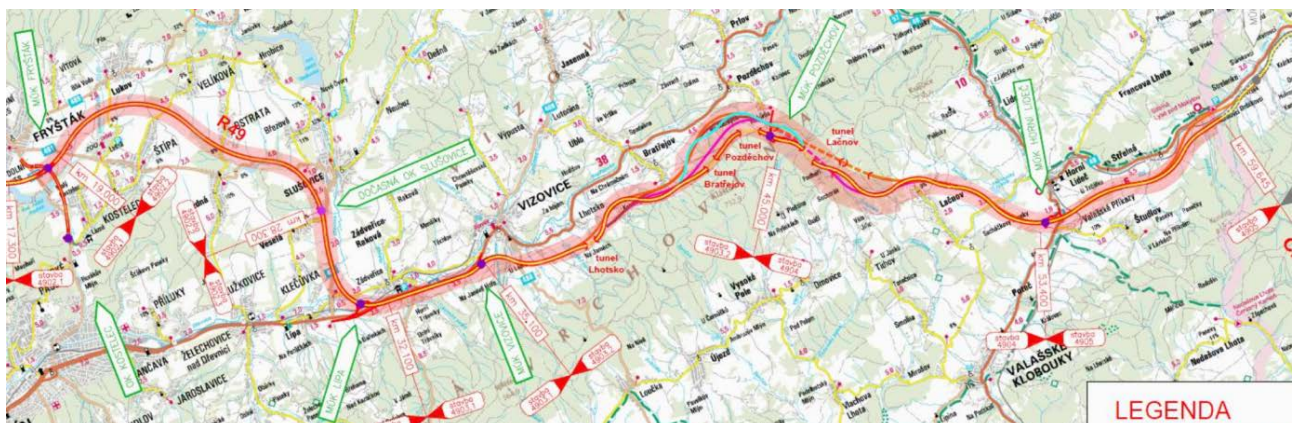


Fig. 16: Motorway D49.

sections of the motorway route are only at the stage of project preparation. The corridor of the road is defined in The Principles of Territorial Development of Zlín Region. In terms of influencing the migration corridors in the pilot area, the section no. 5506 between Napajedla – Babice intersects the corridor between Vizovické vrchy and Chříby.

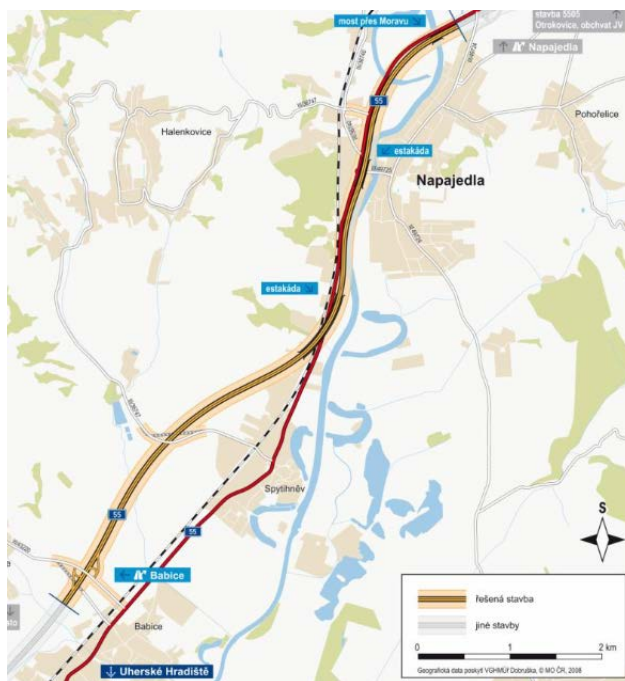


Fig. 17: Motorway D55.

### 5.1.2.2 Planned railway infrastructure

#### Optimization of track no. 280 - Valašsko

The railway between Hranice, Valašské Meziříčí, Horní Lideč and Púchov is an important route, especially for freight transport. Since 2015, there has

been a gradual upgrading of aged infrastructure in some sections with a slight increase in speed. The feasibility study (Moravia Consult, 2016) evaluated a total of 8 variants to address the transport-technological deficiencies of the existing operation. The larger part of the route is designed approximately in the current or slightly modified route, but with two major exceptions:

- » A brand-new line track between Hranice and Milotice n/B - due to the morphology of the terrain, the relocation will need a lot of earthwork, two tunnels and several estacades.
- » Relocation off the Horní Lideč railway station

The effects of different variants on the environment were also assessed in the DSP, but without considering the impact on migratory permeability of the landscape. However, the impacts on the Natura 2000 system, including EVL Beskydy, are analysed in the text.

#### High-speed railway Přerov - Bohumín

Project under consideration is part of the proposed Fast connections system. This is a rail with a proposed speed of 350 km/h. Its route has not yet been established, so a detailed spatial-technical study was prepared for its planning (Moravia Consult, 2013). The route is divided into two sections of the high-speed line and the section of the conventional line (Polanka nad Odrou - Bohumín). Addition of required links to the already existing conventional railways, or rather a new construction of the overtaking points, required the insertion of straight sections to the proposal, which subsequently had a significant effect on the adjustments of the route. The landscape design creates a new corridor approximately at the same direction as the D1 motorway, which intersects all migration routes between the Beskydy mountain range and Oderské vrchy mountain range.



## 5.2 The Slovak Republic

### 5.2.1 Existing transport infrastructure

The Slovak part of the pilot area is located in the Trenčín and Žilina Region. The most populated area is the River Váh valley, where economic centres and important transit routes are located. There are two international TEN-T transport corridors in the pilot area. The most important transit routes are D1 motorway and a double track railway No. 120, which connect the capital city of Bratislava and the city of Žilina. D1 continues further to the city of Košice in the east of Slovakia, which is one of the most important and the longest motorways in Slovakia in west-east direction. Once D1 motorway is finished it will connect the capital city of Bratislava with Vyšné Nemecké at the border with Ukraine (direction Užhorod). D1 is part of the branch „A“ V. Pan-European corridor with the route (Terst) – Bratislava – Žilina – Košice – (Užhorod – Lvov). It is also a part of the European road – the roads E50, E65, E442 pass through the pilot area. D1 together with D3 (situated in the Kysuce region in the north) also creates an important route in the south-north direction. D3 is planned to be built in the route of the current 1<sup>st</sup> class road I/11. Only two sections of the motorway are currently under operation. Once it is finished, the D3 motorway will connect the city of Žilina with the city of Čadca and cross border SK/PL Skalité. It will

create an important link between three countries – Slovakia, the Czech Republic and Poland as well as between three major industrial centres of Žilina – Ostrava – Katowice. A substantial amount of regional level transport is secured by 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> class roads. There also are few important border crossings to Czech Republic and Poland.

#### The main corridors of transport infrastructure

There are two international multimodal corridors of Trans-European Transport Network (TEN-T) crossing the pilot area (Fig. 18):

- » The Baltic - Adriatic corridor is represented in the pilot area by the railway lines Žilina - Bytča (No. 106), Žilina - Čadca - Mosty u Jablunkova (No. 106), Čadca - Zwardoň (No. 114) and motorways D1, D3 and also by planned water routes Váh.
- » The Rhine - Danube corridor is represented in the pilot area by the railway lines Žilina - Vrútky (No. 106) and by motorway D1.

There are several roads which are considered to be part of the comprehensive TEN-T network: planned R5 expressway – currently I/11 (E75), R3 expressway – currently I/59 (E77) and I/64, R1 expressway – currently I/59 (E77), and R6 expressway – currently I/49. Even though the road infrastructure is quite well developed in the pilot area, there is insufficient connection of municipalities to TEN-T network. Total length of the comprehensive TEN-T corridors in the area is 254 km.

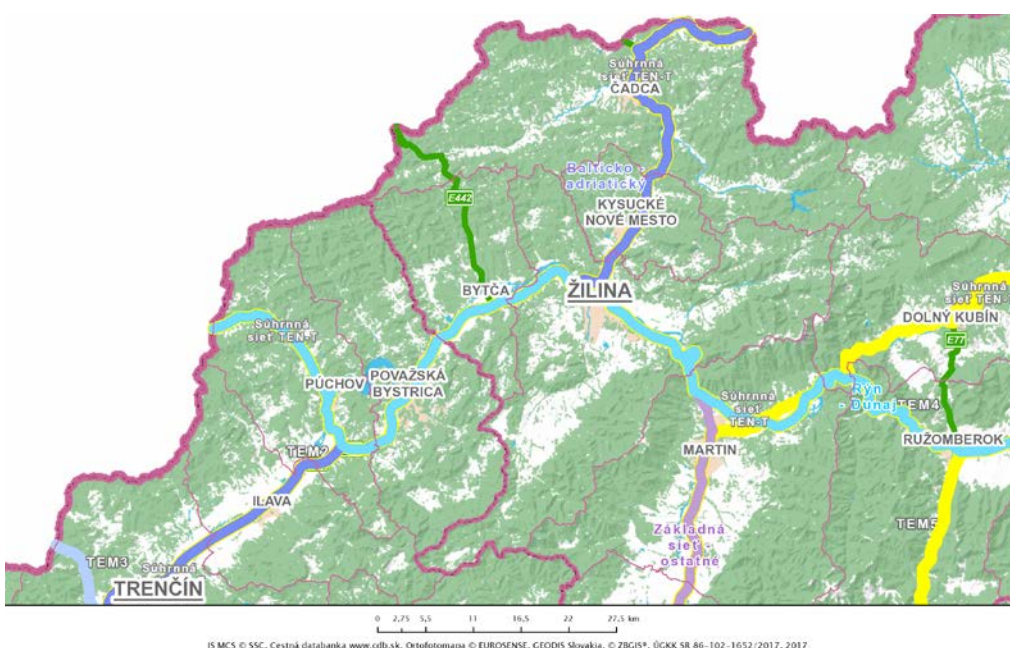


Fig. 18: International transport corridors TEN-T in Slovakia (SSC, IS MCS Portal).

There also are 2 Trans-European Motorways (TEM) crossing the pilot area, with the total length of 155 km:

- » TEM 2 – state border PL/SK, cross border Skalité, district Čadca – Žilina (continue to Bratislava – state border SK/AU, cross border Berg, Bratislava)
- » TEM 4 – intersection I/61, I/60 Žilina – Ružomberok (continue to – Poprad – Košice – Michalovce – state border SK/UA, cross border Vyšné Nemecké, district Sobrance)

There are 3 European International Road Networks in the area, with the total length of 202 km:

- » E050: state border CZ/SK, border crossing Drietoma, district Trenčín – Žilina (continue to – Poprad – Košice – Michalovce – state border SK/U, border crossing Vyšné Nemecké, district Sobrance)
- » E075: state border CZ/SK, border crossing Svrčinovec, district Čadca – Žilina – Trenčín (continue to Trnava – Bratislava – state border SK/HU, border crossing Rusovce, district Bratislava)
- » E442: state border CZ/SK, border crossing Makov, district Čadca – Bytča – intersection with I/61, I/60 Žilina

Total road length in the pilot area is 1,590 km, including districts which cover the pilot area partially. Road density differs from 0.283 km of roads per km<sup>2</sup> to 0.410 km of roads per km<sup>2</sup>, depending on the district. The highest density per km<sup>2</sup> is in the district of Považská Bystrica, Ilava, and Púchov. The highest density per 1,000 inhabitants is in districts of Bytča and Čadca.

The motorway in the pilot area covers 74 km and expressways only cover 8.8 km. According to the census realized by The Slovak Road Administration (SSC) in 2015, the annual average daily traffic intensity on the motorways in the pilot area varied from 21,274 to 26,210 cars. The highest intensity was in districts of Ilava and Púchov. The following motorways and expressways are operating or planned to operate in the pilot area:

- » D1 – Bratislava – Žilina – (Martin)
- » D3 – Hričovské Podhradie – Žilina – Čadca – Svrčinovec – Skalité, state border SK/PL
- » R3 – Žiar nad Hronom – Martin – (Orava)
- » R5 – Svrčinovec – state border SK/CZ
- » R6 – Púchov – Lysá pod Makytou – state border SK/PL.

There are several 1<sup>st</sup> class roads in the pilot area covering 348 km in total. The annual average daily traffic intensity (SSC, 2015) of these roads varied from 1,411 cars to 39,927 cars (10,042 cars on average). The highest intensity is in districts of Žilina and Martin, on the roads I/18 and I/11. The most important of them are:

- » I/10 – state border ČR/SR – Bytča
- » I/11 – state border SK/ČR Svrčinovec – Čadca – Žilina

» I/12 – state border PL/SK Skalité – Svrčinovec (original route along new D3 section)

» I/18 – Žilina – Lipníky, district Prešov, in Pilot area part Žilina – Strečno – Martin – Kraľovany

» I/49 – state border SK/ČR Lysá pod Makytou/Strelná – Beluša (district Púchov) – crosses the river Biela voda valley

» I/61 – Bratislava – Žilina (trajectory of D1) – crosses the river Váh valley

» I/64 – Komárno – Nitra – Topolčany – Prievidza – Žilina; in the Pilot area connect Žilina – Rajecké Teplice – Fačkov (and continue to Prievidza)

» I/70 – Kraľovany – Dolný Kubín

» I/65 Vrútky – Martin – Turčianske Telice (- Žiar nad Hronom)

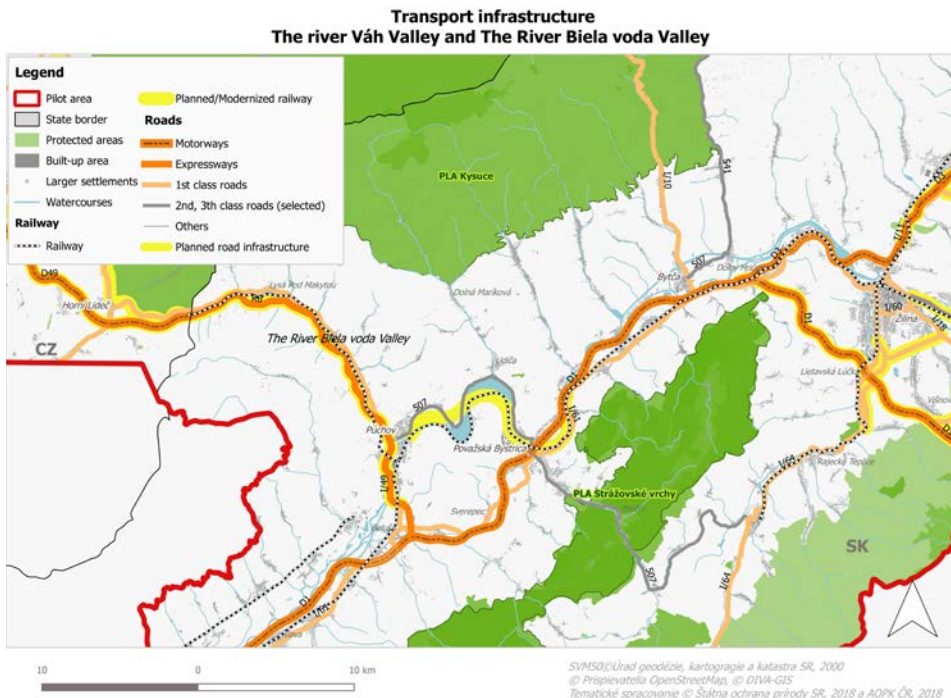
*The main transport infrastructure is also shown on the map in Fig. 5 (above).*

It is mainly the 2<sup>nd</sup> and 3<sup>rd</sup> class roads which secure the connection to TEN-T network. They also create an important transport connection to the Czech Republic and Poland. The 2<sup>nd</sup> class roads cover 255 km in the pilot area and the 3<sup>rd</sup> class roads (with mainly local significance) cover 903 km. Traffic intensity on the 2<sup>nd</sup> class roads is quite high. It varies from 991 to 18,026 cars (5,497 cars on average, SSC 2015). The traffic volume has seriously increased during the last decades due to various reasons. Increase in the standard of living leads to an increased use of personal car transport. Also, a part of cargo transport has moved from railway to road transport. Introduction of fees to be paid for use of motorways, expressways and the 1<sup>st</sup> class roads contributes to the increase of traffic on the 2<sup>nd</sup> and 3<sup>rd</sup> class road, too. These roads were not prepared for such a rapid increase in traffic density and therefore they are now in bad technical conditions. This can endanger the security of drivers and efficient traffic fluency. In year 2012, 27.8% of the 2<sup>nd</sup> class roads and 21.6% of the 3<sup>rd</sup> class roads in Trenčín Self-governing Region were assessed to be in insufficient condition. Similar situation was found in the Žilina Self-governing Region, where 20% of the 2<sup>nd</sup> and 3<sup>rd</sup> class roads were assessed to be in insufficient condition (2015). The situation has not changed much since. Further, many road bridges in this area are also in a low technical state.

**The main transportation corridors are shortly described in the following text:**

#### **The River Váh Valley - part Vážske Podolie**

Vážske podolie is located in the River Váh valley, on the western side of Strážovské vrchy mountain range. The River Váh is the longest river in Slovakia, along which there are significant settlements and transport routes established between the northern



**Fig. 19:** The River Váh Valley and the River Biela voda Valley.

and south-western part of Slovakia. The cities of Bytča, Považská Bystrica, Púchov, Ilava and Dubnica nad Váhom are situated here. District of Považská Bystrica, Ilava and Púchov have the highest density of road infrastructure per km<sup>2</sup> in the pilot area.

The most important traffic routes connecting the capital city of Bratislava and the city of Žilina are crossing the area. It is the motorway D1 and the 1<sup>st</sup> class road I/61, which connect cities of Dubnica nad Váhom, Púchov, Považská Bystrica and Žilina in this area. The motorway D3 is operating in the section of Hričovské Podhradie and Žilina Strážov. The average daily traffic intensity is highest in the Districts of Dubnica nad Váhom and Ilava, where it varies from 10,000 to 15,000 vehicles per 24 hrs. Near the city of Považská Bystrica, there are 5,500-6,500 vehicles per 24 hrs. The highest traffic intensity is in the section of Bytča – Žilina, where it varies from 5,500 to 8,000 vehicles per 24 h (SSC, 2015).

The valley is also crossed by a two-track railway line No. 120, which is part of the highest transport infrastructure – Pan-European multimodal corridors (ECMT). The track begins in Bratislava and it connects the cities of Dubnica nad Váhom – Púchov – Považská Bystrica – Žilina and continues further to Košice and Užhorod. The line between Púchov and Považská Bystrica is now in the process of modernization. Other railway lines have already been modernized. The highest average mortality on the railway in this area was recorded on the track between Považská Bystrica and Považská Teplá.

In the years 1959-1963, Hričovský canal and Nosický canal were built in the area. They connect the storage tank Hričovská dam and the reservoir Nosice.

### The River Biela voda Valley and Lyský priesmyk (Lyský pass)

The river Biela voda valley is connected to the Vážske podolie near the city of Púchov and continues to the village of Lysá pod Makytou, near the CZ/SK border on the west. It creates a natural border between Javorníky and Biele Karpaty mountain range. The municipalities situated here are as follows: Vieska Bezdedov, Dohňany, Mestečok, Záriečie, Lúky, and Lysá pod Makytou. The village of Beluša (District of Púchov) is connected to the village of Lysá pod Makytou by a 1<sup>st</sup> class road I/49, which is important from the regional viewpoint. The average daily traffic intensity of this road is between 5,000-7,000 vehicles per 24 h (SSC, 2015). The highest intensity is near the city of Púchov and the lowest in the cadastre Lysá pod Makytou.

The expressway R6 is planned to be built in the area. A short section of the R6 is already in operation near the village Beluša. In the future, the expressway will continue along the village of Lysá pod Makytou to the Czech Republic, where it will connect to the motorway D49. Any transport is currently secured by the road I/49.

The border of Javorníky and Biele Karpaty mountain range is followed by a route of railway line No. 125, which connects Púchov – Lúky pod Makytou – Strelenka – Horní Lideč (CZ). It is a part of the highest-level transport infrastructure – Pan-European multimodal corridors (ECMT). It is also a part of the comprehensive TEN-T network and a part of the European freight railway network AGC E63 and E40.

### Bytča - Makov (Kolárovičský brook Valley)

The Javorníky mountain range are split in the middle by the road I/10, which connects the city of Bytča and the village of Makov and continues to the Czech



**Transport infrastructure**  
**The river Váh Valley - the part of Malá Fatra and the River Rajec Valley**



**Fig. 20:** The River Váh Valley – a part of Malá Fatra and the River Rajec Valley.

Republic in the direction to Olomouc. This is the most important long-distance traffic link in the area connecting the Czech and Slovak Republic. The average daily traffic intensity varies from 5,000-8,000 cars in the cadastre of Bytča and Makov. The intensity on the other sections of this road is around 4,000 vehicles per 24 h (SSC, 2015).

### The River Váh Valley - the part of Malá Fatra

As the River Váh crosses the Považské Podolie, it continues to flow through the gorges in the Malá Fatra mountain range. There is a plan for the D1 motorway to connect the cities of Žilina and Martin here in this point. The section between Žilina and Martin is currently under construction, but the bypass of the city Martin is already in operation. One of the most problematic roads in this region is the national road I/18 (E 50). The segment between Žilina and Kralovany is approximately 42.5 km long with an average traffic intensity of 26,831 vehicles per 24 h (SSC, 2015). There are several important collision spots in the cadastre areas of Strečno, Vrútky, Turany and Ratkovo in this section. Significantly less frequented is the road II/583, which leads from the village of Párnica northwards to Zázrivá, where it continues westwards through the village of Terchová to Žilina. The route is 48 km long. From the mortality perspective, the road I/70 from the village of Kralovany to the village of Párnica in Orava is less important. This segment is 8.5 km long.

Several risk areas have been identified in the Malá Fatra Mountain range, based on the frequency of brown bear collision occurrence. Two of them are very important:

- » First is the south foothill area of the Malá Fatra NP. It is approximately a 3.3 km long section of the I/18 road, beginning from behind the bridging of the derivation canal of the River Váh in the village of Turany, following south-east up to the

beginning of the retaining wall over the I/18 road near the Šútovská Epigenéza Natural Monument in the cadastre of Ratkovo. Another collision area lies approximately 2.2 km in the south-western direction from the abovementioned bridging over the derivation canal in the cadastre of Turany.

- » The second most important area is the point called Strečniansky prielom: approximately 8.3 km long section of the I/18 road. It starts at the rock of the Strečno castle and ends at the Dubná skala stone pit in the Martin District. Few collisions were recorded also on the road II/583 (Žilina – Párnica, Dolný Kubín District).

There is the city of Martin near the border of the pilot area which is connected with the city of Žiar nad Hronom by the R3 expressway. This road will continue to the Orava region (the city of Dolný Kubín) and on the route between Martin – Ružomberok and it will pass through the D1 motorway.

Žilina is an important railway transit node in Slovakia. The electrified two-track line No. 180 connects this city with the city of Košice in the east of Slovakia. The section of the line between Žilina and Kralovany is 41 km long. From animal mortality point of view, this is extremely critical part of the train line, especially in the cadastre Nezbudská Lúčka and Strečno.

There also is the Intermodal Transport Terminal Žilina-Teplička, where modernization was finalized only recently. The terminal is situated in the district of Žilina, in the cadastre territory of the municipality Teplička nad Váhom, in the vicinity of the Žilina Water Dam. The terminal is connected to rail and road infrastructure and it is designed to ensure effective unloading, loading, transshipment, and storage of intermodal loading units.

### The Rajec Valley

The Rajec Valley is located between the city of Žilina and the city of Rajec. It includes the village of Ražecské Teplice, which is a popular tourist destination. The 1<sup>st</sup> class road I/64 runs through it and continues further on to the cities of Prievidza and Komárno. The highest average traffic intensity is at the section of Žilina-Ražecské Teplice, where it varies from 10,000 to 18,000 vehicles per 24 h (SSC, 2015). The one-track railway No. 127 is of local significance; nevertheless, collisions with animals are quite frequent.

### The River Kysuca Valley

The River Kysuca flows between Javorníky Mountain range and Turzovská vrchovina Mountain range. It passes through the city of Čadca and continues to the city of Žilina, on the border of Javorníky Mountain range and Kysucká vrchovina. The municipalities of Kysucké Nové Mesto, Čadca, Turzovka and Krásno nad Kysucou are situated here. There is strong urbanization in the whole river valley.

The most important traffic route in this area is to be the motorway D3, which in the future should connect the city of Žilina with the cross-border SK/PL Skalité. D3 will be part of the European road E75 and of the VI. Pan-European transport corridor. The motorway is mostly in the phase of project preparation. Currently, the transport is secured by the 1<sup>st</sup> class road I/11 mainly, which connects the city of Žilina with the city of Čadca. The average daily traffic intensity on this road is quite high. It varies from 10,000-20,000 vehicles per 24 h (SSC, 2015) on the busiest parts of the road; the highest is near the city of Žilina.

In the Kysuce region, the line No. 127 plays a significant role, because it connects the cities of Žilina – Čadca and Mosty u Jablunkova in the Czech Republic. The section between Čadca and Krásno nad Kysu-

cou is one of the two places with the highest animal railway mortality in Kysuce. The regional railway No. 128 connects Čadca with the municipality Turzovka and Makov. The highest mortality on this track is at the section of Staškov - Turzovka.

### Čierňanka Valley

Čierňanka is a small tributary of the River Kysuce and flows through the Jablunkovské medzihorie mountain range in the northern part of the pilot area. The municipalities of Skalité, Čierne, Svrčinovec and Čadca are situated here. There is strong urbanization in the whole river valley.

The most important traffic route is the motorway D3 between Svrčinovec (near the city Čadca) and Skalité, state border SK/PL, which was opened for operation in 2017. The main transport link before the opening of D3 was the 1<sup>st</sup> class road I/12. The average traffic intensity (SSC, 2015) on this road was 3,500 vehicles per 24 hrs.

The first part of valley between Čadca and Svrčinovec is also important as an international connection to easternmost part of the Czech Republic. The national road I/11 (8,000 vehicles per 24 h, SSC 2015) and double-track electrified railway No. 127 connect Čadca (and Žilina) to the industrial Moravian-Silesian region. There is also a planned expressway R5 there and a new ecopassage D3 Green Bridge Svrčinovec is planned to be built in this area. The one-track line No. 129 connects the cities of Čadca, Skalité-Serafinov and Zwardoň in Poland.

### The River Bystrica Valley

The River Bystrica is a left tributary of the River Kysuce (at the city of Krásno nad Kysucou). Strong urbanization is evident. The 2<sup>nd</sup> class road II/520 connects the cities of Krásno nad Kysucou, Zborov nad Bystricou, Stará Bystrica, Nová Bystrica and secures the connectivity between the Kysuce and Orava Region.

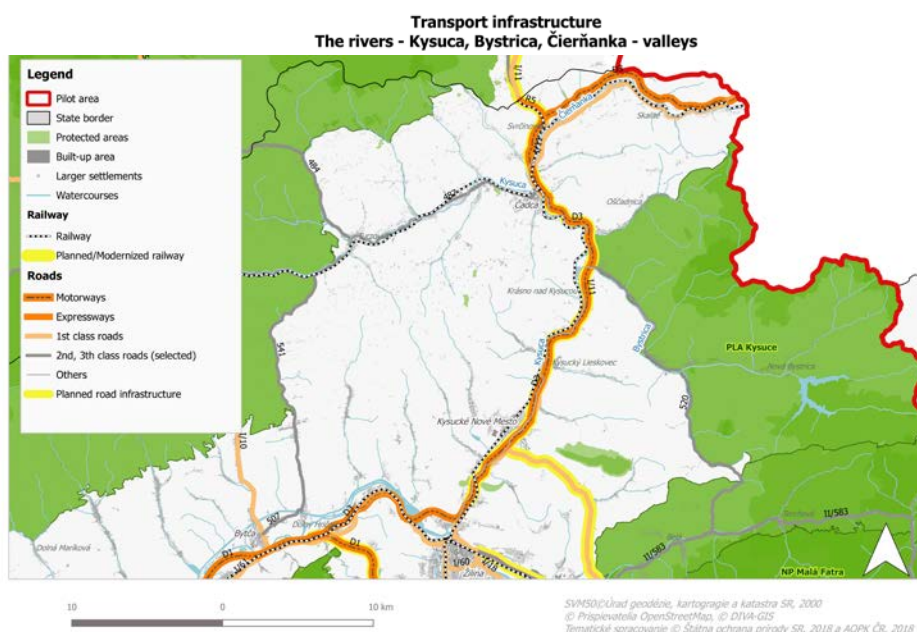


Fig. 21: The valleys of the River Kysuca, Bystrica and Čierňanka in Kysuce Region.

## 5.2.2 Planned transport infrastructure

### **D1 Motorway - Hričovské Podhradie - Lietavská Lúčka**

This section is currently under construction. It is a part of the D1 northern route, and it will pass through two tunnels - Ovčiarsko and Žilina. The total length is planned to be 11.32 km. D1 motorway will cross the village of Lietavská Lúčka by an estacade.

### **D1 Motorway - Lietavská Lúčka - Višňové - Dubná Skala**

This 13.51 km-long section of the motorway D1 is currently under construction and once finished, it will connect the cities of Žilina and Martin. The longest tunnel Višňové is a part of this section.

### **D1 Motorway Feeder - Lietavská Lúčka - Žilina**

The motorway feeder Lietavská Lúčka - Žilina (2.59 km) which will secure the connection between D1 and the 1<sup>st</sup> class road I/64 in the city of Žilina are also under construction.

### **D1 Motorway - Turany - Hubová**

The section is situated on the border of the pilot area, on the west of the Malá Fatra mountain range. It is one of the most controversial sections of D1. There was a long-lasting dispute over which variant should be realized. The final decision of the Slovak republic Ministry of Environment confirmed the variant including the tunnel of Korbeľka. This decision was only announced to the relevant municipalities at the beginning of the year 2018. This variant was also preferred by experts from environmental field. In the past, several detentions were filed against the final report. The construction will start in 2021 and it is supposed to take 5.5 years. The Korbeľka tunnel should be 5.9 km long. The motorway will continue near its eastern portal with the Havran tunnel, which should be 2.9 km long. The total length of the section will be 13.534 km.

### **Ecoduct Turany - Hubová**

As a compensation measure for the construction of D1 Turany - Hubová, two ecopassage of the 100 m width are planned to be built. They will be situated in the corridor (one ecopassage is planned to be built over the I/18 road and the other over the D1) in the north of the Turčianska

kotlina basin, connecting the mountain ranges of Malá Fatra and Veľká Fatra. It is the most problematic area of Malá Fatra in relation to the number of animal collisions with the traffic. The corridor is surrounded by large pastures, hedges and arable land. It is bordered by the villages of Šútovo and Ratkovo on the northeast, and the village of Turany on the southwest.

### **D3 Motorway - Čadca, Bukov - Svrčinovec**

This part of the D3 motorway in Kysuce region is currently under construction. It should be 5.673 km long and it will improve the connection between Slovakia, the Czech Republic and Poland.

### **R5 Expressway - Svrčinovec - state border SK/CZ**

The expressway R5 will connect the village of Svrčinovec with the state border of the Czech Republic. The length of R5 expressway will be approximately 2 km.

### **D3 Green bridge Svrčinovec**

80m wide ecopassage will be built at the end of D3 motorway Svrčinovec - Skalité and in the section of the planned R5 expressway Svrčinovec - state border SK/CZ. It will be a set of two ecoducts. One will be built over the I/11 road to the Šlahorov stream and the second over the railway line to the Berkov grunts in the area between the roundabout and the turn to Puraš.

### **R6 Expressway - State border SK/CZ - Mestečko and Mestečko - Púchov**

R6 expressway will cross the valley of the River Biela voda in Strážovské vrchy mountain range and it will connect the city of Púchov and the municipality of Lysá pod Makytou and the state border SK/CZ. The 22.27 km of this expressway are under preparation and planning. Two sections of the road are already in the EIA process - the first one is the state border SK/CZ - Mestečko (11 km) and the second is Mestečko - Púchov (11.27 km).

### **Other roads**

The priority for next years is to construct a new superior road infrastructure, to finish and improve the quality of the TEN-T motorways and expressways, and to improve accessibility of less developed regions through connecting them to TEN-T network and 1<sup>st</sup> class roads. One of the strategic plans is the reconstruction of 1<sup>st</sup> class roads and reconstruction of 2<sup>nd</sup> and 3<sup>rd</sup> class roads



which are in bad technical condition. Out of these, the roads II/517 (Považská Bystrica – Rajec) and II/507 (Gabčíkovo-Žilina) are the priority in the Trenčín Self-governing Region.

### **Railways - modernization of rail line No. 120 - Púchov - Žilina**

One of the main goals of railway development in the pilot area is modernization of an existing rail line Púchov – Žilina (line No. 120, part of the corridor No."Va."). The modernisation should secure the operation of the train line at a speed limit of 160 km per hour. Total length of lines, which should be reconstructed, is approximately 39 km. To reach this speed limit it will be necessary to change the trajectory of the railway line, especially in the transect of Púchov – Považská Bystrica, modernization of which is currently under way. The modernization also involves the construction of noise barriers near residential areas. This, however, creates an impermeable barrier for terrestrial animals. There are also plans for modernization of the railway corridor State border CZ/SK – Čadca – Krásno nad Kysucou.

6

# Overview of protected areas in the pilot area



# 6.1 An overview of protected areas at national level

## 6.1.1 The Czech Republic

There are two large-scale protected landscape areas (PLAs) in the pilot area: PLA Beskydy and PLA Poodří and 219 small-scale protected areas. PLAs cover 128,449.23 ha, which is 25.7% of the CZ part of the pilot area. Small-scale protected areas cover 6,222.47 ha, which is 1.24% of the CZ part of the pilot area. These include 11 National Nature Reserves, 68 Nature Reserves, 3 National Nature Monuments, and 137 Nature Monuments.

Following is the list of administrative bodies with the competency over different protected areas:

**PLA Beskydy:** Regional Administration of Protected Landscape Area Beskydy (NCA)

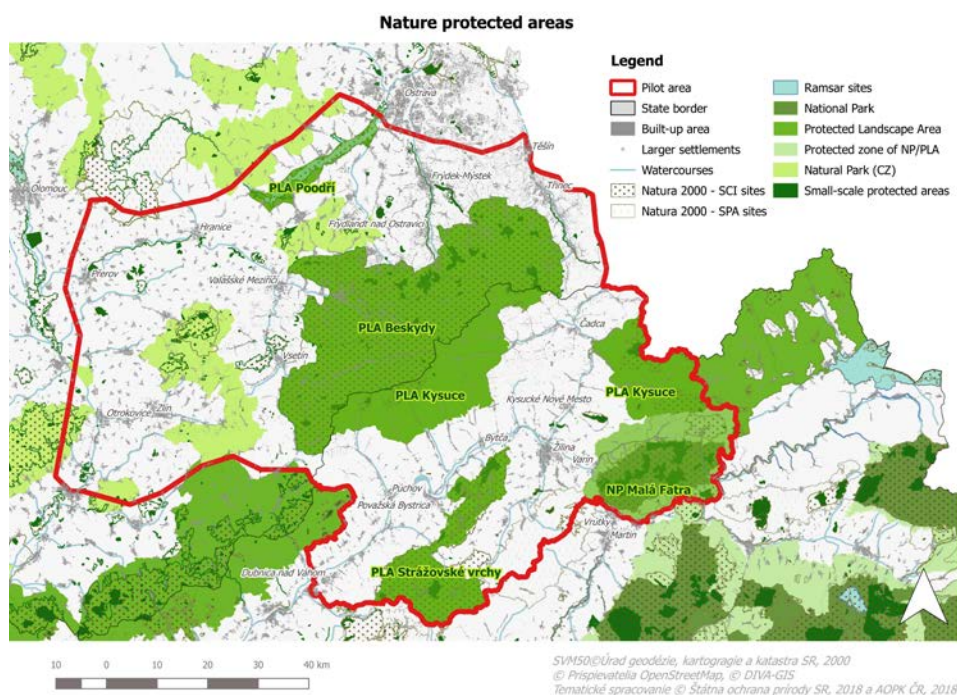
**PLA Poodří:** Regional Administration of Protected Landscape Area Poodří (NCA)

**National Nature Reserves:** 7 under Regional Administration of Protected Landscape Area Beskydy (NCA), 2 under Regional Administration of Protected Landscape area Poodří (NCA), 2 under Regional Administration Olomoucko (NCA)

**Nature reserves:** 28 under Regional Administration of Protected Landscape Area Beskydy (NCA), 15 under Regional District Administration Office Zlín, 12 under Regional District Administration Office of Moravskoslezský kraj, 7 under Regional Administration of Protected Landscape area Poodří (NCA), 6 under Regional District Administration Office of Olomouc

**National Nature Monuments:** 2 under Regional Administration of Protected Landscape area Poodří (NCA), 1 under Regional Administration Olomoucko (NCA)

**Nature Monuments:** 78 under Regional District Administration Office Zlín, 25 under Regional Administration of Protected Landscape Area Beskydy (NCA), 19 under Regional District Administration Office of Moravskoslezský kraj, 13 under Regional District Administration Office of Olomouc, 1 under Regional Administration of Protected Landscape area Poodří (NCA), 1 under The Czech Republic Ministry of Environment



**Fig. 22:** Overview of nature protected areas designated in the pilot area.



## 6.1.2 The Slovak Republic

There are three large-scale protected areas in the Slovak part of the pilot area: PLA Strážovské vrchy, PLA Kysuce and NP Malá Fatra and 83 small-scale protected areas, covering 144,830 ha, which constitutes 42% of the Slovak part of the pilot area.

These include 4 Protected Sites, 25 Nature Reserves, 24 National Nature Reserves, and 22 Natural Monuments. The main part of the area is administrated by NP Malá Fatra, PLA Kysuce

and PLA Strážovské vrchy. In the area of their competency, there is a following number of small-protected areas:

- » 4 Protected sites: Strážovské vrchy 1, Malá Fatra 2, Kysuce 1,
- » 25 Nature Reserves: Strážovské vrchy 2, Malá Fatra 13, Kysuce 10,
- » 24 National Nature Reserves: Strážovské vrchy 5, Malá Fatra 16, Kysuce 3
- » 22 Natural Monuments: Strážovské vrchy 5, Malá Fatra 9, Kysuce 8

## 6.2 An overview of protected areas at international level

### 6.2.1 Czech Republic

There are 52 Sites of Community Importance (SCI) in the whole pilot area and 5 Special Protection Areas (SPA Libavá lies in pilot area only marginally). SCIs cover the area of 137,102.55 ha, which constitutes 27.4 % of the CZ part of the pilot area. SPAs cover the area of 83,643.38 ha, which is 16.7% of the CZ part of the pilot area. One Ramsar site Poohří has been declared in the Czech part of the pilot area, which covers 4,212.33 ha; that is 0.8% of the CZ part of the pilot area.

Following is the list of administrative bodies with the competency over different protected areas:

**Sites of Community Importance:** 31 under Regional District Administration Office Zlín, 13 under Regional District Administration Office of Moravskoslezský kraj, 12 under Regional District Administration Office of Olomouc, 2 under Regional Administration of Protected Landscape Area Beskydy (NCA), and 2 under Regional Administration of Protected Landscape area Poohří (NCA)

**Special Protection Areas:** 2 under Regional Administration of Protected Landscape Area Beskydy (NCA), 2 under Regional District Administration Office of Moravskoslezský kraj, 2 under Regional District Administration Office Zlín, 1 under Regional Administration of Protected Landscape area Poohří (NCA), and 1 under Regional

District Administration Office of Olomouc

**Ramsar site:** Regional Administration of Protected Landscape area Poohří (NCA), Regional District Administration Office of Moravskoslezský kraj

### 6.2.2 Slovak Republic

There are 41 SCI/SAC Special Conservation Areas within the entire pilot areas and 3 Special Protection Areas (SPA). SCI/SAC cover 68,503 ha, which constitutes 20% of the SK pilot area cover. SPAs cover 85,548 ha, which constitutes 25% of the SK pilot area cover.

From these, the following are in the competency of PLA Strážovské vrchy, NP Malá Fatra and PLA Kysuce:

- » SCI: PLA Strážovské vrchy 4, NP Malá Fatra 12 and PLA Kysuce 25
- » SPA: PLA Strážovské vrchy 2, NP Malá Fatra 1

However, only six SCI/SAC (listed in the Tab. 2) were designated for the protection of large carnivores (the grey wolf, the European lynx and the brown bear) in the area of Malá Fatra. Even though these areas are ideal when it comes to the quality of the habitat, they do not cover the real spatial/ areal dispersion of large carnivores (namely SAC Kozol and SAC Klák).

| Category and name of the site     | Area (ha)  |
|-----------------------------------|------------|
| SAC 0239 Kozol 92.873             | 92.873     |
| SAC 0240 Kl'ak 83.370             | 83.370     |
| SAC 0251 Zázrivské lazy 2,928.145 | 2,928.145  |
| SAC 0252 Malá Fatra 22,253.171    | 22,253.171 |
| SAC 0663 Šíp 1,799.213            | 1,799.213  |
| SAC 0930 Lúčanská Fatra           | 1,454.307  |

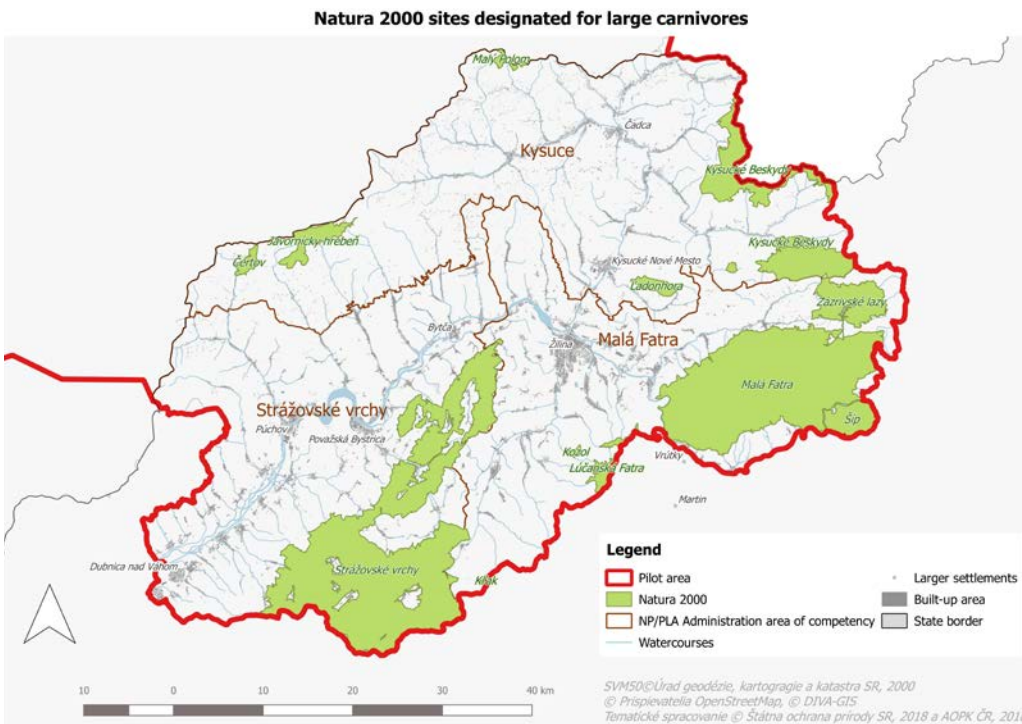
**Tab. 2:** List of SCI/SAC areas designated for the protection of large carnivores in Malá Fatra.

In the area of Strážovské vrchy mountain range, one SCI/SAC (SKUEV0256 Strážovské vrchy), with the total area of 29,973 ha, is designated for the protection of the grey wolf, the European lynx and the brown bear.

In the area of Kysuce, 6 SCI/SAC (listed in the Tab. 3) were designated for the protection of large carnivores. SKUEV Čertov was designated for the grey wolf and the European lynx only, and others were designated for the protection of all three large carnivores.

| Category and name of the site | Area (ha) |
|-------------------------------|-----------|
| SAC 0102 Čertov               | 400.755   |
| SAC 0288 Kysucké Beskydy      | 7,000.94  |
| SAC 0642 Javornický hrebeň    | 1,352.693 |
| SAC 0657 Malý Polom           | 208.621   |
| SAC 0834 Ladonhora            | 572.886   |
| SAC 2288 Kysucké Beskydy      | 382.341   |

**Tab. 3:** List of SCI/SAC areas designated for the protection of large carnivores in Kysuce.



**Fig. 23:** Natura 2000 sites in Slovak part of the pilot area designated for large carnivores.

## 6.3

# Biodiversity of the area

### Beskydy and Poodří

There are two Protected Landscape Areas in the pilot area: PLA Beskydy and PLA Poodří. PLA Beskydy hosts several endangered species of flora and fauna. Especially species of orchids such as the Elder-flowered Orchid (*Dactylorhiza sambucina*) and the Broad-Leafed Marsh Orchid (*Dactylorhiza majalis*) are known for its spring flowering phenomenon. Beskydy landscape is thus well-known either for species-rich meadows and pastures or especially for remnants of old-growth beech forests with rare Carpathian animals, e.g. the fire salamander (*Salamandra salamandra*) and the Carpathian blue slug (*Bielzia coerulans*). Two Special Protected Areas for bird protection were designated within the PLA territory. You can also find here small pseudo-karst caves. The Beskydy Landscape still has an extraordinary aesthetic value that arose from the historical coexistence of man and the mountains.

On the other hand, PLA Poodří is located in the flood plain of Oder River, which is a totally different landscape. On ponds with less intensive management, there is relatively rich vegetation. At the edges there are reed beds further than e.g. *Ceratophyllum sp.*, *Potamogeton sp.*, *Utricularia sp.* and critically endangered species of aquatic macrophytes *Trapa natans* or *Salvinia natans*. The populations of *Eubranchipus grubii* are particularly valuable in the periodic flood plains. In the running waters (especially in the Oder River), there lives the population of critically endangered Painter's mussel (*Unio pictorum*). Up to this date, over 400 species of birds have been found in the Poodří Protected Landscape Area, which is more than 60% of all bird species in the Czech Republic. The nesting of the Red-crested pochard (*Netta rufina*) and Goosander (*Mergus merganser*) has been confirmed. The number of nesting Greylag goose (*Anser anser*) has increased, which currently nest regularly on all pond systems. Especially two species of mammals living here should be mentioned: the European beaver (*Castor fiber*), which naturally expanded to PLA Poodří in 2002, and the Eurasian otter (*Lutra lutra*).

### Strážovské vrchy mountain range

Rich geological, geomorphological, hydrological, climate and soil conditions of the south of the pilot area are well reflected in high diversity of plant and animal species that are present here. Typical representatives of Strážovské vrchy mountain range are orchids and species growing on soils rich in calcium.

There is a wide spectrum of habitats used, among others, by the brown bear, the European lynx, the

grey wolf, the wild cat, and the European otter. Biodiversity of this area is rich, but very fragile. Its level keeps decreasing, which is confirmed by the case of western capercaillie (*Tetrao urogallus*), which has gone extinct in this area due to unsuitable forest and meadow management. The same applies to a number of invertebrates. Significant negative influence is caused by habitat fragmentation due to new developments and increasing transport infrastructure. This causes higher animal mortality and "genetic" isolation of the populations.

### Kysuce

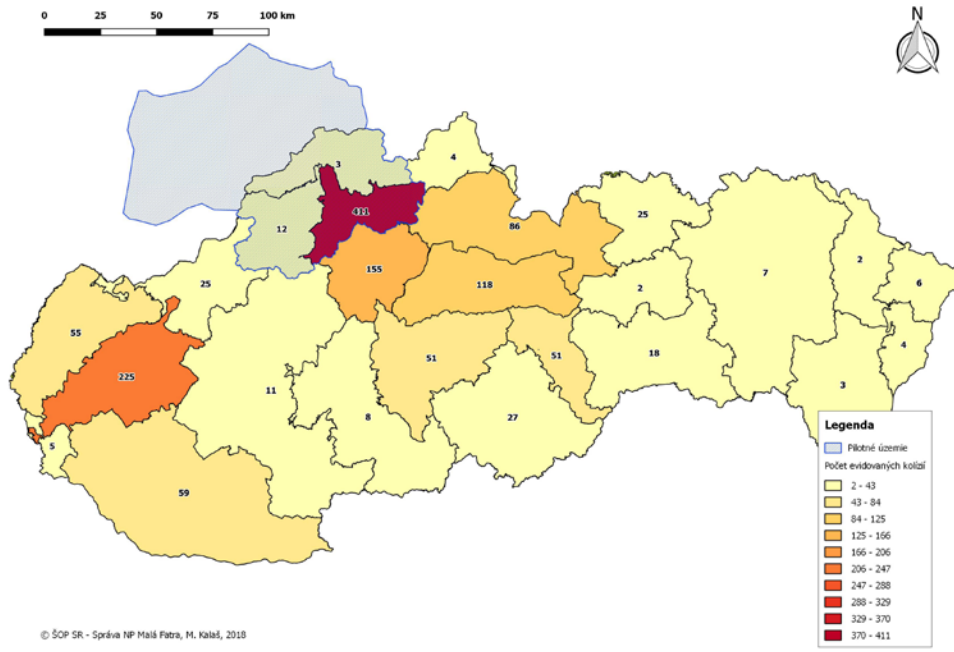
Continuing up towards the northwest, biodiversity of the area decreases. This is mainly due to geological bedrock (flysch) and due to several negative impacts of human activity (e.g. intensive forest monocultures planting). Natural forest communities of fir-beech forests, which are typical for this area, are preserved in only few places. When they create communities of ancient forest, they are protected as nature reserves.

### Malá Fatra mountain range

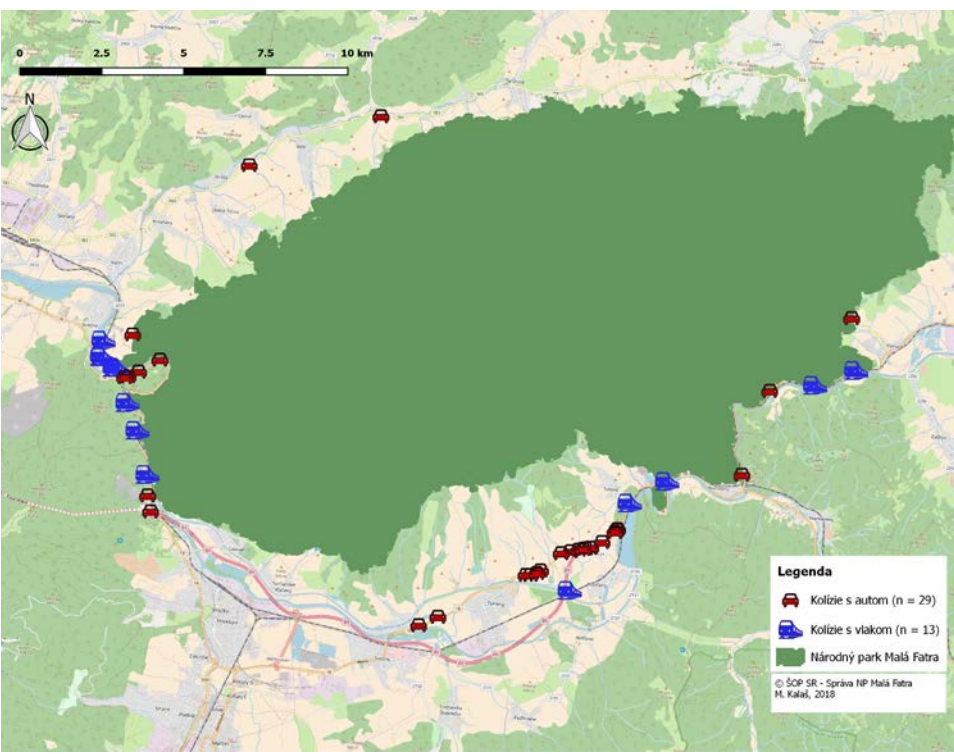
Areas described above represent sites with occurrence of all key large mammal species, which are significantly influenced by road and railway mortality. There is a brown bear population with a minimal estimated density of 16.1 individual per 100 km<sup>2</sup> (Kalaš 2017), permanent occurrence (reproduction including) of the European lynx population (Duľa et al. 2017) and permanent occurrence of the grey wolf with confirmed reproduction rates (Kutal 2017). Ungulates are represented by a common occurrence of the red deer, the wild boar and the European roe deer.

Updated data confirm high traffic mortality of large carnivores within the Western Carpathian mountain range area. Traffic mortality rates of the brown bear are probably the highest here overall. In the NP Malá Fatra buffer zone, there were 29 road traffic collisions with the brown bear registered in the time period between 1997 - 2017, and another 13 collisions were registered with railways. One of these railway collisions killed two individuals at once (cubs). Traffic mortality represents 42.2% of the overall mortality of the brown bear in the time period between 1997- 2017, which confirms a negative impact of the habitat fragmentation by transport infrastructure.





**Fig. 24:** An overview of registered traffic mortality of animal species during 2000 - 2018 (n = 1374) in KIMS database.



**Fig. 25:** An overview of the brown bear (*Ursus arctos*) collisions on roads and railways in the area of NP Malá Fatra during 1997 - 2017 (n = 42).

## 6.3.1 Large carnivores in the pilot area

The most sensitive species to landscape fragmentation, which live in the pilot area, are large mammals, especially large carnivores: the wolf, the bear and the lynx. This group of umbrella species has the highest spatial demands – they live on a large territory and especially young animals naturally disperse from parental territories to areas further away. During their journey they must face several obstacles in the human dominated landscape such as highways, railroads, urban built-up areas, fenced game enclosures, etc.

The following subchapter is thus dedicated to those three large carnivore species, which serve as a good indicator of transport infrastructure permeability also for other smaller forest species, e.g. ungulates: the red deer, the roe deer, the wild boar, the fox, and the badger.

### **Eurasian lynx (*Lynx lynx*)**

The Lynx is the smallest of the three large carnivores in the Western Carpathians. Its regular occurrence and reproduction in the years 2012-2016 is documented in Moravian-Silesian Beskydy, Javorníky, Kysuce Beskydy mountain range, Kysuce highlands, Malá Fatra and Oravská Magura (Kutal et al., 2017a, Duľa et al.). There are 17-19 individuals in the entire area of interest (Bojda et al., 2017). Reproduction and current occurrence in these areas is confirmed by data obtained also from the TRANSGREEN project (mainly based on camera trapping). The lynx is more sensitive to landscape fragmentation compared to the wolf, but current knowledge confirmed that some individuals are able to overcome relatively frequented communications, such as the road between Čadca and Žilina, where traffic flow is around 15,000 cars per day (Bojda et al., 2017). However, road mortality remains one of the major factors influencing the viability of population living at the edge of the continuous occurrence of the species. For example, in the years 2015-2016, three lynx individuals were found killed on the roads in the Moravian-Silesian Beskydy Mountain range and Javorníky Mountain range. Moreover, one female has been found dead on the railway in the Moravian-Silesian Beskydy mountain range in 2017.

### **Grey wolf (*Canis lupus*)**

The occurrence of wolf differs significantly between the different geomorphologic units of the Western Carpathians. The occurrence in the period 2012 - 2016 was rather sporadic along the Czech-Slovak national border. On the other hand, the wolf reproduction has been confirmed in the Kysuce Beskydy mountain range, Kysuce highlands, Malá Fatra and Oravská Magura (Kutal et al., 2017a, Kutal et al., 2017b) during the same period. The wolf hunting in core areas of its distribution (eastern part of the pilot area) has a significantly negative effect on the distribution of the wolf along Czech-Slovak border (Kutal et al., 2016). This is probably reflected in large fluctuation in wolf packs in this part of the pilot area (Kutal et al., 2017b). Although wolf is a successful colonizer of the European landscape (Chapron et al., 2014), the population stagnates under the influence of anthropogenic factors in the Western Carpathians. The population is mainly threatened by legal and illegal hunting and by collisions with vehicles (2010 - Plevník, 2012 - Krhová, 2017 - Skorkov) (Hulva et al., 2018).

### **Brown bear (*Ursus arctos*)**

The brown bear is the largest carnivore living in the pilot area. Regular reproduction of the brown bears is confirmed in Malá Fatra and Strážovské vrchy. The occurrence of the species is strongly fluctuating along the Czech-Slovak border (Kutal et al., 2017a). The bear has only been found in the Javorníky mountain range in recent years. There were signs of not more than two dispersing individuals per year. Collisions of bears with the traffic are repeatedly recorded mainly around Malá Fatra, both on the roads as well as railways. Altogether, 29 traffic collisions are recorded in the 1997-2014 period, of which 27.5% occurred on the railway path (Kalaš 2014). Only two collisions between vehicles and bears – Mosty u Jablunkova and Kolárovice (Bartošová 2002) are known from the Czech-Slovak border, reflecting rather sporadic occurrence of bears in this area.

Monitoring of large carnivores by camera traps is carried out by an NGO Friends of the Earth in the pilot area. Friends of the Earth also organize so called wolf patrols in order to search for footprints, scats and other signs of large carnivores in the area. This activity will continue until the end of the TRANSGREEN project.

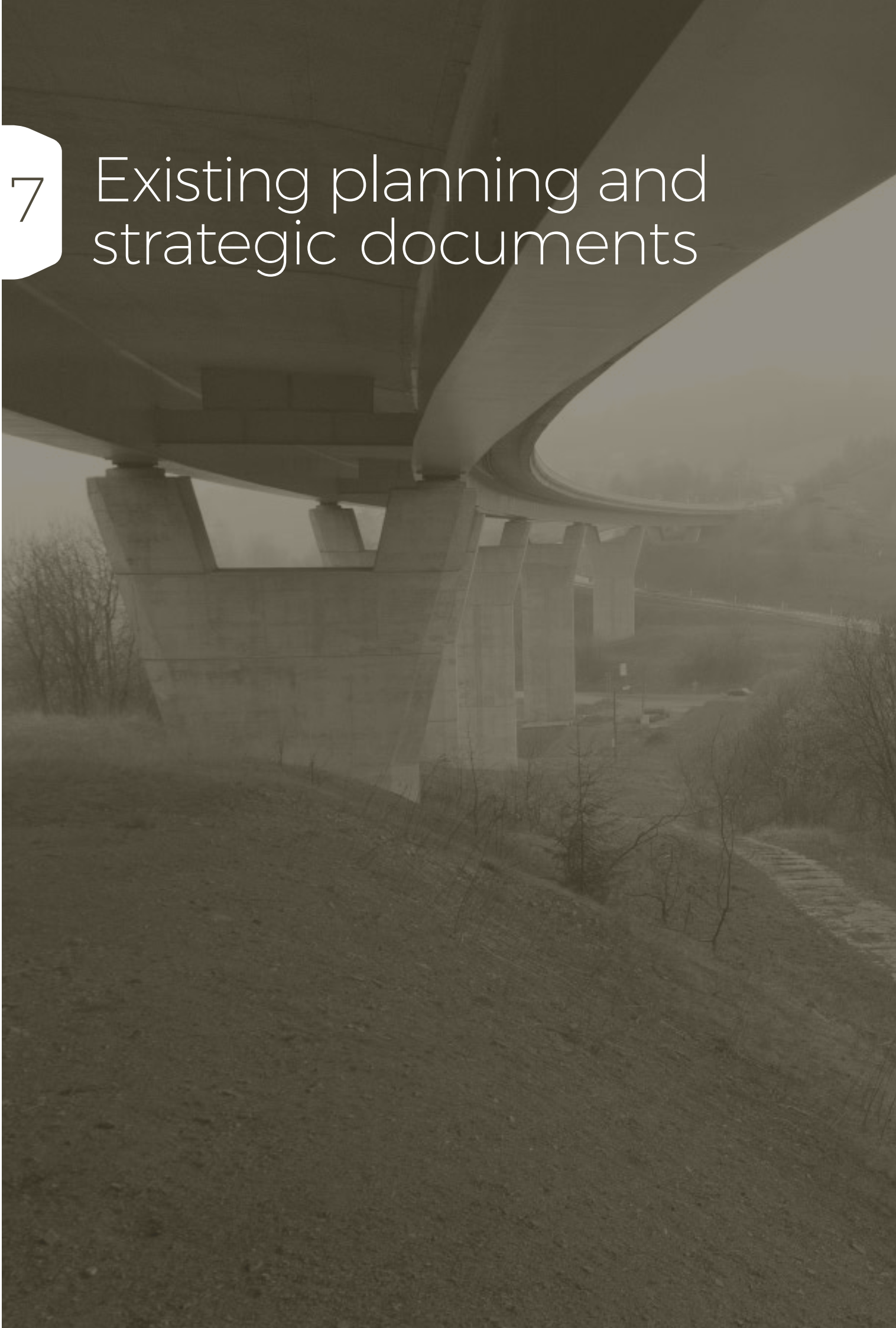


**Fig. 26:** Brown bear in his natural habitat (Photo: Tomáš Hulík).



7

# Existing planning and strategic documents





## 7.2 The Slovak Republic

The pilot area is located in two self-governing regions, which have separate spatial development plans.

The spatial plan of the **Trenčín self-governing region** was elaborated in 1998 (Regional Spatial Plan Trenčín – 1998 [https://www.tsk.sk/buxus/docs/UPN\\_TSK.pdf](https://www.tsk.sk/buxus/docs/UPN_TSK.pdf)).

Amendments and addendums were elaborated in 2004, 2011 and 2017:

- » Amendments and addendums No 1/2004 [https://www.tsk.sk/buxus/docs/uzemneplanovanie/ZmenyDoplnkyUPN\\_TSK.pdf](https://www.tsk.sk/buxus/docs/uzemneplanovanie/ZmenyDoplnkyUPN_TSK.pdf)
- » Amendments and addendums No 2/2011 <https://www.tsk.sk/buxus/docs/Zmeny%20a%20doplnky%20c.%20%20UPN%20VUC%20Trencianskeho%20kraja%20-%20Cistopis.pdf>
- » Amendments and addendums No 3/2017 <https://www.tsk.sk/buxus/docs/UPN%20VUC%20TK%20ZD3%20SČ.pdf>

Protection of biocorridors during transport infrastructure construction is dealt with in the 1998 Plan as follows:

*„In regards to the protection of territorial system of ecological stability features, the plan focuses on strengthening the legislative protection and on stabilisation of biodiversity of the area as follows:*

- » *There is a need to update the documentation of the regional territorial system of ecological stability (TSES) in the whole region, to harmonise and specify the proposed biocenters and biocorridors and to finalise the structure of landscape ecological stability. It is also necessary to delimitate a higher number of regional biocorridors. In the Trenčín region, there currently are 18 biocenters of supraregional importance; protected areas make up the core of the biocenter. There are 186 biocenters of regional importance, of which the core of 22 is made of protected areas.*

2.12.4.2 Collisions of ecologically valuable features with the selected stress factors

- » *To safeguard the functionality of ecologically valuable landscape features (TSES, nature and landscape protection, protection forests) it is necessary to know the places of collision. An overview of these collisions is depicted graphically in the following table. Altogether, there are 32*

*collisions, out of which 24 are collisions with the touristic area, 6 with transport infrastructure and 2 with excavations of mineral resources.*

Spatial plan of Žilina self-governing region was elaborated in 1998 (**Regional Spatial Plan Žilina** - [http://www.regionzilina.sk/files/odbory/RR/upn\\_vuc\\_zk\\_dokumenty/upn\\_vuc\\_zk.pdf](http://www.regionzilina.sk/files/odbory/RR/upn_vuc_zk_dokumenty/upn_vuc_zk.pdf)).

Amendments and addendums were elaborated in 2005, 2006, 2008, 2011, and 2018.

- » Amendments and addendums No 1., 2005 [http://www.regionzilina.sk/files/odbory/RR/upn\\_vuc\\_zk\\_dokumenty/upn\\_vuc\\_zk\\_zad\\_c1.pdf](http://www.regionzilina.sk/files/odbory/RR/upn_vuc_zk_dokumenty/upn_vuc_zk_zad_c1.pdf)
- » Amendments and addendums No 2., 2006 [http://www.regionzilina.sk/files/odbory/RR/upn\\_vuc\\_zk\\_dokumenty/upn\\_vuc\\_zk\\_zad\\_c2.pdf](http://www.regionzilina.sk/files/odbory/RR/upn_vuc_zk_dokumenty/upn_vuc_zk_zad_c2.pdf)
- » Amendments and addendums No 3., 2008 [http://www.regionzilina.sk/files/odbory/RR/upn\\_vuc\\_zk\\_dokumenty/upn\\_vuc\\_zk\\_zad\\_c3.pdf](http://www.regionzilina.sk/files/odbory/RR/upn_vuc_zk_dokumenty/upn_vuc_zk_zad_c3.pdf)
- » Amendments and addendums No 4., 2011 [http://www.regionzilina.sk/files/odbory/RR/upn\\_vuc\\_zk\\_dokumenty/upn\\_vuc\\_zk\\_zad\\_c4.pdf](http://www.regionzilina.sk/files/odbory/RR/upn_vuc_zk_dokumenty/upn_vuc_zk_zad_c4.pdf)
- » Amendments and addendums No 5., 2018 [http://www.regionzilina.sk/files/odbory/RR/upn\\_vuc\\_zk\\_dokumenty/upn\\_vuc\\_zk\\_zad\\_c5.pdf](http://www.regionzilina.sk/files/odbory/RR/upn_vuc_zk_dokumenty/upn_vuc_zk_zad_c5.pdf)

Ecological corridors are dealt with in the Section 2.12. LANDSCAPE STRUCTURE and TSES.

### 2.12.1.1. Territorial system of ecological stability

Spatial maintenance and development of species biodiversity in their natural environment, creation of optimal spatial basis of ecologically stable areas and lines, maintenance of unique landscape features, safeguarding and enhancement of natural landscape character, as well as the protection of natural resources were basic requirements for elaboration of Regional TSES of Districts Čadca, Dolný Kubín, Liptovský Mikuláš, Martin, and Žilina. Another background document is a proposal of national ecological network of Slovakia (ECONET), which specified ecologically valuable landscape areas of Slovakia in relation to the surrounding states (Czech Republic, Poland, Ukraine, Hungary, and Austria). The above-



mentioned documents were taken into consideration during the process of preparation of Spatial Development Plan of Žilina Region.

#### **2.12.1.2. The basics of territorial system of ecological stability - proposal**

Proposal for the structure of territorial system of ecological stability creates an ecological network in the landscape, which:

- » Safeguards spatial protection of all ecologically valuable segments in the area,
- » It delimitates areas providing conditions for permanent existence, multiplication, shelter and food to plant and animal communities which are typical for the region – biocenters (having character of core areas with a priority eco-stabilising effect in the landscape),
- » Enables migration and exchange of genetic information of living organisms – biocorridors and core areas,
- » Enhances soil, climate and eco-stabilising conditions,
- » Safeguards an optimal development of natural and cultural values in the area.

# Status of ecological corridors in pilot area and activities for their evaluation



## 8.1

# The role and importance of ecological corridors for the dispersal of animals or their distribution

**A**nimal species vary greatly in their level of habitat specialization and their tolerance to habitat disturbance. These attributes are important influences on how they perceive a certain landscape and the level of connectivity that it affords. Some species are tolerant of human land use and are able to live in, and freely move through. The others who are more specific to one or more habitats can use corridors.

Ecological corridors connect so-called core areas of primary habitats, where species do occur in the long term and are able to breed. Highly functional and wider areas interconnecting primary habitats are called linkage zones (and/or stepping stones). Especially stepping stones of a suitable habitat serve as unique islands that could sustain temporal occurrence of focal species.

Linear features such as hedgerows, streamside strips and unlogged strips of forest can all function as supporting landscape features within the corridor. Similarly, broad tracts of natural vegetation that link nature reserves or other large natural (core) areas and stepping stones at the landscape, regional, or local scale, also function as corridors.

With regards to the corridor:

- » the goal is to maintain continuity of populations between habitats (between core areas with breeding individuals), rather than simply foster infrequent movements of individuals;
- » the goal is the continuity of entire faunal communities;
- » the goal is to maintain ecosystem processes, which requires the presence of continuous habitats for their function.

Purposes of ecological corridors commonly recognized include to:

- » assist movement of wide-ranging or migrating animals through developed landscapes;
- » facilitate dispersal of individual species between otherwise isolated habitats or populations in order to establish a new home range;
- » secure regular daily movements in order to search for food, shelter or finding mates;
- » promote effective continuity and gene flow between populations in two areas by supporting a resident population;

- » promote the natural continuity of habitats, communities and ecological processes between large areas such as national parks and conservation reserves;
- » provide the opportunity for populations to shift in response to change and natural catastrophes;
- » provide habitat and continuity for wildlife in conjunction with other environmental and social benefits (Bennett 2003).

The originally continuous distribution of many animal species has recently been disintegrated by rapid landscape fragmentation. In human dominated landscape, people continue to fragment natural environments via urbanization, agricultural activities, but also expanding of transport infrastructure. Urbanization is defined as habitat destruction whereas transport infrastructure rather fragments and transects wildlife habitats. By identifying ecological corridors, the level of habitat fragmentation can be reduced through the implementation of suitable mitigation measures. Thus, development of new human structures is not necessarily blocked; however, its impact on natural wildlife habitat and its permeability should always be taken into account. Therefore, identification of ecological corridors needs to be done as accurately as possible.

So called critical barrier sites are defined within the migration corridors, i.e. areas with significant barrier effect which hinder permeability of given section for target species. The permeability of the corridor is lowered in these points as a result of:

- » Close proximity of built-up area (the width between settlements is lower than 500 meters)
- » Crossing with important transportation infrastructure (highways, 1<sup>st</sup> class roads, two rail railways etc.)
- » Crossing through non-forest agricultural land (wider than 2 km)
- » Combination of several barrier factors of lower intensity (e.g. 2<sup>nd</sup> grade road together with a railway in non-forest land etc.)

To secure permeability of landscape for animal dispersal and/or migration and to avoid isolation of animal population, it is necessary to secure landscape connectivity especially in these critical points on corridors.



Wildlife species often use traditional routes in order to move among patches with a suitable habitat. This knowledge is often transmitted to the offspring. Consequently, if mitigation measures aiming at improvement of wildlife movement are placed inappropriately, their effect is doubtful. The most affected are groups of species restricted to the well-preserved natural environment, those with great requirements regarding the size of their home range/territory, or regularly or occasionally dispersing/migrating species. The impacts of ongoing fragmentation in the conditions of the project pilot area are the most severe on all three species of large carnivores – the grey wolf, the Eurasian lynx and the brown bear. They all have very similar environmental requirements, i.e. they are restricted to vast forested areas with minimum human disturbances. Long-distance migration (and/or dispersal) is inseparable part of their biology. In many cases, this migration

may involve dispersing subadults that are being pushed away from their parent's home range, but we may also record vagrancy of adult animals. Animals can migrate tens or even hundreds of kilometres. Long-distance migration is also typical of large ungulates, i.e. mainly the Eurasian elk. Seasonal migration from lowland to highland has been recorded in the Red deer population. Especially large carnivores serve as ideal umbrella species for the preservation and restoration of the landscape connectivity for other smaller forest dwelling species. If we manage to preserve landscape connectivity for them, we automatically secure the permeability for other middle sized and smaller forest species such as the Roe deer, the fox and the badger etc. The current nature conservation practices emphasize the protection of individuals and their habitats. In the future, efforts should be focused on the ecosystem approach (Anděl et al. 2010).

## 8.2 Main threats to ecological connectivity

The biodiversity of the pilot area is rich with occurrence of many threatened and endangered species. The main threat to biodiversity of the project area is the habitat and landscape fragmentation.

Intensively used roads – mainly motorways and highways with high traffic flow, planned high-speed railways and intensive urban development can be identified as the main anthropogenic barriers causing habitat fragmentation. The most obvious impact is perceived especially due to fauna mortality on roads/railways, which creates impermeable barriers for migration, direct loss of suitable habitats and disturbance (noise, lighting, etc.) and may, in long term, even lead to genetic isolation of populations. Species, which are mostly threatened by isolation of their populations, include large and middle size mammals (e.g. foxes, otters, badgers, ungulates, large carnivores) (Kutal 2013).

### Road and Rail infrastructure

Highways, motorways and other roads may represent an important barrier for natural movement and migration of wildlife species. The road permeability and the risk of a collision of an animal with a vehicle depend mainly on the traffic intensity. The most serious consequences for the animal populations have motorways and highways which often create an insurmountable barrier due to the high traffic intensity (Anděl & Gorčicová 2008 in Kutal 2013).

However, lower category of roads with higher traffic intensity also creates an impermeable barrier. For instance, a substantial part of traffic-related bear mortalities has occurred on secondary roads and railways (SNC SR). More intensive traffic leads to an increasing number of collisions with animals. The number of animals killed on roads is so high that they are endangering the survival of some species or their own population. Higher traffic volumes are connected with increased barrier effect. A study, which was realised in Slovakia (Skuban, Findo) shows that traffic volume exceeding 5,000 vehicles/24 hrs completely restricted the movement of the bears. The intensity on the roads during the night or early morning is of utter importance, because animals cross the roads during the night more often (Kutal 2013). The study realised in PLA Beskydy show that permeability of the roads for animals was better when the traffic intensity during the night was lower (Váňa in Kutal, 2012, Dostál (2018) – separate result/output of the TRANSGREEN project).

Roads with lower traffic intensity may also have an important impact on the animal populations, mainly on species living in relatively low population densities and inhabiting large areas, for example large carnivores. Death of even only one individual caused by a collision with a motor vehicle may therefore mean a considerable loss for the small population (Kutal 2013).

For those reasons, it is absolutely necessary to plan and realize appropriate mitigation measures which allow safe crossing of the road/railway by wildlife during construction or upgrading the transport infrastructure.

### Urbanization

Landscape and urban planning can also threaten ecological connectivity of primary habitats of wildlife. Growing of human settlements is destroying wildlife habitat and creating another migration barrier.

The crucial problem in the Carpathian mountain range is the placement of transport infrastructure and the settlement into mountain valleys. Continuously built-up areas along the roads in these valleys create a migration barrier for animals, often tens of kilometres long.

The places most threatened by urbanization are critical places of migration corridors, which are significantly endangering the transitiveness for target species. Construction of new houses, shopping or industrial centres in such places can destroy the last migration routes of animals. It is especially important to prevent negative effects of new developments through better planning which takes into account the needs of all the species living in the surrounding landscape.

### Agricultural activities

Agricultural activities, including livestock grazing, crop farming and orchard planting are another negative factor for reducing landscape permeability for wildlife species. Especially the use of fences excludes many animals from these areas. It is worth mentioning that the management of predators insists on protection measures against carnivores, including fencing (if people want to apply for compensation measures). Wildlife can seriously harm agricultural crops and thus, farmers start to fence fields, even over many hectares. It is doubtful whether this management practise is not rather counterproductive under the aspect of habitat fragmentation in a human dominated landscape. Therefore, important ecological corridors for wildlife should be kept free of any fence, even in their surroundings. This challenging management question should be analysed into further detail and discussed more in order to find an appropriate solution for all involved parties.

Cultivation of some crops alongside roads and railway can create attractive feeding spots for some animals. For instance, scientists presume that in cultural landscapes, bears cross roads more frequently in search of attractive anthropogenic food, such as maize and fruits (Skuban et al. 2016). These places are often connected with increased mortality due to vehicle collisions.

## 8.3

# Identification of ecological corridors

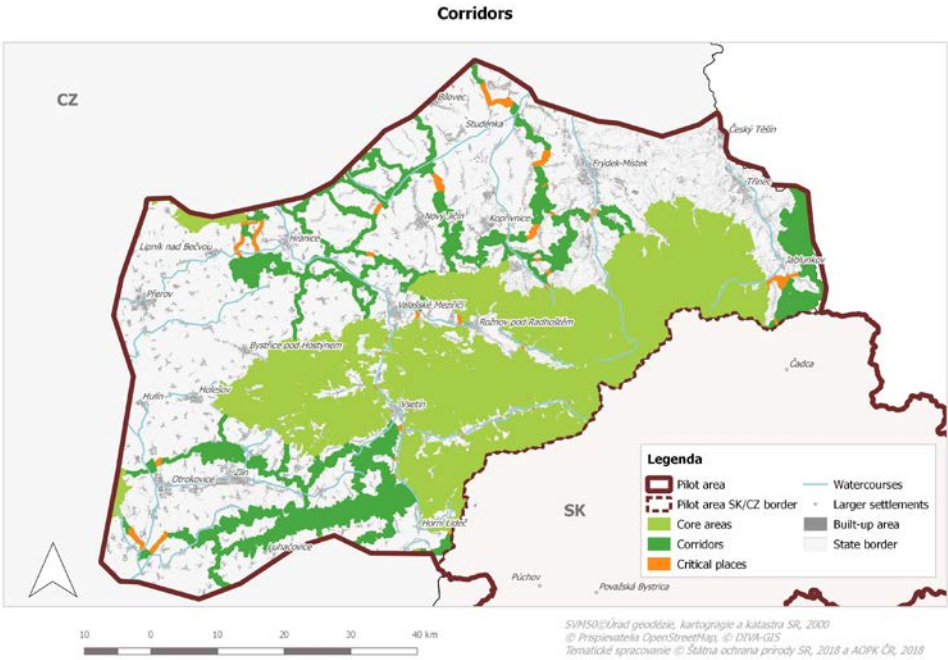
Identification of ecological corridors (biotope) for selected species of large mammals has been done recently through the project of the Complex Approach to the Protection of Fauna of Terrestrial Ecosystems from Landscape Fragmentation in the Czech Republic (2015-2017). Resulting output consists of the synthesis of partial inputs, such as data on the occurrence of focal species, habitat suitability models, barrier permeability assessment and landscape connectivity analyses. Ecological corridors were designated not only as an axis (with 250 m buffer), but as a surface of suitable biotopes interlinking core areas as well (see Fig. 28). The migration corridors were checked also in the field. Problematic sites with identified barriers for migration (highway, high speed railway, 1<sup>st</sup> class road, a settlement) were visited and possible solutions to allow the migration permeability were proposed. The core areas were designated as a compact territory which hosts or has a high possibility to allow long-term occurrence of large mammals' popula-

tion (large carnivores, the Eurasian elk) in the future. The area must provide enough food, shelter and undisturbed space for reproduction. Those areas are covered by vast forests and other suitable biotopes such as meadows, shrubs or extensively used fields. The abovementioned species also serve as umbrella species that have the highest spatial requirements. This means if we secure the landscape and transport infrastructure permeability for them, then also other smaller forest species will automatically benefit from taking such positive measures.

This new concept is prepared to be legislatively treated as the biotope of selected and specially protected species of large mammals of national importance. This tool needs to be used in a mandatory way in territorial planning procedures according to the Building Act (No. 183/2006 Coll.) and related Decree No. 500/2006 Coll. (the biotope of selected and specially protected species of mammals is already mentioned there). The methodology, limits and regulations are under preparation.



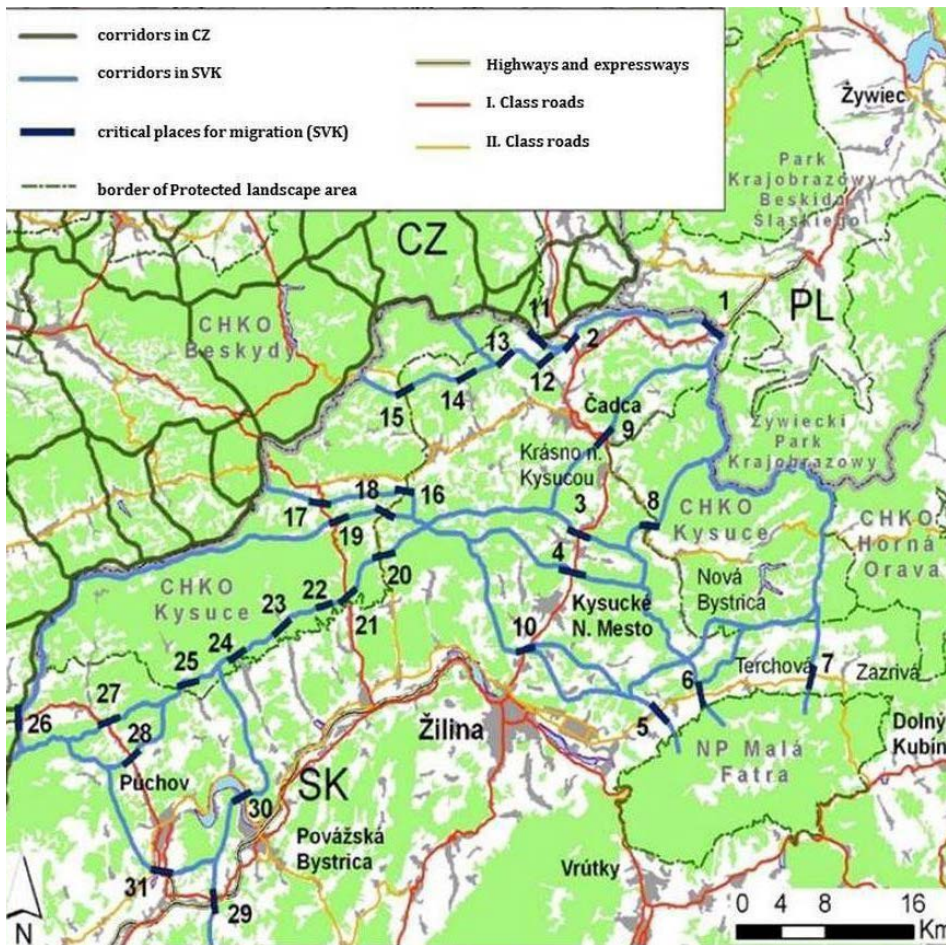
**Fig. 27:** The lynx – one of the umbrella species (Photo: Tomáš Hulík).



**Fig. 28:** Overview of ecological network (biotope of selected species of large mammals) in the CZ part of the pilot area.

\*Migration corridors were identified in the Slovak part of the pilot area (see Fig. 29) during studies which are compiled in Kutal and Suchomel (2014).





**Fig. 29:** Overview of the main corridors and critical places for migration in the Slovak part of the pilot area. The map was adjusted according to Kutal and Suchomel (2014).

## 8.4 Ecological corridors in the pilot area (critical barrier sites)

**In the Czech Republic, ecological corridors (biotope) for selected species of large mammals have been identified recently (see Chapter 8.3). We have chosen several most critical sections of the corridors, which are important and provide key ecological connectivity with forest species of animals (Fig. 30). It is absolutely crucial to maintain road/railway permeable in these selected corridor sections. Most of them are part of same transboundary ecological corridor between the Czech and Slovak Republic.**

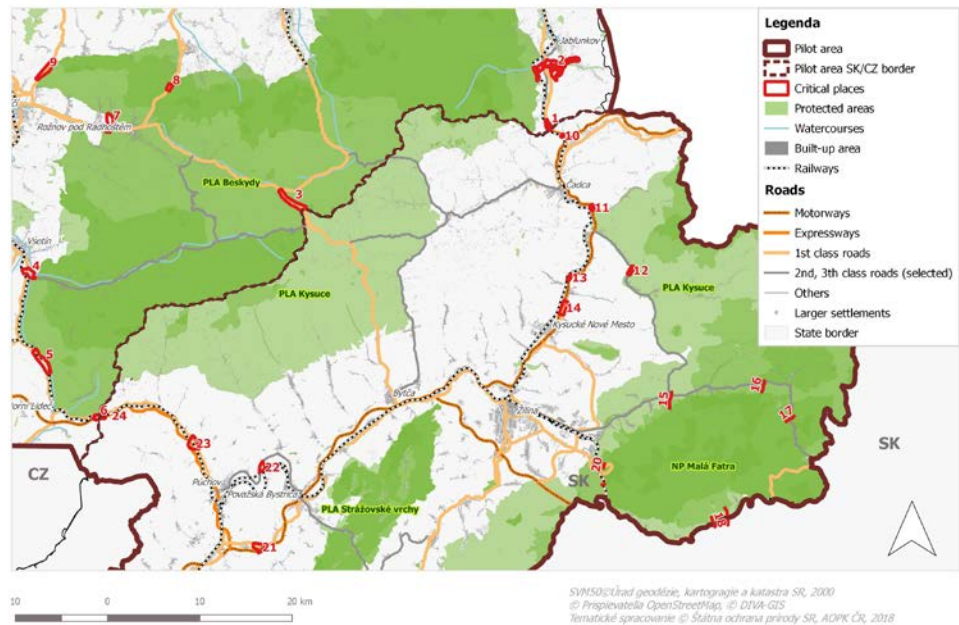
In Slovakia, some ecological corridors were already known, but there was a lack of data about their permeability. One of the aims of the project TRANSGREEN was to identify or verify corridors and critical places in terms of the existing transport infrastructure. In these places, we tried to ascertain the importance of corridors for animal movement.

**Altogether, 24 critical points were identified:**

|                          |                       |
|--------------------------|-----------------------|
| 1. Mosty u Jablunkova    | 13. Kysucký Lieskovec |
| 2. Jablunkov             | 14. Povina            |
| 3. Horní Bečva           | 15. Bránica           |
| 4. Vsetín, Janová        | 16. Rovná hora        |
| 5. Lidečko, Lužná        | 17. Sokol             |
| 6. Střelná               | 18. Turany            |
| 7. Zubří                 | 19. Dubná skála       |
| 8. Trojanovice           | 20. Strečno           |
| 9. Hostašovice           | 21. Visolaje          |
| 10. Svrčinovec           | 22. Udiča             |
| 11. Horelica a Oščadnica | 23. Mestečko          |
| 12. Klubina              | 24. Strelenka         |



Critical places



**Fig. 30:** Overview of the key selected critical places for migration in the pilot area.

## 8.5 Camera trap monitoring of selected migration objects on main road / highway in the CZ part of the area

One of the activities that are dealt with within the TRANS-GREEN project is monitoring of migration objects using camera traps. Altogether 17 localities were equipped by camera traps Browning, which allow to record wildlife crossings through overpasses and/or overpasses/culverts (see overview of localities further below). The sites for monitoring were chosen especially on highway D1 and 1<sup>st</sup> class road I/48 (see Fig. 31), which are ones of the main migration barriers for wildlife in the area. The monitored sites also correspond

to a large extent with migration corridors for selected specially protected species of large mammals. Preliminary results from the beginning of the project are shown in Tab. 1. Almost all objects are being used by the fox (except for one), 14 objects were utilized by the hare, 13 objects were utilized by the roe deer and martens, 5 by the badger and otter, and 4 by the wild boar. The red deer or any species of a large carnivore weren't recorded. This activity will be in process until the end of TRANSGREEN project.

**Fig. 31:** Map of monitored localities in the Czech part of the pilot area (<https://mapy.cz/s/2Euv6>).



**Tab. 4:** Species recorded during camera trapping monitoring of the selected migration objects on highway D1 and 1<sup>st</sup> class road I/48. Zero indicates that no species representatives were recorded. Data were collected by Mořic Jurečka.

| Locality number | Locality name     | Coordinates of the object       | Monitoring duration (Month), 2017/2018 | Red deer | Roe deer | Wild boar | Fox | Badger | Marten sp. | Hare | Otter | Domestic cat | Other species            |
|-----------------|-------------------|---------------------------------|--|----------|----------|-----------|-----|--------|------------|------|-------|--------------|--------------------------|
| 1               | Bělotín           | 49°34'58.29"N,<br>17°45'03.31"E | IX-II                                  | 0        | x        | x         | x   | x      | x          | x    | 0     | X            |                          |
| 2               | Bílov             | 49°43'18.57"N,<br>18°00'36.06"E | X-IV                                   | 0        | x        | 0         | x   | x      | x          | x    | 0     | X            |                          |
| 3               | Bohuslávky        | 49°32'49.61"N,<br>17°33'25.71"E | IX-IV                                  | 0        | x        | 0         | x   | 0      | x          | x    | 0     | X            |                          |
| 4               | Dolní Újezd       | 49°33'02.78"N,<br>17°32'09.63"E | IX-IV                                  | 0        | x        | x         | x   | 0      | x          | x    | 0     | X            | Squirrel                 |
| 5               | Dub               | 49°33'40.78"N,<br>17°53'55.12"E | IX-IV                                  | 0        | 0        | 0         | x   | x      | x          | x    | x     | X            | Least weasel             |
| 6               | Hladké Životice   | 49°40'38.60"N,<br>17°55'57.73"E | IX-IV                                  | 0        | x        | 0         | x   | x      | x          | x    | 0     | 0            |                          |
| 7               | Hrabůvka          | 49°34'22.42"N,<br>17°40'52.04"E | IX-IV                                  | 0        | x        | 0         | x   | 0      | x          | x    | 0     | X            |                          |
| 8               | Hynčice           | 49°37'15.07"N,<br>17°49'00.93"E | IX-II                                  | 0        | x        | 0         | x   | 0      | x          | x    | 0     | X            | Hedgehog                 |
| 9               | Chlebovice        | 49°39'31.54"N,<br>18°15'39.32"E | IX-IV                                  | 0        | 0        | 0         | x   | x      | x          | 0    | x     | 0            | Polecat                  |
| 10              | Jezernice         | 49°33'45.85"N,<br>17°37'39.78"E | IX-IV                                  | 0        | x        | x         | x   | 0      | x          | x    | x     | X            | Squirrel                 |
| 11              | Kletné            | 49°40'12.41"N,<br>17°55'21.16"E | IX-IV                                  | 0        | x        | x         | x   | 0      | x          | x    | 0     | X            | Fallow deer              |
| 12              | Odry              | 49°38'16.20"N,<br>17°51'43.68"E | IX-IV                                  | 0        | x        | 0         | x   | 0      | x          | x    | x     | X            | Fallow deer,<br>hedgehog |
| 13              | Podhoří           | 49°34'14.35"N,<br>17°38'49.93"E | IX-IV                                  | 0        | x        | 0         | x   | 0      | x          | x    | x     | X            |                          |
| 14              | Příbor            | 49°38'32.47"N,<br>18°09'46.14"E | IX-IV                                  | 0        | 0        | 0         | 0   | 0      | 0          | 0    | 0     | 0            |                          |
| 15              | Příbor-Hájov      | 49°38'37.50"N,<br>18°10'26.88"E | IX-III                                 | 0        | 0        | 0         | x   | 0      | x          | 0    | 0     | 0            |                          |
| 16              | Pustějov          | 49°42'31.00"N,<br>17°59'42.48"E | IX-IV                                  | 0        | x        | 0         | x   | 0      | x          | x    | 0     | X            |                          |
| 17              | Suchdol nad Odrou | 49°40'00.47"N,<br>17°55'01.73"E | IX-IV                                  | 0        | x        | 0         | x   | 0      | x          | x    | 0     | X            | Least weasel             |



Following is an overview of 17 monitored localities with pictures from each site (Photo© Mořic Jurečka).



**Fig. 32:** Locality 1: Landscape bridge Bělotín.



**Fig. 33:** Locality 2: Underpass Bílov.



**Fig. 34:** Locality 3: Underpass Bohuslávky.





**Fig. 35:** Locality 4: Overpass Dolní Újezd.



**Fig. 36:** Locality 5: Culvert Dub.



**Fig. 37:** Locality 6: Underpass Hladké Životice.





**Fig. 38:** Locality 7: Underpass Hrabůvka.



**Fig. 39:** Locality 8: Underpass Hynčice.



**Fig. 40:** Locality 9: Culvert Chlebovice.





**Fig. 41:** Locality 10: Underpass Jezernice.



**Fig. 42:** Locality 11: Overpass Kletné.



**Fig. 43:** Locality 12: Landscape bridge Odry.





**Fig. 44:** Locality 13: Underpass Podhoří.



**Fig. 45:** Locality 14: Culvert Příbor.



**Fig. 46:** Locality 15: Culvert Příbor - Hájov.



**Fig. 47:** Locality 16: Underpass Pustějov.



**Fig. 48:** Locality 17: Underpass Suchdol nad Odrou.

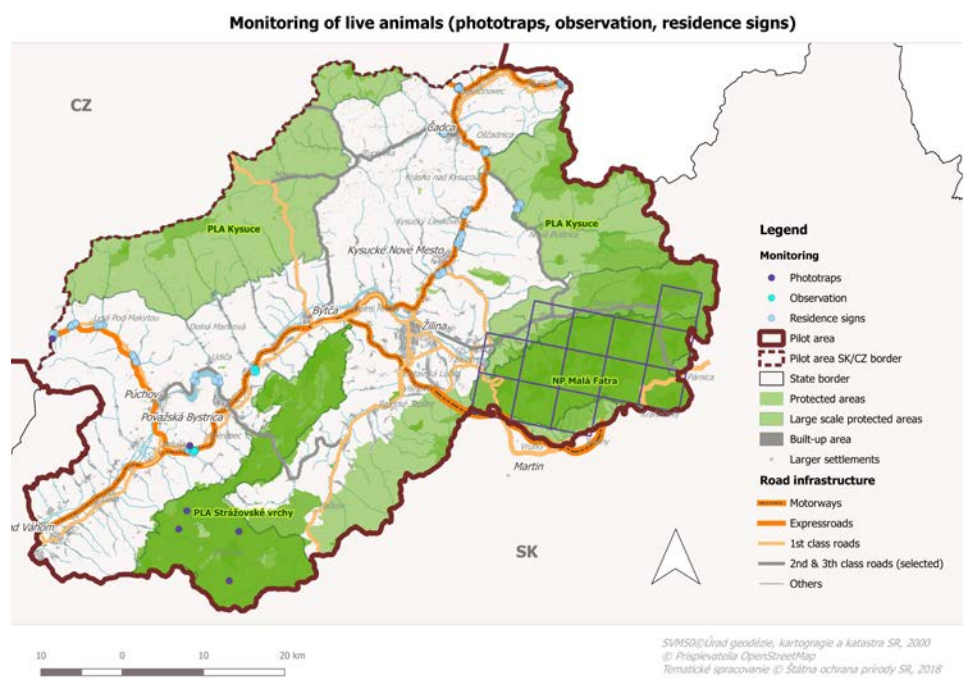


## 8.6 Animal monitoring in the Slovak part of the pilot area

For practical reasons only 2 photo traps were installed alongside the roads I/49 and I/61 in Strážovské vrchy competency area. Other phototraps were installed in selected areas and were used for monitoring of large carnivore species, with focus on Lynx (*Lynx lynx*) (Fig. 49). This data will help to evaluate the migration of species and to reduce the number of potential collision zones which could be used by individuals for translocation.

Mapping of residence signs as well as live observation sites were realized on the roads I/49, I/61, II/507 in Strážovské vrchy area and on the road I/11, I/12 and II/520 in Kysuce area. The most frequently recorded species in Strážovské vrchy

mountain range during the period between 07/2017-03/2018 were the red deer (*Cervus elaphus*) – 67 records (r.), the European roe deer (*Capreolus capreolus*) – 38 r., the red fox (*Vulpes vulpes*) – 30 r. and the European mouflon (*Ovis musimon*) – 7 r. Also, the Eurasian beaver (*Castor fiber*), marten (*Martes sp.*), Eurasian otter (*Lutra lutra*), European badger (*Meles meles*), European hare (*Lepus europaeus*) were observed. In Kysuce region, most of the records belong to the European roe deer (*Capreolus capreolus*) – 119 r., the red deer (*Cervus elaphus*) – 108 r., the wild boar (*Sus scrofa*) – 68 r. Two records belong to non-identified Arctiodactyla, 36 to the red fox, 9 to the Eurasian otter (*Lutra lutra*) and 4 to the European badger (*Meles meles*).



**Fig. 49:** Monitoring of animals in the Slovak part of the pilot area.

# 8.7 Fauna mortality monitoring in the pilot area

## 8.7.1 Czech Republic

This activity is undertaken also in the Czech part of the pilot area. NCA and Transport Research Centre are performing intensive fauna mortality monitoring on selected roads. Results will be merged and evaluated by the end of the TRANSGREEN project.

A preliminary output was compiled from the database governed by the Nature Conservation Agency of the Czech Republic. Data were collected extensively between 2002 – 2017. Altogether, 456 findings of dead animals on the road were reported (see Fig. 51 and Tab. 6). The highest mortality was recorded in the black bird (*Turdus merula*) – 90 ex., common toad (*Bufo bufo*) – 47 ex., followed by Eurasian otter (*Lutra lutra*) – 22 ex., and the European common frog (*Rana temporaria*) – 22 ex. unfortunately, four Eurasian lynxes and one wolf have been found dead on the 1<sup>st</sup> class road during that period. A summary of species is displayed in the Tab. 5. The most affected group of species were birds (221 findings) followed by amphibians (98 findings), mammals (72 findings), and reptiles (65 findings).



Fig. 50: Red fox killed by a car (Photo: P. Orolin).

Data obtained most probably do not reflect the actual share of road mortality caused by traffic. It is highly probable that the recorded shares and mortality numbers are influenced by several confounding factors such as time of the day, period of the year, willingness of the finder to enter data into database, etc.

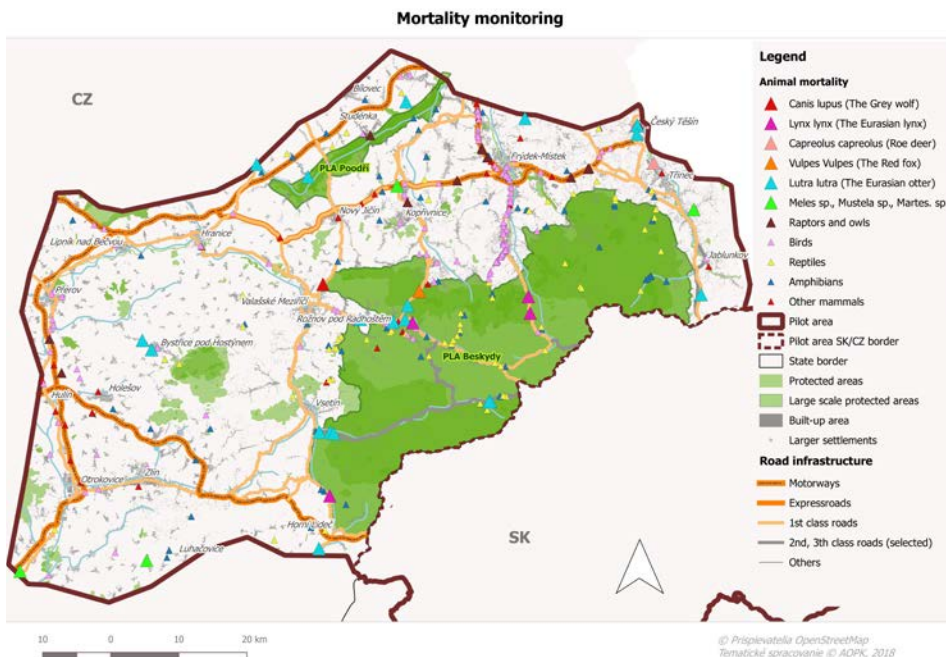


Fig. 51: Overview of fauna mortality data in the CZ pilot area between 2002-2017. (Data from NCA CR Database).

**Tab. 6:** An overview of species found dead on roads during the period 2002-2017. (Data from NCA CR Database).

| Species                       | Number | Species                  | Number |
|-------------------------------|--------|--------------------------|--------|
| Accipiter nisus               | 1      | Muscicapa striata        | 1      |
| Aegithalos caudatus           | 3      | Mustela putorius         | 1      |
| Alcedo atthis                 | 2      | Natrix natrix            | 18     |
| Anas platyrhynchos            | 6      | Nyctereutes procyonoides | 1      |
| Anguis sp.                    | 15     | Parus major              | 5      |
| Asio otus                     | 3      | Passer domesticus        | 9      |
| Bombina variegata             | 1      | Passer montanus          | 1      |
| Bufo bufo                     | 47     | Pelophylax esculentus    | 2      |
| Bufo viridis                  | 15     | Pelophylax ridibundus    | 1      |
| Buteo buteo                   | 5      | Perdix perdix            | 1      |
| Canis lupus                   | 1      | Periparus ater           | 3      |
| Capreolus capreolus           | 1      | Phasianus colchicus      | 7      |
| Castor fiber                  | 1      | Phoenicurus ochruros     | 2      |
| Certhia sp.                   | 2      | Phoenicurus phoenicurus  | 1      |
| Ciconia ciconia               | 3      | Phylloscopus collybita   | 2      |
| Cinclus cinclus               | 1      | Picus viridis            | 1      |
| Coccothraustes coccothraustes | 1      | Poecile palustris        | 1      |
| Columba livia f. domestica    | 2      | Rana dalmatina           | 2      |
| Columba palumbus              | 1      | Rana temporaria          | 22     |
| Coronella austriaca           | 3      | Salamandra salamandra    | 8      |
| Corvus frugilegus             | 1      | Sciurus vulgaris         | 6      |
| Cricetus cricetus             | 5      | Serinus serinus          | 1      |
| Cyanistes caeruleus           | 4      | Sitta europaea           | 3      |
| Dendrocopos major             | 7      | Spinus spinus            | 1      |
| Emberiza citrinella           | 1      | Streptopelia decaocto    | 1      |
| Erinaceus sp.                 | 8      | Sylvia atricapilla       | 4      |
| Erithacus rubecula            | 3      | Sylvia borin             | 1      |
| Falco tinnunculus             | 2      | Sylvia curruca           | 1      |
| Fringilla coelebs             | 2      | Troglodytes troglodytes  | 1      |
| Garrulus glandarius           | 2      | Turdus merula            | 90     |
| Hippolais icterina            | 2      | Turdus philomelos        | 14     |
| Hirundo rustica               | 3      | Turdus viscivorus        | 1      |
| Chloris chloris               | 2      | Tyto alba                | 1      |
| Chroicocephalus ridibundus    | 1      | Vipera berus             | 13     |
| Lacerta agilis                | 13     | Vulpes vulpes            | 1      |
| Lanius collurio               | 3      | Zamenis longissimus      | 1      |
| Lepus europaeus               | 17     | Zootoca vivipara         | 2      |
| Lynx lynx                     | 4      |                          |        |
| Martes foina                  | 2      |                          |        |
| Martes martes                 | 1      |                          |        |
| Meles meles                   | 1      |                          |        |
| Motacilla alba                | 2      |                          |        |

**Tab. 5:** Overview of the fauna mortality in the Czech part of pilot area according to the group of species.

| Group of species | Number |
|------------------|--------|
| Amphibians       | 98     |
| Reptiles         | 65     |
| Birds            | 221    |
| Mammals          | 72     |



## 8.7.2 Slovak Republic

### Mortality on roads

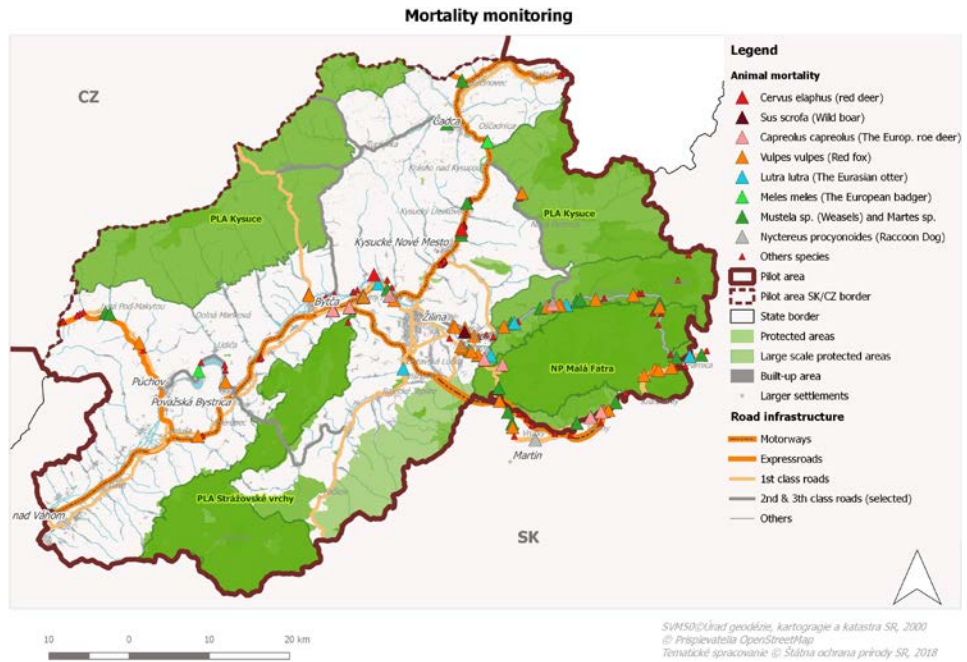
Mortality monitoring was realised on selected road sections regularly during the period 03/2017 – 06/2018. In Strážovské vrchy mountain range, sections on roads I/49, I/61 and II/507 were monitored, in Malá Fatra sections on roads I/18, I/70, II/507 and II/583 were monitored and in Kysuce area - I/11, II/520 and II/487.

Totally, 378 records have been evaluated during the first monitored period - 03/2017-11/2017, with total No. of dead animals - 384. Birds, small terrestrial mammals, the red fox, amphibians and reptiles, but also *Mustela spp.* and *Martes spp.* have the

highest mortality in the area. Recorded data are in the Table 7 and are shown on the map (Fig. 52). During this period no large carnivores were killed in the area. According to data of cadavers recorded, it was concluded that there are just few records of collision with ungulates. However, this is not because they do not exist. In case of vehicle collisions with game species, the vehicle is often damaged, and the Police are usually called to the scene. The Police subsequently call the local Hunter Association, which has a legal duty to remove the injured or dead animal. The mapper, realising the monitoring of sections twice a month cannot make evidence of these cases. Therefore, it is important to collect also data from Hunting Associations. This monitoring activity will continue until the end of June 2018.

**Tab. 7:** Number of animals recorded during the mortality monitoring

| Group of species / Species   | Sum of cadavers<br>(period 03/2017-11/2017) |
|--|---|
| Birds  | 79  |
| Small terrestrial mammals etc.   | 54  |
| The red fox ( <i>Vulpes vulpes</i> )                                       | 47  |
| Amphibians/reptiles  | 44  |
| Mustelidae - weasels ( <i>Mustela sp.</i> ) & marten ( <i>Martes sp.</i> ) | 42  |
| Hedgehogs ( <i>Erinaceus sp.</i> )   | 36  |
| European hare ( <i>Lepus europaeus</i> )                                   | 19  |
| Raptors and owls   | 11  |
| The European roe deer ( <i>Capreolus capreolus</i> )                       | 10  |
| Bats ( <i>Chiroptera</i> )   | 10  |
| The Eurasian otter ( <i>Lutra lutra</i> )                                  | 8   |
| The European badger ( <i>Meles meles</i> )                                 | 6   |
| The red squirrel ( <i>Sciurus vulgaris</i> )                               | 4   |
| The wild boar ( <i>Sus scrofa</i> )  | 4   |
| Domestic animal  | 3   |
| Raccoon dogs ( <i>Nyctereus procyonoides</i> )                             | 2   |
| The muskrat ( <i>Ondatra zibethicus</i> )                                  | 2   |
| The red deer ( <i>Cervus elaphus</i> )                                     | 2   |
| Other mammals  | 1   |
| <b>SUM</b>   | <b>384</b>                                  |



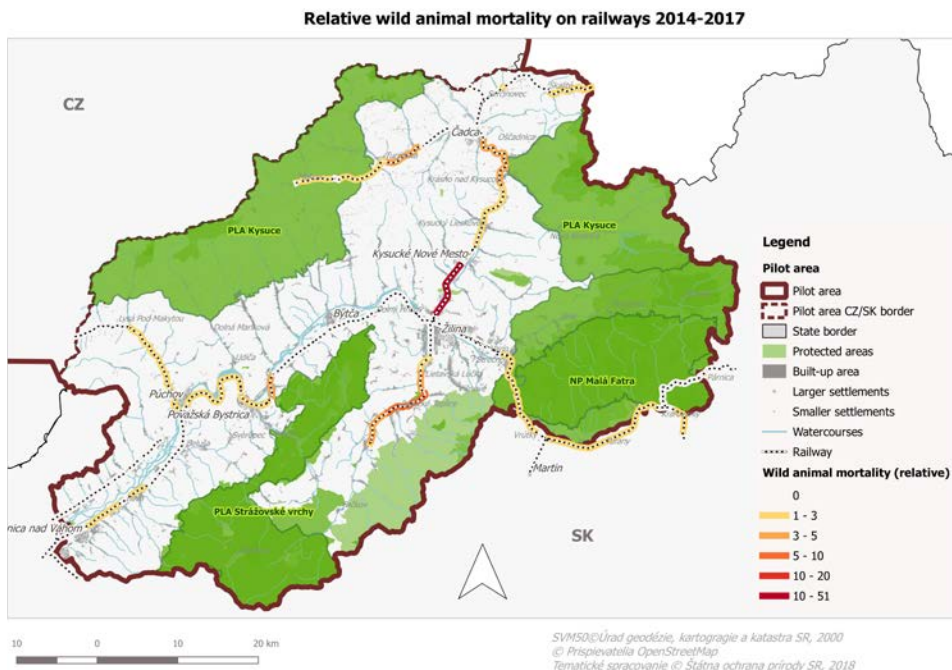
**Fig. 52:** Mortality monitoring in the pilot area during the period 03/2017-11/2017.

### Railway mortality

Slovak Railway Administration collects data on animals killed on railways each year. Data for the period 2014-2017 were obtained and evaluated. A lot of data, however, miss some important information about the animals killed. One of the most important pieces of information is an exact GPS location; however, in this case, the mortality was recorded only per section of railway line. Different lines have different length, which in this pilot area can differ from only few meters to 16 kilometres. Therefore, even though most of the records can be displayed in GIS, the information is not precise.

Railway lines with different relative mortality per km of the section are visualized in Figure 53. The absolute number of cadavers killed on railway line sections is depicted in the Figure 54. There were 58 cadavers recorded in the pilot area in 2014, 108 in 2015, 80 in 2016, and 595 in 2017, which is totally 841 cadavers for the period 2014-2017.

Species, which were most often killed on railways in the whole area of Slovakia, were the European roe deer (*Capreolus capreolus*), the wild boar (*Sus scrofa*), the red deer (*Cervus elaphus*) and then the brown bear (*Ursus arctos*).



**Fig. 53:** Relative animal railway mortality per km of the section.

Absolute wild animal mortality on railways 2014-2017

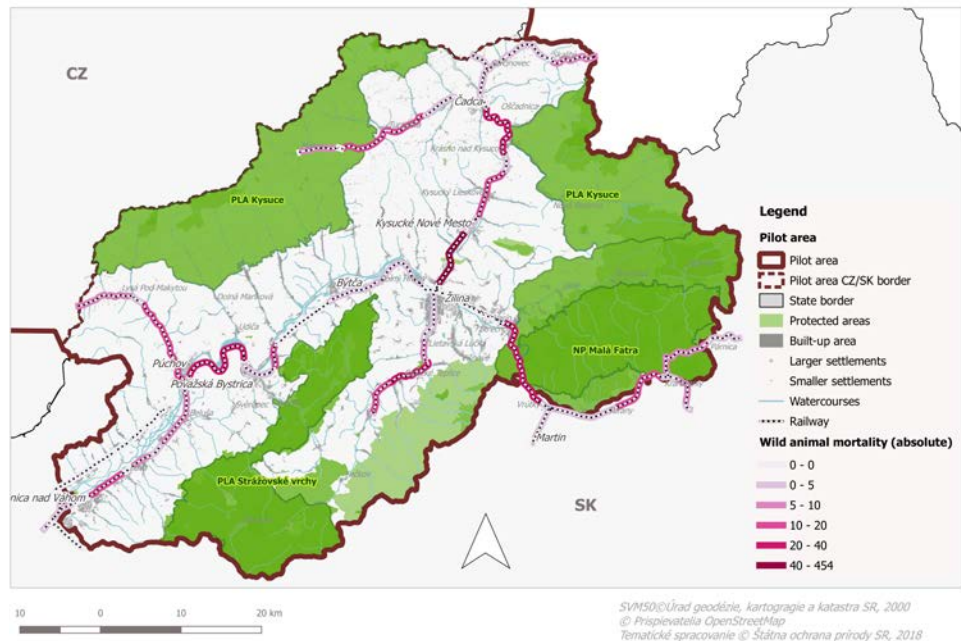


Fig. 54: The absolute number of cadavers killed on railway line sections.

## 8.8 Bridge inventory in the pilot area

### 8.8.1 Czech Republic

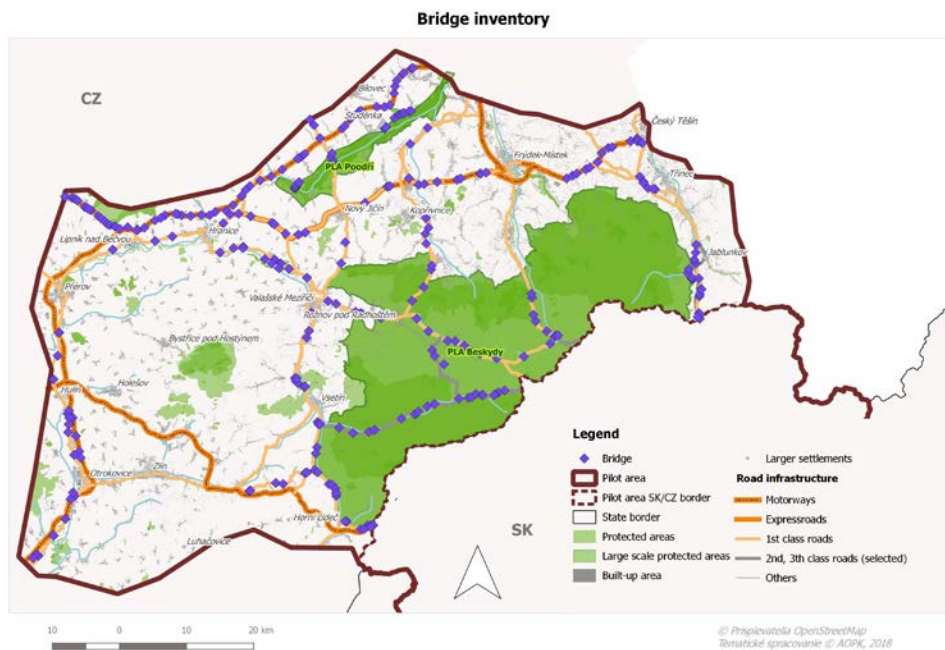
Inventory of existing underpasses and overpasses was partially done also in the Czech part of the pilot area. The crucial question is necessarily related to the real permeability and the proper functioning of such structures. Many factors, e.g., the type of structure and its dimensions (openness index), terrain type either on or underneath the structure, location, and type of surroundings, play an inevitable role in the final usability and actual permeability for various animal species. Inventory of mitigation structures, wider than five metres and outside the urban areas, was done on main railway corridors in the area. These include the following track sections: Přerov – Ostrava, Český Těšín – Jablunkov, Hranice na Moravě – Vsetín – Horní Lideč, and Přerov – Staré Město. Moreover, the inventory of mitigation objects took place on all motorways and 1<sup>st</sup> class roads in the pilot study area. These are (part of) D1, D48, D55, I/11, (part of) I/35, I/47, I/48, I/49, (part of) I/55, I/56, (part of) I/57, and (part of) I/58. Furthermore, culverts and underpasses on 2<sup>nd</sup> class roads were checked in the

Protected Landscape Area Beskydy. All mitigation objects were inspected in the field and photo documented. Technical parameters, object type, and disturbance factors, e.g., the presence of barriers in the vicinity, terrain type on or under the object were recorded as well. We also noticed the presence of mitigation measures and their current status.

Altogether, 415 objects were visited and documented up to date. The majority of the structures were controlled on the roads – 354 structures in total. Additionally, 61 objects were visited on main railway sections (see Fig. 55). The 264 objects were controlled by Transport Research Centre.

The 151 objects were inspected by Nature Conservation Agency. Evaluation of migration permeability of the checked transport infrastructures is in progress. The main result will be the joint map for the whole pilot area with the structures sorted according to their actual migration permeability in three main categories: A – permeable for large mammals, B – permeable for middle sized animals and C – permeable for small animals.





**Fig. 55:** An overview of already checked transport objects on main roads and railway section in the CZ part of pilot area.

## 8.8.2 Slovak Republic

Monitoring of migration objects is one of the project activities. 82 bridge objects were documented in the Slovak part of the pilot area – 27 in Strážovské vrchy, 25 in Malá Fatra and 30 in Kysuce (Map – Fig. 56). The sites for monitoring were especially chosen on motorways and 1<sup>st</sup> class roads, which are one of the main migration barriers for wildlife in the area. List of the objects on selected roads is in the Table 8. The 14 bridges were overpasses and 68 underpasses. The character of the bridge, selected parameters, disturbances, surroundings habitats, presence of animals and many other parameters were recorded. Permeability of objects is in the Table 9 (A = permeability for all animals including large mammals, B = permeability for middle size animals, e.g. the roe deer, C = permeability for small animals, e.g. the fox). In Kysuce area, most of the objects (24) have week disturbances for animals, and 6 objects have strong disturbances. In the area of Strážovské vrchy mountain range, 13 bridges have strong disturbances and the same number has week disturbances. Only 1 bridge is without any disturbances. In Malá Fatra mountain range, main disturbances were caused by roads, railways, but also by urbanization.

**Tab. 8:** Inventory of bridges on selected roads

| Area             | No. of Road   | No. of inventorized bridges |
|------------------|---------------|-----------------------------|
| Kysuce           | D3            | 18                          |
| Kysuce           | I/11          | 3                           |
| Kysuce           | II/484        | 4                           |
| Kysuce           | II/520        | 1                           |
| Kysuce           | III/2035      | 4                           |
| Malá Fatra       | 1/18          | 8                           |
| Malá Fatra       | 1/61          | 2                           |
| Malá Fatra       | 1/61, railway | 1                           |
| Malá Fatra       | D1            | 6                           |
| Malá Fatra       | D3            | 6                           |
| Malá Fatra       | Local road    | 1                           |
| Malá Fatra       | Railway       | 1                           |
| Strážovské vrchy | D1            | 27                          |

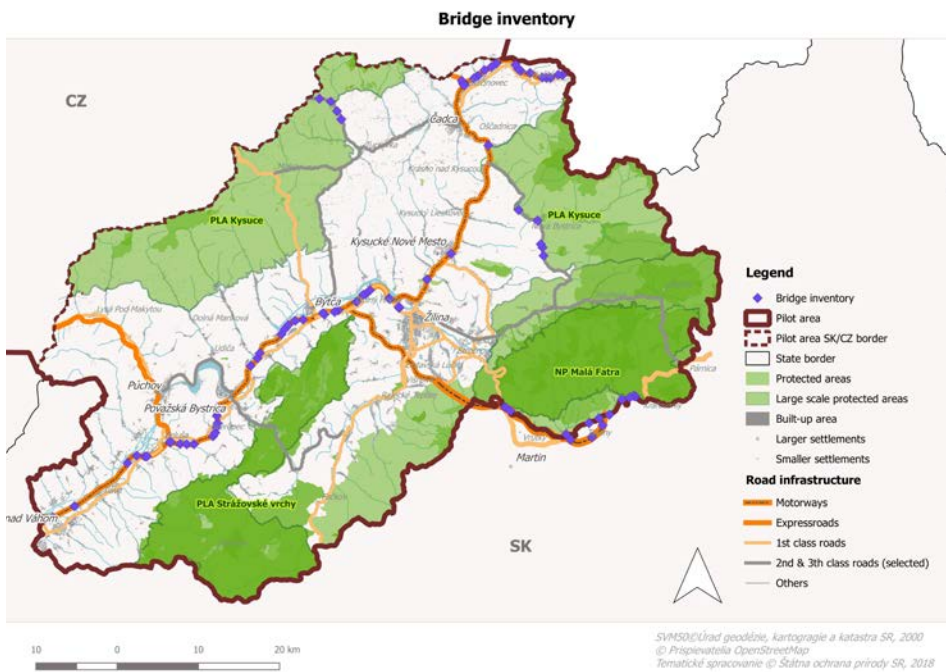


Fig. 56: Bridge inventory in the Slovak part of the area.

Tab. 9: Permeability of inventorized objects.

| Area             | Permeability | No. of inventorized bridges |
|------------------|--------------|-----------------------------|
| Kysuce           | A,B,C        | 20                          |
| Kysuce           | A?,B,C       | 5                           |
| Kysuce           | B,C          | 4                           |
| Kysuce           | C            | 1                           |
| Malá Fatra       | yes          | 22                          |
| Malá Fatra       | no           | 3                           |
| Strážovské vrchy | A            | 20                          |
| Strážovské vrchy | B            | 4                           |
| Strážovské vrchy | C            | 3                           |

A = permeability for all animals including large mammals  
 B = permeability for middle size animals, e.g. the Roe deer  
 C = permeability for small animals, e.g. the fox

9

# Best practices





**Optimization of the railway in section Mosty u Jablunkova - Bystřice n. Olší**

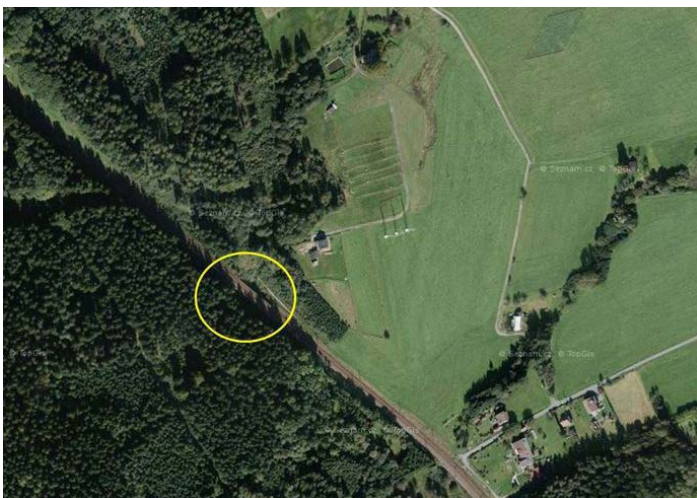
The project of railway reconstruction took place in the eastern part of the Czech Republic in the city of Mosty u Jablunkova cadastre. This area was identified to be of importance for large carnivores' migration from Slovakia and Poland to the Site of Community Importance CZ0724089 Beskydy, which was designated for the wolf, the bear and the lynx protection. The two last remaining migration corridors were identified there, which allow free animal movement in the east-west direction. Beskydy

Protected Landscape Area Administration proposed the construction of two underpasses (bridges) directly located in migration corridors (CZ1 a CZ2) during the preparatory phase of the railway reconstruction (see Fig. 57, 58, 59). Finally, these two mitigation structures have already been constructed. Both underpasses meet the requirements to allow for large mammals' migration. The migration permeability of railway sections for large mammals has been improved, which has been successfully confirmed by sand belt monitoring and snow tracking of animals passing through the underpasses.



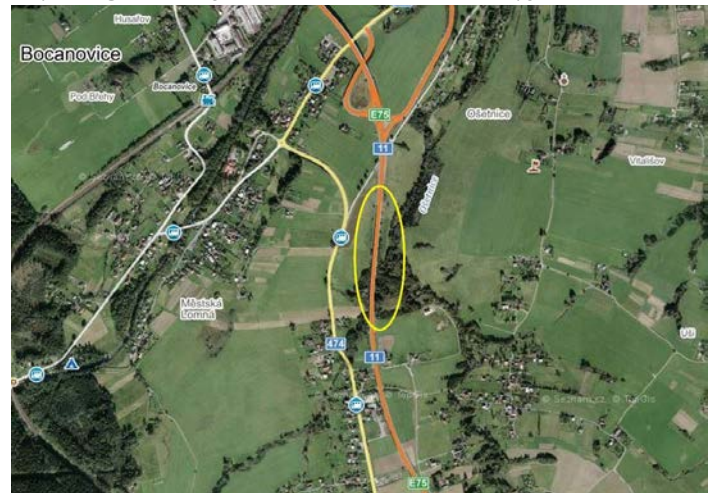
**Fig. 57:** Underpass constructed on the railway in the Mosty u Jablunkova cadastre close to national border (photo by Ivo Dostál / Transport Research Centre).

**Fig. 58:** Ortophotomap with the location (yellow ellipse, GPS: 49.4948417N, 18.7632283E) of the underpass constructed on the railway in the Mosty u Jablunkova cadastre. The underpass was constructed directly in the corridor CZ1, which is top priority (www.mapy.cz).



**Fig. 59:** Ortophotomap with the location (yellow circle, GPS: 49.5508247N, 18.7365906E) of the underpass constructed on the railway in the city of Jablunkov cadastre. The underpass was constructed directly in the corridor CZ2, which is top priority (www.mapy.cz).

**Fig. 60:** Ortophotomap with the location (yellow ellipse) of the landscape bridge in the city of Jablunkov cadastre (www.mapy.cz).



### Landscape bridge (estacade) in the city of Jablunkov

This transport infrastructure is located on the 1<sup>st</sup> class road I/11 in the cadastre of the Jablunkov city. It allows animal migration up to the size of large mammals (the Red Deer, the Moose). This ecological corridor (CZ2) is one of the last two corridors (CZ1 and CZ2, see Chapter 8.4), which can provide free migration space and opportunity to connect large carnivores' population living in Slovakia/Poland and PLA Beskydy.



Fig. 61: Landscape bridge in the city of Jablunkov cadastre is located in corridor CZ2 (©Martin Strnad / NCA CR).

### Installation of road signs „Beware of wildlife“ and recommended speed limit up to 70 km/h

The Protected Landscape Area Administration Beskydy have sent a request for installation of traffic warning signs “Beware of wildlife” to the Administration offices of Moravsko-Slezsko and Zlín



Fig. 62: Installed warning sign in migration corridor Pindula CZ08 - Trojanovice (see Chapter 8.4.1.).

District. Seven most critical sections on migration corridors for large mammals were mentioned in Moravsko-Slezsko district and ten critical sections in Zlín District. Finally, only Moravsko-Slezsko District have agreed on installation of warning signs with the speed limit of 70 km/h (50 km/h was proposed). The City council of Vsetín and regional police directorate refuse to do so. They argued that the proposed speed limit will negatively influence traffic fluency.

### Railway tunnel Púchov-Považská Bystrica

Currently, the tunnel variant of electrified two-track railway line No. 120 is under construction in the section between Púchov - Považská Bystrica. The construction is realized in the framework of modernization of this railway track and will have a positive effect on animal migration.

### D1 - bridge no. 164 in the section Sverepec-Visolaje

The bridge on the motorway D1 near the village of Sverepec allows for migration of animal species. The bridge is localized in the corridor and in the area, which has yet not been urbanized, between the villages of Sverepec and Visolaje. However, in accordance with the current spatial plan, the area is potentially threatened by urbanization.

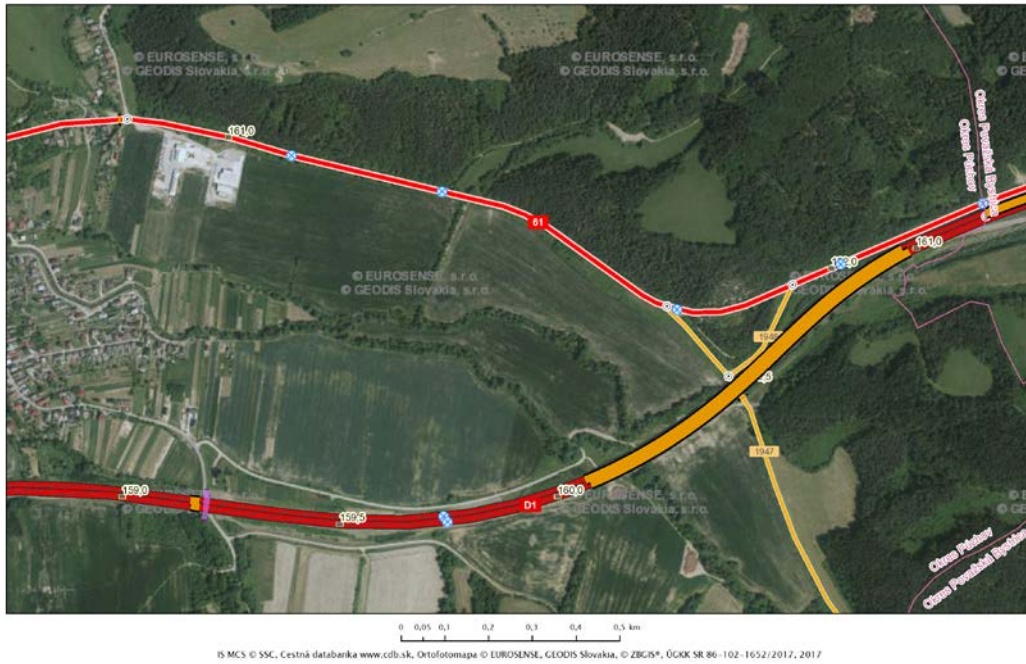
### D3 viaduct - Skalité

D3 motorway in Skalité, near the state border with Poland, is designed and constructed as a viaduct (No. H 201). The viaduct is located in the supra-regional bio corridor I and it is used by large carnivores. Migratory area that remains under the viaduct secures the connectivity of sites with large carnivores' occurrence. Half profile of the D3 motorway was put in operation in 2017. This caused a significant decrease of traffic on the existing 1<sup>st</sup> class road I/12 in the area as well as a reduction of disturbing effects of traffic in the migratory space under the viaduct. This area is not influenced by strong urbanization, which increases the possibility for migration and animal dispersion. Inclusion of the viaduct and its surrounding area into the Skalité Municipality Spatial Plan as an undeveloped area is an essential condition for securing optimal functionality of this migration corridor.

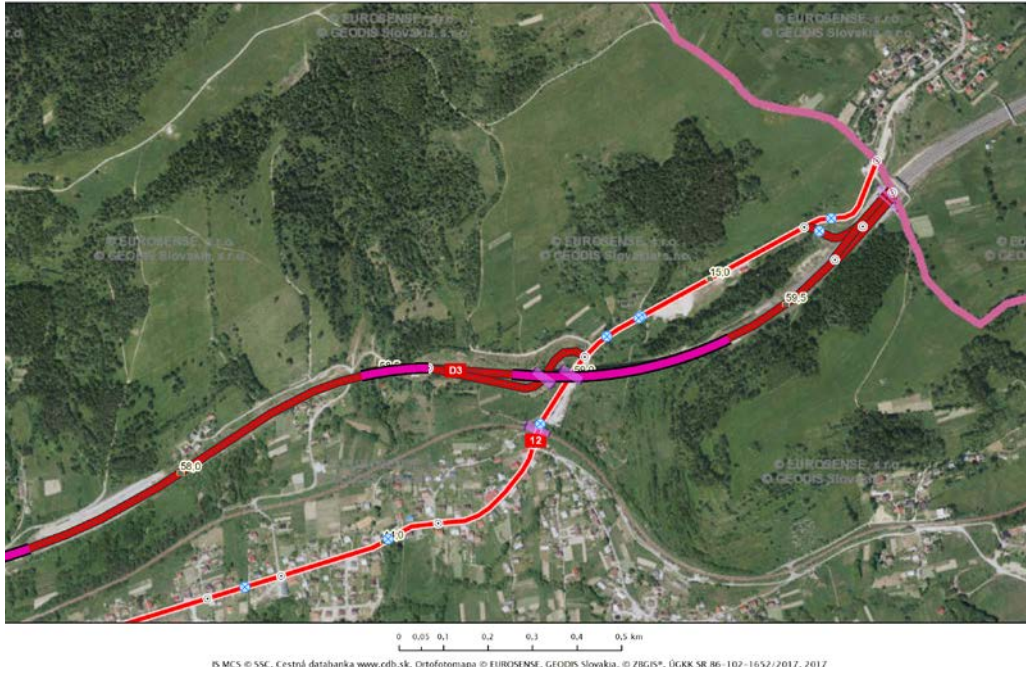
### Cooperation

Cooperation between an NGO Fatranský spolok and NGO Hnutí Duha can also be pointed out as a good example. These NGOs are from two different countries which have a common interest to safeguard the permeability of the West Carpathian area for large carnivores. As a result of several projects, their work and cooperation has brought about two publications which deal with this topic in more detail.





**Fig. 63:** Bridge No.164 on D1 motorway near the village of Sverepec.



**Fig. 64:** Viaduct near the village of Skalité.



10

# Negative occurrences



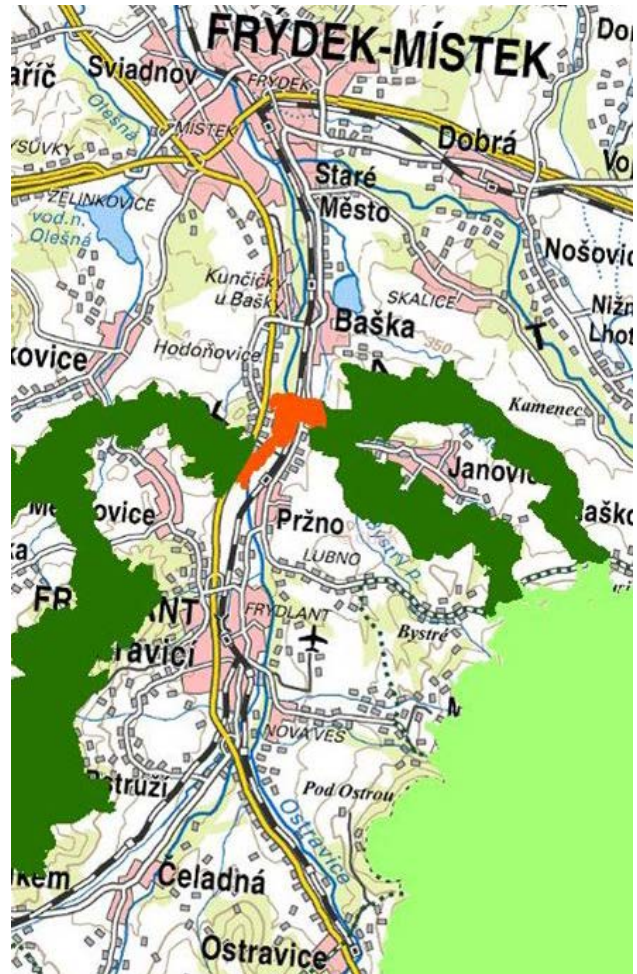


**Fencing along the 1<sup>st</sup> class road I/56 Frýdek Místek - Ostravice**

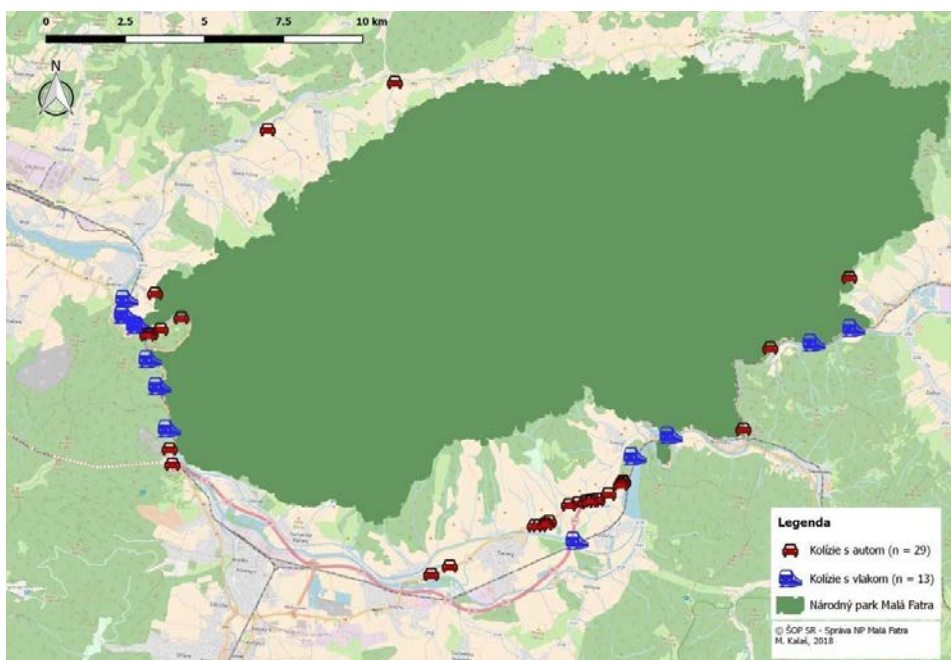
One of the negative examples has occurred recently on 1<sup>st</sup> class road I/56 from Frýdek-Místek towards Ostravice. Based on the investor's plan, General Road Directorate (ŘSD) prepared action aiming at fencing 1<sup>st</sup> class road I/56 almost completely. It is general feature of today's practices to plan and build fencing along almost all the 1<sup>st</sup> class roads. In one certain place, the section of the road conflicts with the ecological corridor for large mammals (long distance corridor/biotope of selected specially protected species of large mammals). We plan to meet with responsible authority bodies to discuss and solve the problem.

**Unresolved situation - D1 around the National Park Malá Fatra**

The situation in and around the Malá Fatra National Park is very destructive for wildlife movements. Traffic load on the 2<sup>nd</sup> class road I/18 reaches up to 27,000 vehicles per 24 hours and creates nearly impenetrable barrier for many wildlife species. Animals either need to accept the road as a home range barrier or are killed during crossing attempts (Kalaš 2011, Skuban et al. 2017b) (Fig. 66). The road I/18 is an important travel route to Poland or the Czech Republic and it is used by national and international traffic. The long debates on the technical realization of the highway prolong the situation. National Motorway Company had realized a study on brown bear and lynx movements with the help of GPS/GSM telemetry in 2012. Due to political reasons, the study was stopped before its official end. However, several animals were caught, and their movement routes were registered (Findo et al. 2014; Skuban et al. 2017b). Scientific results could contribute to better planning of mitigation measures in support of wildlife movement.



**Fig. 65:** Section of 1<sup>st</sup> class road I/56 leading in North-South direction from Frýdek-Místek towards Ostravice. Road section conflicts with ecological corridor (dark green) and this place was identified as critical for migration there (orange). The core area for large mammal distribution is depicted in light green.



**Fig. 66:** National Park Malá Fatra is surrounded by roads with very heavy traffic volume. The unresolved situation leads to very high collision rate with wildlife, brown bears including (Kalaš 2011; Findo et al. 2014).



### Strong developments in Kysuce Region

Strong developments in the Kysuca, Čierňanka and Bystrica Valley are a long-term specific problem of the whole region (Fig. 67, 68). Over the time, secluded settlements have created a united urban area. Migration of large mammals, large carnivores including, through

the valleys and between orographic units is very difficult, even impossible in many places. There are many negative examples in this region. The last remaining undeveloped areas of these valleys have been identified during this project and it is necessary to secure their protection against any development.

Intensive urbanization in Kysuce region

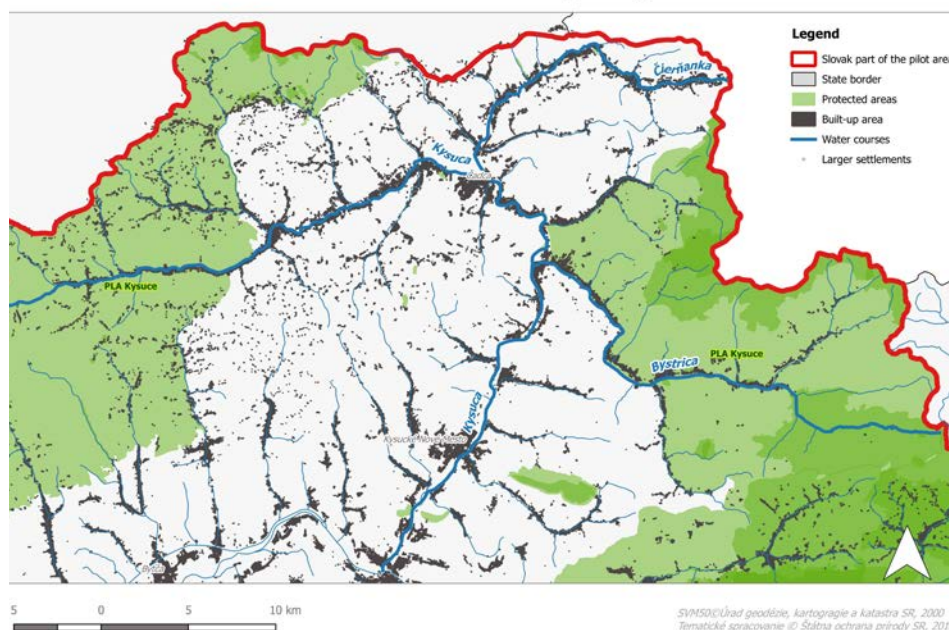


Fig. 67: Intensive developments in Kysuca, Čierňanka and Bystrica Rivers Valley.

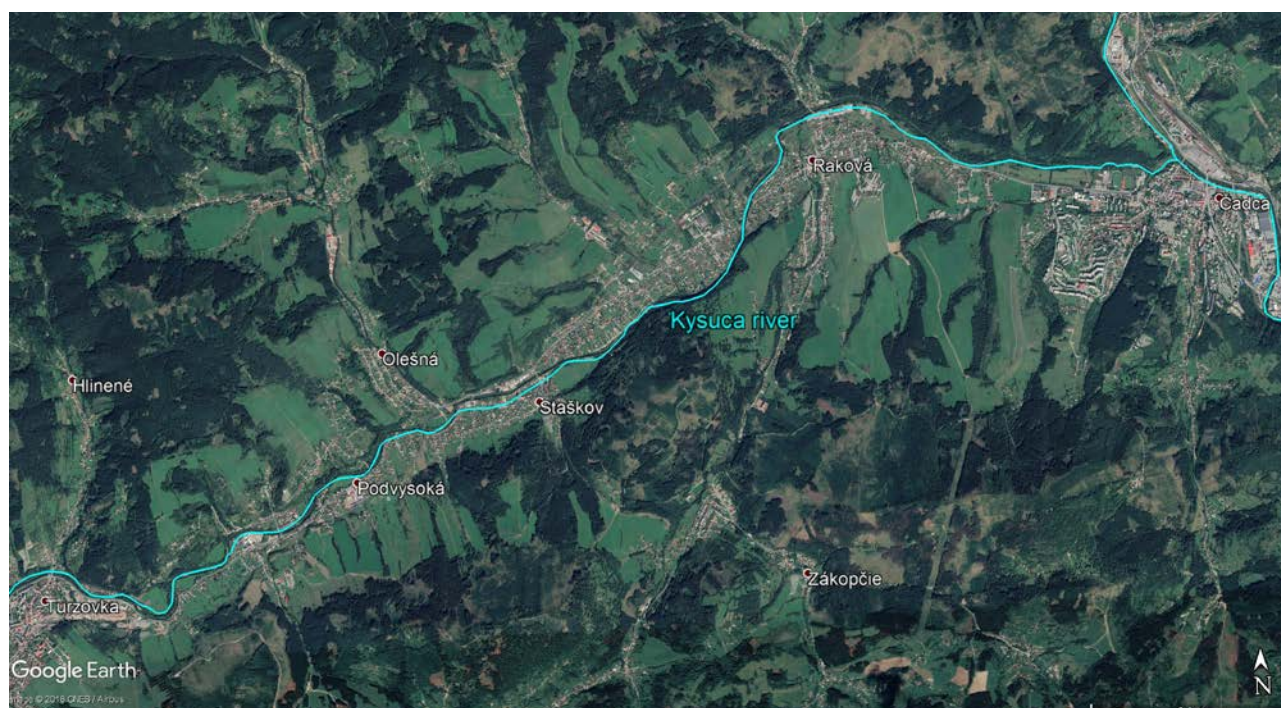


Fig. 68: Intensive developments in Kysuca River Valley between the cities of Čadca and Turzovka.



### Derivation channels - Hričov and Nosice

The channels of Hričov and Nosice were both built in the post war period in the years 1959-1963 and they are part of the River Váh cascade. Hričov channel is a 28.41 km long derivation channel, which connects the storage tank Hričov Dam and the Reservoir Nosice (Fig. 69). It is a derivation channel for water works Mikšová and Považská Bystrica. The dam, under which the hydroelectric power plant is built, is located between the municipalities of Nimnica and Nosice. Behind the Nosice waterworks, a short Nosice channel is created alongside the River Váh, which flows through several cascades and connects with the River Váh in the city of Púchov.

The channels were built without any measures to provide for migration routes for terrestrial animals. These channels create a migration barrier between Strážovské vrchy mountain range and Javorníky mountain range. This barrier is permeable only under certain circumstances.

### The influence of agriculture on the number of road collisions with animals

According to the study<sup>1</sup> focused on the impact of traffic on the brown bear, which was realized in NP Malá Fatra, there are several risk areas identified, based on the number of collisions occurred. Different reasons for traffic collisions were defined.

One of the areas identified is the south foothill of the Malá Fatra NP, which is part of this pilot area. It is approximately a 3.3 km long section of the I/18 road starting just behind the bridging of the derivation canal of the River Váh in the village of Turany and going further south-east up to the beginning of the retaining wall over the I/18 road near the Natural Monument of Šútovská epigenéza in the Ratkovo cadastre.

Another collision area is located approximately 2.2 km in the south-west direction from the abovementioned bridging over the derivation canal in the Turany cadastre. We are aware of about 11 collisions, 10 of which are caused by cars and 1 by train. This place takes up about 42% of all known collisions from the Malá Fatra NP area and its broader surroundings. With reference to the time of the year, three collisions occurred in September, one collision in June and one in October.

In the area described above, in the south-east part of the Turčianska Kotlina basin, there are large areas of agrocenoses where corn and wheat are grown. These crops are an important source of nutrition for bears, which contributes to an increased aggregation of the individuals of the given animal species. Although we cannot eliminate the natural migration between the Malá Fatra and Veľká Fatra mountain ranges, a large proportion of the collisions in this area will probably be caused by bear transfers to places with abundant and easily accessible food.

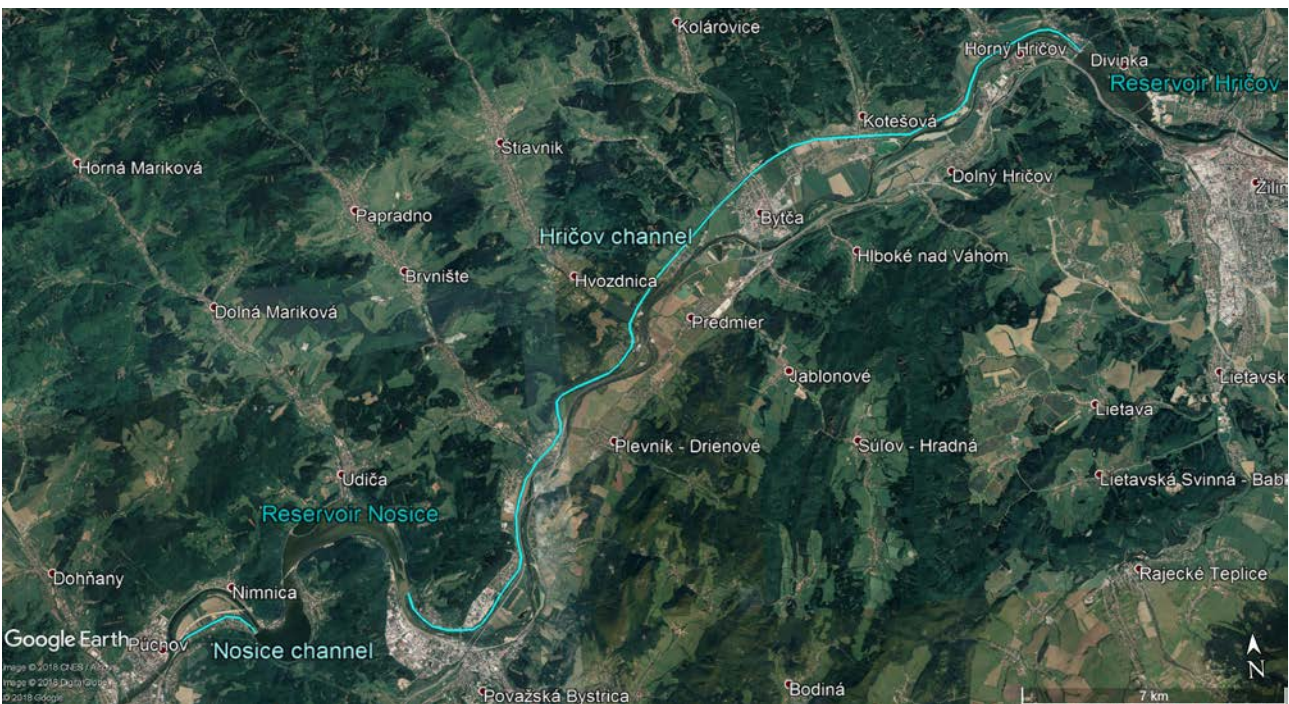


Fig. 69: Derivation channel Hričov and Nosice.

Gaps of available knowledge, accessibility and availability of biodiversity and transport data



70

↑ 1 km ↑



- » There are no clear state concepts and conceptual co-operation between the Environmental and Transport sectors. Act No. 114/1992 Coll. (CZ) and Act No. 543/2002 Coll. (SVK) on Nature and Landscape Protection do not directly address landscape fragmentation; individual constructions are prepared on the basis of suggestions made in specific territorial and building decisions. Individual cases are usually treated separately when taking into consideration the conclusions of the EIA assessment. However, it has no specific rules and the problem can be solved differently by responsible authorities.
- » There is no standard monitoring of the effectiveness of the implemented mitigation measures and already built objects in both countries. This leads to the fact that the passage for the animals is realized and no one will evaluate whether it fulfils its purpose or not. Monitoring the effectiveness of the implemented measures is a standard case in many countries and is perceived as a necessary step towards increasing the efficiency of funds spent to ensure the permeability of linear transport infrastructure for animals.
- » Improve the process of the International transboundary SEA / EIA assessment on the impact of landscape fragmentation on Sites of Community Importance.
- » Introduce the concept of biotope of selected and specially protected species of large mammals (and/or ecological corridors) as an obligatory instrument into all levels of decision-making process during spatial planning procedures (transport/urban planning etc.).
- » There is a lack of studies on migration behaviour of wildlife in both countries. The issue of landscape fragmentation has been more underestimated in Slovakia than in the Czech Republic, but there are still gaps of knowledge. It is not precisely known how the large carnivores which are of European interest, behave in relation to transport infrastructures (where cross the roads/railways).
- » Accessibility to biodiversity data is very good. Nature Conservation Agency of the Czech Republic manages species/biotopes occurrence data database which is open for all Administration bodies, research institutions as well as the public upon signing bilateral agreement on data usage, entering and/or sharing. The database exceeds 20 million records.
- » Accessibility of transport data is good via Transport Infrastructure operator's geoportal (<https://geoportal.rsd.cz/web>) in CZ. Data on traffic volume on Slovak roads is freely available on the Internet via the Slovak Road Administration ([www.ssc.sk](http://www.ssc.sk)). Data about planned and existing highways and dual carriageways are freely available on the Internet ([www.dialnice.info](http://www.dialnice.info), [www.ndsas.sk](http://www.ndsas.sk)). But there is a problem to obtain basic GIS data. (e.g. network of road, network of railway, network of nature protected areas) in an appropriate form (e.g. shapefiles) in both countries. These data are available only upon request. Open free data are available ([www.openstreetmap.org](http://www.openstreetmap.org), [www.freemap.sk](http://www.freemap.sk)), but they are not precise, and they miss some key attributes. There exist a few geoportals in Slovakia/Czech Republic, where the map of infrastructure or biodiversity can be displayed, or produced, but these geoportals do not allow downloading layers or they have limitations to import your own layers (e.g. Information system of the Road network model-ismcs.cdb.sk, National geoportal - [geoportal.gov.sk](http://geoportal.gov.sk), Enviro-geoportal - [geo.enviroportal.sk](http://geo.enviroportal.sk), etc.).
- » There is still a lack of quantitative and qualitative data about animal mortality on roads and railways in both countries and a common database is missing. In case of collisions of vehicles with game species, the involved vehicle is often damaged, and the police are usually called. The police subsequently call the local hunters associations, which have a legal duty to remove the injured or dead animal (SVK and CZ). There is a central database with game species managed by national Forest Centre in Slovakia (in CZ there is no central database), nonetheless, the access to these data is very complicated. In case of traffic related mortality of protected wildlife species, it is obligatory for the police to call the representatives of SNC SR (in CZ there is no such obligation). Data about mortality are not collected systematically by SNC SR and they are stored in different databases, which have been created for other purposes (KIMS, AVES symphony etc.), therefore the data have different formats and attributions. Slovak Railways collect data on animals killed on railways. Unfortunately, this data does not have precise GPS information. Each accident is recorded only per section of lines. Different sections have different length with a range of few meters up to 20 km. In the CZ, the railway operator checks the rail sections regularly, but there is no rule to collect data on fauna mortality.



# 12. Recommendations to fill in the gaps

- » To achieve a framework agreement (e.g. MoU) between transport and environmental sector on common approach in dealing with landscape fragmentation caused by linear infrastructure, including the establishment of a common database on traffic fauna mortality.
- » To identify and ensure the protection of ecological corridors functionality and integrity throughout the processes of spatial planning (amendment in nature conservation and spatial planning legislation).
- » To unify the approach of relevant authorities in the assessment of new transport structures in regard to maintenance and enhancement of landscape permeability.
- » To introduce monitoring of mitigation structures' effectiveness (over/underpasses).
- » To use the result of ecological corridors monitoring in proposals for new mitigation structures.
- » To promote the conduction of studies dedicated to behavioural ecology of large mammals in relation to traffic infrastructure.

# 13. Conclusions

**T**he importance of ecological corridors and landscape permeability for wildlife was underestimated for many decades. In some important places for wildlife movement, no mitigation measures were built. Moreover, there were no particular studies aiming at identification of ecological corridors and / or critical places.

This project has helped to continue the work which has started in this area in recent years, when people working in nature conservation in both the Czech Republic and Slovakia had started to pay attention to the population of large carnivores living here. It was especially the effect that transport infrastructure had on the populations and the effort to decrease its negative influence that inspired them to start their own research projects and activities to point out the importance of sustaining the ecological connectivity of this area. Today we can see that there is a higher interest taken in this topic also by other sectors and some regional governments as well, and that the habitat fragmentation and landscape connectivity are becoming more known terms not only in the environment sector. This is very important and necessary if we want to eliminate the conflict between green and grey infrastructure and developed country in a way that will be beneficiary not only for people, but also for animals.

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### Project Partners

**Austria** – WWF Central and Eastern Europe (former WWF DCP, project lead)

**Czech Republic** – Friends of the Earth Czech Republic – branch Olomouc, Nature Conservation Agency, Transport Research Centre

**Hungary** – CEEweb for Biodiversity

**Romania** – Association “Milvus Group”, WWF Romania

**Slovakia** – National Motorway Company, State Nature Conservancy of the Slovak Republic, SPECTRA – Centre of Excellence of EU – Slovak University of Technology in Bratislava

### Associated Strategic Partners

**Austria** – Ministry for Transport, Innovation and Technology

**Czech Republic** – Ministry of the Environment

**Hungary** – National Infrastructure Developing Private Company Ltd.

**Poland** – Ministry of Infrastructure and Construction

**Romania** – Ministry of the Environment, Ministry of Transport

**Slovenia** – Ministry of Infrastructure

**Ukraine** – Ministry of Ecology and Natural Resources, Transcarpathian Regional State Administration – Department of Ecology and Natural Resources