

# Action plan for mitigating threats to corridors, conflict zones and mitigation measures in the Hungarian Pilot Area

**April 2021.**

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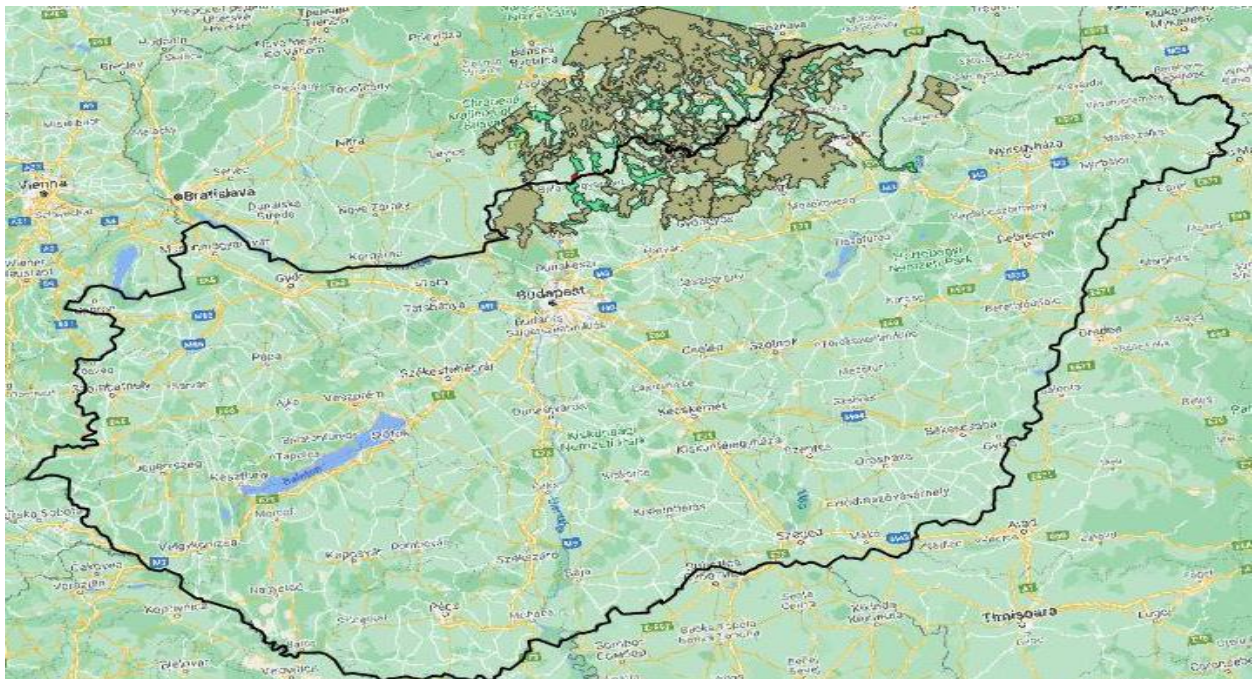
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## Introduction

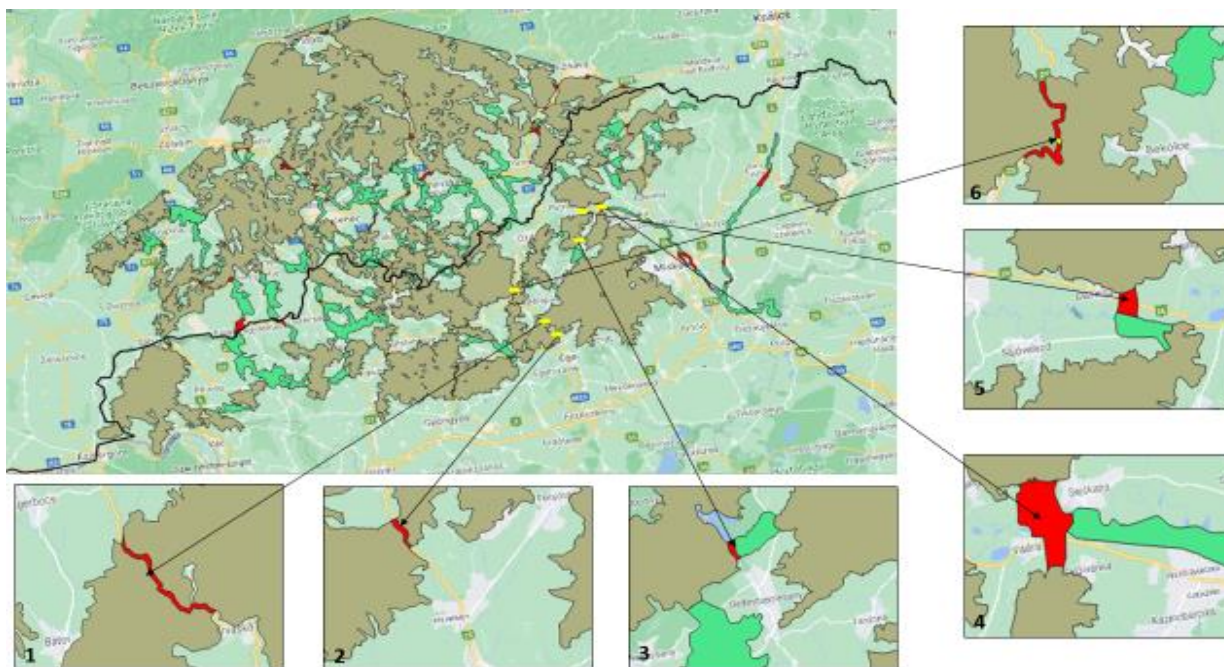
The Hungarian pilot area of the ConnectGreen project includes the territory of the Bükk National Park Directorate, nevertheless in this document - similarly to the project implementation and the integrative menour of the project partnership - we publish all project's habitat suitability modelling results made for Hungary.

These recommendations might become even more important when the wolf population - stated protected over the project implementation period in Slovakia - strengthens due to the optimal circumstances, causing presumably an increasing population in Hungary and consequently requiring stronger protection acts for large carnivores, too.



*Figure 1: Map displaying the study areas which includes migration zone (green), conflict zone (red) and suitable habitat area (grey)*

## CRITICAL ZONES 1 to 6 (ConnectGreen pilot area):



### Cards of Critical Zones

#### 1. Nearby village - Szarvaskő (47° 59'21" N, 20° 19'42" E)

##### Landscape Characteristics

Highly dense forested area with main road 25 running in the bottom of a deep narrow valley, intercepting the two habitat area which is overall a mountainous landscape. Other transportation infrastructure is also present (railway). Creek named Villősi Patak runs along the main road. No migration zone has been identified so far within this conflict area, but most likely that it is frequently crossed by vertebrates and ungulates.

##### Dispersal Barriers

- Road: This is the main barrier of this critical zone which is highly used by cars. A few smaller dirt roads open from the main road which extends into the forest (wide enough for cars to enter).
- Railway: Single railway present throughout a section of the highlighted zone which than continues in a different direction, a railway train stop can also be found close to the junction. The railway goes over the creek creating a bridge which may allow passage for smaller animals. Occasional road-kill is also registered here. The migration of animals over the rail-line is not only crossing, but usually following the railway lane.

- Road/Traffic Barriers: Material made from steel and can be found mainly at corners/sharp turns to protect cars from falling to the creek in accidents. Roadkill is quite usual here (ungulates, small and medium carnivores, fox, otter, squirrel, small rodents). The parallelly running stream and road mean a significant barrier for wild animals.

### **Landscape features important for animal migration**

On both sides of the road there are two massive forested areas, the only creek running through the valley attract mammals to drink and move along the creek.

### **Field report – animal tracks**

No migration zone has been identified so far within this conflict area, but most likely that it is frequently crossed by vertebrates and ungulates. Though additional monitoring was implemented in this spot, carnivores were not registered in the project implementation period. Besides that, it is presumed that even large carnivores use this spot as crossing-place, there is one more potential crossing spot on this road at Mónosbél. In the North there active wild movements were detected by our camera traps. The Southern section of the road is impermeable for large game due to the dense built area of Eger, therefore the Northern side is safe to be used actively further on the road from Szarvaskő.

**Overall rating of permeability for large mammals:** C2 middle impermeable

### **Land use plan**

The forests, creek, valley are included to the protected areas of the Bükk National Park, no changes are planned.

### **Summary**

The “Szarvaskő” critical zone is embed to the massive forested area of the Bükk Mountain, making the connection between the popular Bükk and Mátra Mountains. Though there isn't any record of large carnivore presence, it is most likely to become habited as soon as the species reach the area. The area is quite permeable for large mammals, but many barriers and threats are present, such as roads, railway, and road protecting measures.

## **2. Nearby village - Felnémet/Almar (47° 57'58" N, 20° 20'57"E)**

### **Landscape Characteristics**

The main road, Road 25 runs through the conflict zone, this is a highly dense forested area. Creek running along the main road called Eger Patak. Open green area is seen beside the road which is not fenced. Other transportation infrastructure is also present (railway). There are also “rest spots” along the main road for humans to stop by car and this area is not paved.

### **Dispersal Barrier**

- Road: This is the main barrier of this critical zone which is highly used by cars with high speed, even over the speed limit. There are also few dirt roads opening from the main road which leads into the forested area.
- Railway: A single railway track runs along the creek as well as throughout this conflict area.
- Road/Traffic Barrier: Barrier running along one side of the main road as this critical zone is at high elevation and there is a steep drop on the other side of the barrier.
- Settlement: Right beside the corridor there is a small settlement seen.

#### **Landscape features important for animal migration**

On both sides of the road there are two large forested areas, the only creek running through the valley attract mammals to drink and move along the creek

#### **Field report – animal tracks**

Migration zone has not been identified near this critical zone.

**Overall rating of permeability for large mammals:** C2 middle impermeable

#### **Land use plan**

There are no changes planned.

#### **Summary**

The “Felnémet” critical zone is close to Eger city and is located on the southern part of the Bükk National Park. While there are some hills present there are also flat green areas as well. There are a lot of barriers existing in this area which may impact the migration of animals within the zones, but with the creek flowing parallel to the main road can guide the mammals to safety and away from transportation.

### **3. Nearby village - Dédestapolcsány (48° 11'35" N, 20° 28'29"E)**

#### **Landscape Characteristics**

The landscape of this conflict zone consists of both flat open area as well small hills present throughout. Near the settlement other large mammals are present (horses and cows) that are fenced in and crop fields can also be found. The Lázberci Protected Landscape Area is located within this conflict zone consisting of a lake (Lázberci- Tó). The main road within this conflict zone is Road 23. This is a two lane road and it is highly used, there are dirt roads branching off which leads to an open space which may be used for agriculture. There is a private area with a gate that can be seen from the main road, this is covered by wire fencing), trails can be used by visitors and other recreational and leisure activities can also be done in this area. This consists of highly dense vegetation. The migration zone between the two habitat patches comprises both open and forested habitat. The buffer zones around the ecological core areas are missing, which should protect these core zones against the negative effects.

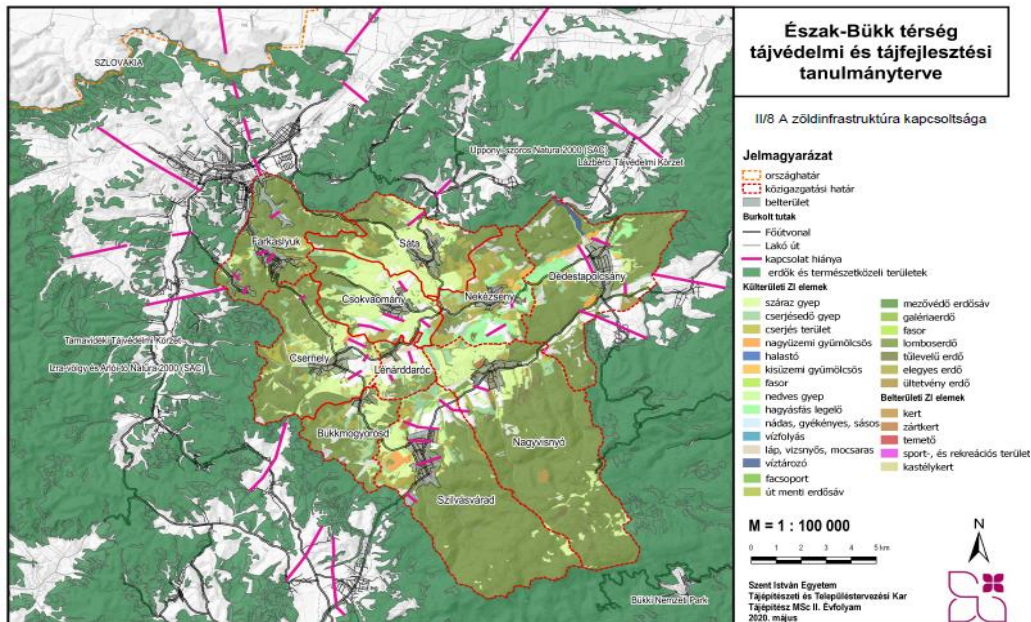


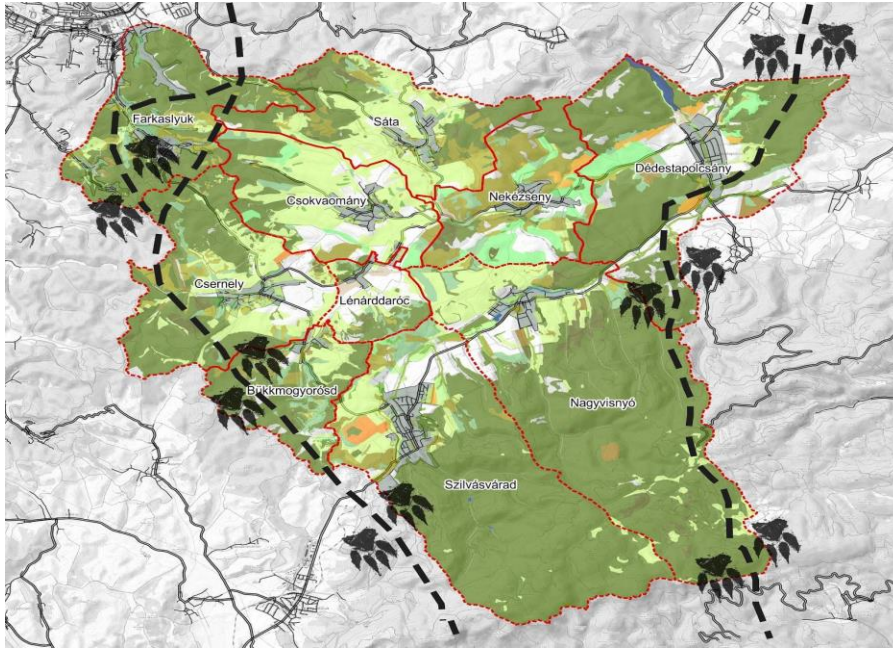
Figure 2: Green infrastructure structure (II/B map) of Landscape protection and landscape development Plan of North-Bükk region (Szent István University, Faculty of Landscape Planning and Settlement Development, 2nd year MSc student 2020., May 2020.)

### Dispersal Barrier

- Road: A narrow road is present within the conflict area which may be used by cars or even cyclists in the Protected Landscape Area. Another road also cuts through the migration zone which is more frequently used by cars.
- Settlement: Can be found at the edge of the protected area as well as near the migration zone. A few industrial buildings are also present near the migration zone.
- Road Barriers: Concrete barriers are present at a section of the migration zone along the main road.

### Landscape features important for animal migration

The migration zone connects the two large habitat patches. The protected forests are in danger thanks to the increasing illegal deforestation in the area (especially in the following villages: Csernely, Csokvaomány, Sáta, Szilvásvárad and Farkaslyuk (part of Ózd)).



*Figure 3: Ecological corridors of Landscape protection and landscape development Plan of North-Bükk region (Szent István University, Faculty of Landscape Planning and Settlement Development, 2nd year MSc student 2020., May 2020.)*

### Field report – animal tracks

Migration zone has been identified which may be used by both smaller and larger mammals to transition between the habitat patches however it is disturbed by a road. Western from this zone there is another migration zone, with which there is no safe connection for the large mammals (between these 2 zones there are more smaller settlements, open spaces, big arable lands and grasslands).

Note: After the project implementation period, wild crossing was registered frequently on the frozen Lázbérci lake. With a drone footage fresh wolf footprints were registered.

**Overall rating of permeability for large mammals:** C2 middle impermeable

### Land use plan

Within this conflict area there are no planned infrastructure changes, it does include a designated bike lane. This area is under the management of the Bükk National Park. The modification of county regional plans are necessary for the designation of new ecological network elements in the area.

### Summary

The “Dédestapolcsány” critical zone is a highly protected area. The lake which is near the conflict zone was created in one of the deep valleys of the Upponyi Mountain. This area is protected, however it is open for the public, and many recreational activities take place. There

are a number of barriers present throughout the area. This is under the management of the Bükk National Park.

#### 4. Nearby village - Vadna (48° 16'25" N, 20° 33'32"E)

##### Landscape Characteristics

Within this critical zone a number of pastured and agricultural lands can be found, relatively flat landscapes, but hills are also present. A river named Sajó runs through this zone. One main road and a number of smaller roads can be seen as well as other transportation infrastructure (railway). There are small patches of forested/shrubby areas mainly present along the river.

##### Dispersal Barrier

- Road: The main road in this area is Road 26. However narrower roads both paved and dirt roads are also seen which may be used for agricultural activities.
- Railway: The railway track is parallel to the main road which goes through both the conflict and migration zone.
- Settlement: The critical zone is surrounded by 3 smaller villages/communities; Vadna, Sajókaza and Sajóivanka. There are other smaller communities present along the migration zone

##### Landscape features important for animal migration

The two habitat patches that are connected by the conflict zone are dense forested vegetation but some open spaces can be observed as well, the only river running through this area may attract mammals and it helps them move along the creek

##### Field report – animal tracks

Migration zone has been identified and the area stretches to the southeast along the Sajó River.

**Overall rating of permeability for large mammals:** C2 middle impermeable

##### Land use plan

There are no changes in infrastructure planned.

##### Summary

The “Vadna” critical zone is located in the northern part of the Bükk National Park. It is surrounded by three small communities which means that there is an increase in human and transportation activities affecting animal movement. With the Sajó River flowing and attracting mammals it can guide them along the river instead of the road. This area has many agricultural fields and in the future it can mean that more green areas could be converted to these types of fields.

## 5. Nearby village - Dubicsány (48° 16'53" N, 20° 30'03"E)

### Landscape Characteristics

This area has multiple and large pasture areas while some fields are also used for agriculture. The river Sajó runs through this area, along the river there are some clusters of smaller vegetated patches.

### Dispersal Barrier

- Road: The main road in this area is Road 25, however smaller dirt roads are seen which separates the pasture lands from each other this may be used by tractors or other larger vehicles.
- Railway: A single railway runs right through the conflict zone and intersects the main road as well. The tracks run parallel to the river.
- Settlement: A small community can be seen right beside the conflict zone.
- Traffic Barriers: These can be seen at some parts of the main road although it is not continuous.

### Landscape features important for animal migration

Both the migration zone and the conflict zone connect the two habitat patches which are forested vegetation. The road running through the migration zone is single lane and a fence made out of wood runs along this road. There is land that is used for agriculture and a building is also present which can be an industrial building.

### Field report – animal tracks

Migration zone has been identified and the area stretches to the southeast along the Sajó River.

**Overall rating of permeability for large mammals:** C2 middle impermeable

### Land use plan

There are currently no changes planned.

### Summary

The “Dubicsány” conflict zone is located in the northern part of the Bükk National Park. The conflict zone which have been identified is particularly in close contact with agriculture/pasture lands, where constant human activities may happen including increased noise from machinery. There are a number of barriers present which may influence the migration of mammals within the conflict zone, however the migration zone can create a safe passage for them.

## 6. Nearby village - Tipászó/ Bekölce (48° 04'46" N, 20° 12'42"E)

### Landscape Characteristics

This is mostly a mountainous area with forested vegetation. The main road meanders throughout this conflict zone, therefore there are multiple traffic barriers which animals will get in contact with and try to get through in order to get from one point to another. There are two creeks which can be seen, this is the Leleszi Patak and the Hodos Patak this will attract many animals to this area.

### Dispersal Barrier

- Road: The main road running through the critical zone is Road 25. Dirt road may also be seen branching off from the main road which goes well into the forested area.
- Settlement: Small settlement can be seen, these properties are fenced in.
- Traffic Barrier: Barriers made out of steel material run along the main road this will decrease the speed of cars as this road is not straight, but consists of many turns and corners.

### Landscape features important for animal migration

On both sides of the main road there are two large forested areas, the two creeks running through the valley will attract mammals and will help them move through this area. We detected moderate movements close to Tipászó by camera traps. There aren't any considerable natural barrier effects right here, though the road becomes steep and full of bends, the edge is very steep fenced with protector fences and bars higher on the road nr. 25, that all together make the area hard to cross or even impermeable for the animals.

### Field report – animal tracks

No migration zone has been identified within this conflict zone.

**Overall rating of permeability for large mammals:** C2 middle impermeable

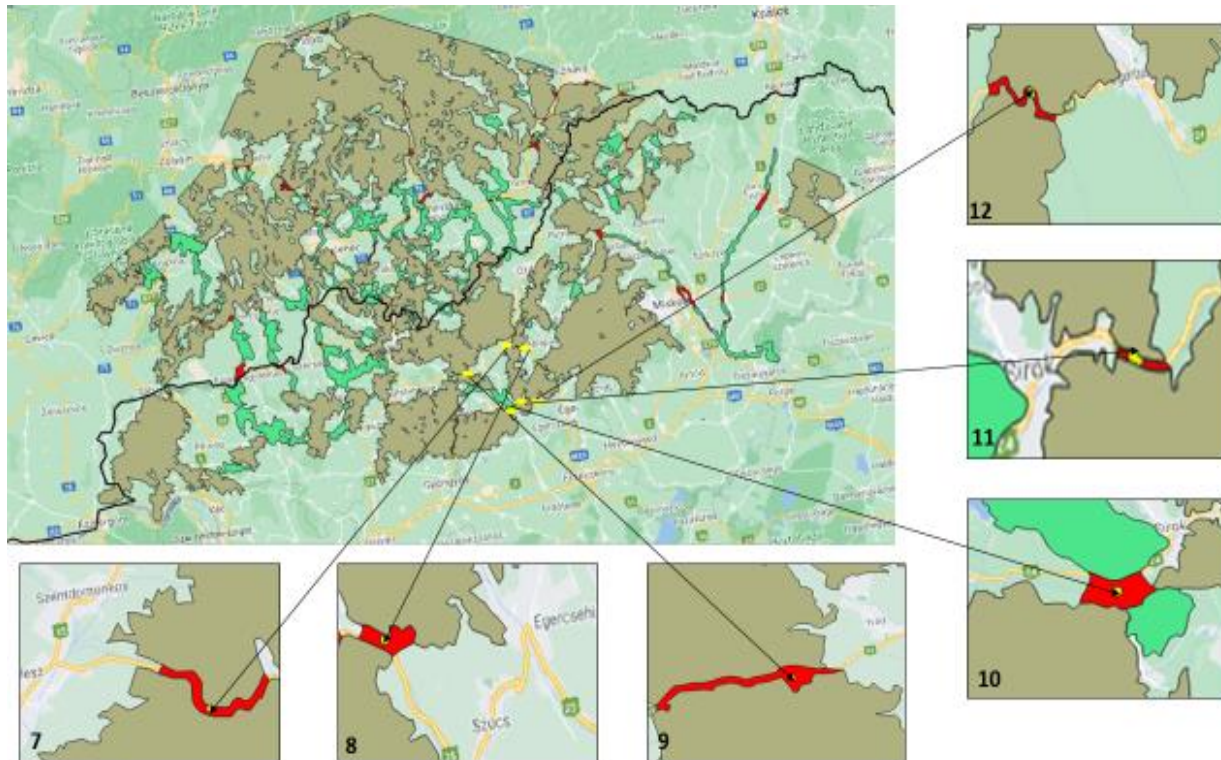
### Land use plan

There are no changes in infrastructure planned within this conflict zone.

### Summary

The "Tipászó" critical zone can be found in the western side of the Bükk National Park and from this location the Mátra Protected zone can be reached as there is a continuous habitat patch allowing small and large carnivores to migrate from one site to another. There has not been a specific migration zone indicated within the conflict zone but the two rivers flowing through the area may suggest possible migrating paths.

## CRITICAL ZONES 7 to 12



Cards of Critical Zones

### 7. Nearby village - Szentdomonkos (48° 03'30" N, 20° 12'27"E)

#### Landscape Characteristics

This area consists of forested hills and open spaces. A distributary channel also runs for a section of the conflict zone. This distributary is part of the Leleszi Patak. Agriculture land is present closer to the nearby settlement.

#### Dispersal Barrier

- Road: The main road within this conflict area is Road 25. Narrower dirt roads also open from the main road.
- Traffic Barrier: A wire fence can be found along the main road, it is not made out of strong material but can still affect animal migration. Metal or steel barriers can also be seen mostly in curves.

#### Landscape features important for animal migration

On both sides of the main road there are two forested areas, the only creek running at a small portion of the conflict zone may attract mammals to drink.

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**Field report – animal tracks**

No migration zone has been identified within this conflict zone.

**Overall rating of permeability for large mammals:** C2 middle impermeable

**Land use plan**

Currently no plans are in place to implement new infrastructure or change the already existing one.

**Summary**

The “Szentdomonkos” critical zone is located on the west of the Bükk National Park and northeast of the Mátra mountains. There are not too many barriers found within the critical zone, but the ones which are present may impact animal activity and migration. Although the nearby settlement is not in close contact with this area it could create a conflict as the main road is heavily trafficked since it is taken to reach the Bükk and one of the bigger cities, Eger.

**8. Nearby Village - Szúcs Bányatelep (48° 03'23" N, 20° 13'42"E)****Landscape Characteristics**

This area consists of vegetated hill and flat green open space, with potential agriculture lands. The area is not densely forested, only a very limited small patch can be seen. The stream Laskó flows through this conflict area which may attract mammals to this area.

**Dispersal Barrier**

- Road: The main road within this conflict zone is Road 25, with narrow dirt road branching off from the main road. A bus stop is also seen along this road.
- Settlement: The properties within the small community which is part of this zone are fenced in. The small community is not directly beside the main road but a dirt road leads to it. Closer to the forested area.

**Landscape features important for animal migration:**

Two forested areas can be seen on both sides of the road. And there are two conflict zones that are in contact with the habitat zones.

**Field report – animal tracks**

No migration zone has been identified within this conflict zone. But we registered signs of active wild movements over the on-the-spot field visit in the last monitoring period of the project implementation. The presence of wolves was registered.

**Overall rating of permeability for large mammals:** C2 middle impermeable

**Land use plan**

No changes are currently planned.

## Summary

The land of the critical zone, “Szúcs Bányatelep” has been deforested and it is now used for agriculture. Although the inhabitants of this area are very low due to past economic situations therefore human activities may not be a primary barrier of this zone, but the main road taken through this area is popular. A small branch of Laskó stream originates at the northern end of this valley and road barriers are not as common in this area as the land is flat and the main road is straight.

## 9. Nearby Village - Ivád (48° 00'55" N, 20° 03'31"E)

### Landscape Characteristics

The area is vegetated with some open green spaces, along the main road there are constant patches of vegetation present which allows animals to migrate through the area without being seen. At this portion of the area there is a continuous road barrier. There are a few pasture lands along the main road as well. The Tó-Patak and Balla Stream flows within this conflict zone.

### Dispersal Barrier

- Road: The main road within this conflict zone is Road 23 this is a two lane road and it is highly used, there are a number of dirt roads branching off which leads to an open space which may be used for agriculture. There is a private area with a gate that can be seen from the main road, this is covered by wire fencing.
- Road Barrier: Steel barrier is seen along the main road by the curves; it is not continuous for a long distance, but could affect the mammals crossing at this portion while decreasing car speed.

### Landscape features important for animal migration

The two forested areas are present on both sides of the road, the northern habitat patch is part of the Mátra Mountain and extends in a continuous patch all the way to the Bükk National Park. The two small creeks may attract small and large mammals and can help guide them along this zone.

### Field report – animal tracks

No migration zone has been identified within this conflict zone. But we registered active animal movements nearby over an additional field visit, even a non-official data provider registered signs of the presence of wolves, out of the project implementation period. On the Eastern side of the spot, at Pétervására we detected significant animal movements by camera traps. Some segments of the road are easily permeable, but in some sections there are bars next to the road that make the place impermeable.

**Overall rating of permeability for large mammals: C2 middle impermeable**

### Land use plan

There are no changes planned within this conflict zone and the near habitat patches as well, therefore no disruptions will be created.

### Summary

The critical zone of "Ivád" is located in Heves country and it is close to the Mátra Mountains and there is not a close human settlement at this zone, but the main road is taken frequently as it offers a scenic route. Some road barriers are seen in this conflict area and no migration zone has been identified.

## 10. Nearby Village - Felső Sirok (47° 55'22" N, 20° 11'07"E)

### Landscape Characteristics

This area has multiple agricultural properties however the sections are divided by denser vegetation and dirt roads which may be used by heavy machinery. There is a main road and multiple side roads within this area, but another transportation infrastructure that intercepts the conflict zone is a railway. The Paradi Tarna River flows through both the conflict and migration zone.

### Dispersal Barrier

- Road: The main transportation infrastructure in this conflict area is Road 24. With other side roads and dirt roads
- Railway: A single railway runs through a part of the conflict zone then enters the migration zone and the edge of one of the habitat patches. Wolf footprints were registered on the rail line in the last monitoring period.
- Road Barrier: The barrier is made out of steel material on one side of the main road as there are steep drops in some sections of the conflict zone.

### Landscape features important for animal migration

The migration zone and habitat patches connected to this conflict zone provide multiple creeks, rivers and smaller lakes which will attract mammals, however this could also mean more human disturbances within these areas.

### Field report – animal tracks

There have been two migration zones identified that are connected to the conflict zone which allows easy transition. Extreme frequency of wild movements is typical on the spot, due to the largely dense population living in the forest nearby, obviously attracting carnivores. The presence of large carnivores is considered to be proven, according to on-the-spot tracking and non-official registrations of signs of their life.

**Overall rating of permeability for large mammals: C2 middle impermeable**

### Land use plan

Currently no plans are in place to change or create new transportation infrastructure.

### Summary

The “Felső Sirok” conflict zone is situated near Eger in the Mátra Mountains. There are many ancient ruins bringing many visitors to this natural area which may create conflict between human activities and animal movement. The Siroki Nyírjes Lake Nature Reserve is also located in this zone and consists of trails which can be explored and it is open to the public. One of the larger habitat patches is part of the Mátra Protection Area.

## 11. Nearby Village - Sirok (47° 55'55" N, 20° 12'43"E)

### Landscape Characteristics

The conflict zone is relatively narrow and it covers the area strictly beside the main road, but it is densely vegetated and flat. There is no steep drop beside the main road and the Kigyos Patak flows near this area and into the habitat patches.

### Dispersal Barrier

- Road: The main road in this conflict zone is Road 24 (Széchenyi István Way), with dirt roads leading into the forested area.
- Road Barrier: Barrier made out of steel runs along one side of the road where there are turns which may cause danger to vehicles.

### Landscape features important for animal migration

On either sides of the main road, two large forested areas can be found and the only creek running through may attract mammals and help them move along the creek.

### Field report – animal tracks

There has not been a migration zone identified connected to this conflict area. Though wildlife movements are very common. The presence of large carnivores is considered to be proven, according to on-the-spot tracking and non-official registrations of signs of their life.

**Overall rating of permeability for large mammals:** C2 middle impermeable

### Land use plan

Although there are plans in place for the main road, it looks like it has been finished.

### Summary

The “Sirok” critical zone is close to human settlement and a number of activities are present in this area posing threat to wildlife. However the densely forested habitat patches allow mammals migrating through the area to be in cover.

## 12. Nearby Village - Egerbakta (47° 55'57" N, 20° 17'01"E)

### Landscape Characteristics

Forested vegetation of hills/mountains with some open green spaces. Pasture lands are also present; they are fenced in with material made out of wire. These pasture lands can be accessed from the side roads and these areas are looked after by humans while some open spaces in the area represent a more grassland look. There is also one large area used for agriculture. The Kigyos Patak and the Szoláti Patak flows within this area.

### Dispersal Barrier

- Road: The main road along this conflict zone is Road 24, from the main road there are dirt roads available to enter the forested areas.
- Road Barrier: Seen during sharp turns there are also signs displayed before the corners to slow down and let the drivers know.

### Landscape features important for animal migration

There are two large habitat areas on either side of the road and these habitat areas connect to both migration zones and another conflict zone. There are multiple creeks and smaller water tributaries present within the habitat patches which will attract many species and guide them to other habitat areas.

### Field report – animal tracks

No migration zone has been identified near this conflict area.

**Overall rating of permeability for large mammals:** C2 middle impermeable

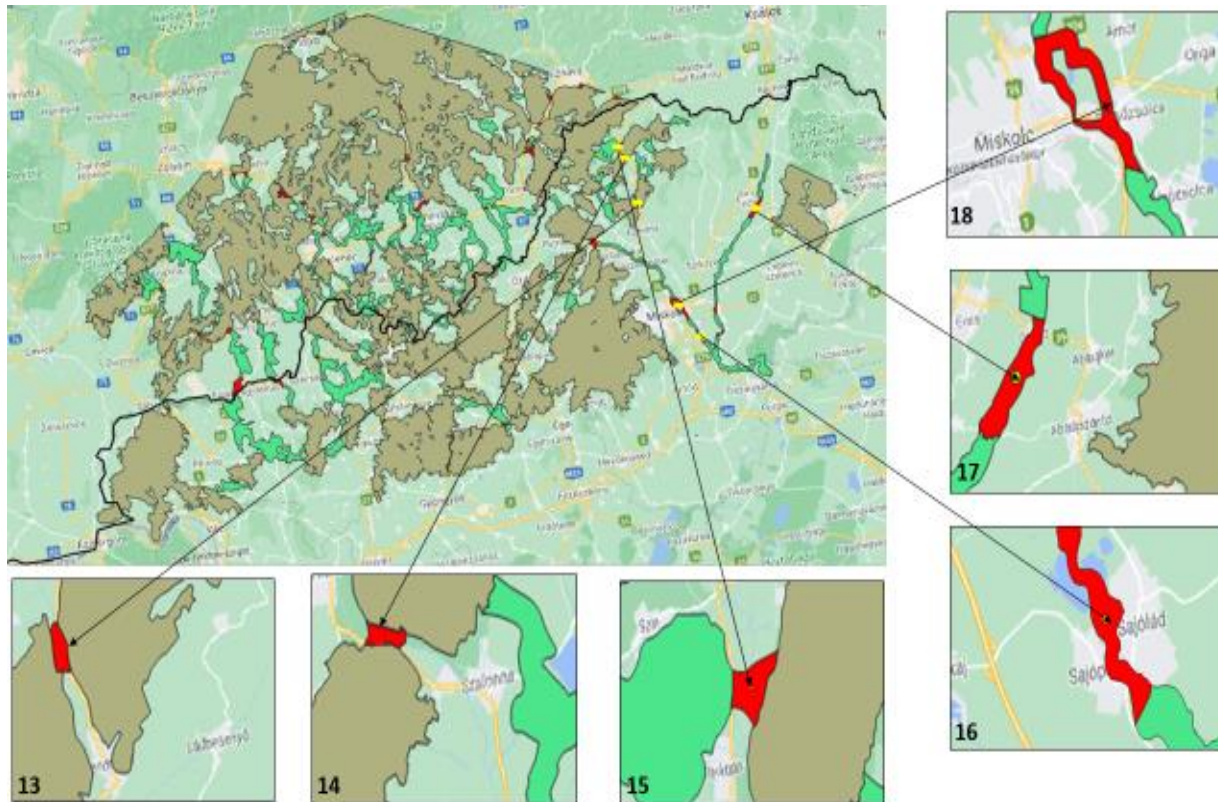
### Land use plan

No changes in place.

### Summary

The “Egerbakta” conflict zone is situated on the southwest side of the Bükk National Park, and there is no settlement found in this area therefore the main human activity is created by the movement on the road which goes straight through the conflict zone.

## CRITICAL ZONES 13 to 18



Cards of Critical Zones:

### 13. Nearby Village - Szendrőlád (48° 20'58" N, 20° 44'15" E)

#### Landscape Characteristics

Forested landscape with both mountains and flat area, some agriculture land right by the main road as well. These areas are not fenced in and freely accessible to wildlife to move through. Another transportation infrastructure (railway) is present in this zone. Between the main road and the railway, River Bódva flows through.

#### Dispersal Barrier

- Road: The main road in this area is Road 27. An unpaved side road is present that allows access to the forested area.
- Road Barrier: Barriers made out of steel are present along sections of the main road, especially in areas where there is a steeper drop beside the road.

- Railway: A single railway goes through this area and it also runs right by the edge of the habitat patch, railway stops are also present one close to the conflict zone and another by the habitat patch.

#### **Landscape features important for animal migration**

On both sides of the main road a medium size habitat patch is present, from these habitat areas there is migration zone which leads to the Aggtelek National Park. The only river running through this area may attract smaller mammals.

#### **Field report – animal tracks**

Migration zone has not been reported at this conflict zone.

**Overall rating of permeability for large mammals:** C2 middle impermeable

#### **Land use plan**

No plans in place to make changes surrounding this area.

#### **Summary**

The “Szendrőlád” critical zone can be found on the northern part of the Bükk National Park. In order to transition from one habitat to another both the railway and the main road may cause conflict as there is no designated area created or available for wildlife.

### **14. Nearby Village - Szalonna (48° 27'01" N, 20° 44'01" E)**

#### **Landscape Characteristics**

Forested vegetation both mountains and flat areas exist within and the surrounding of this conflict zone. A 2 lane main road and a railway is present as infrastructure. The landscape of one side of the road is flat while the other is a steep hill. In terms of water source, River Bódva flows through.

#### **Dispersal Barrier**

- Road: The main road dividing the two habitat patches is Road 27.
- Railway: A single way railroad is present and at the section of the conflict zone a small underpass is created by the tracks.
- Bike Lane: Bike lane is present and created by the nation this is found right beside the main road and along the habitat patch.
- Road barriers: A relatively low in height barrier (material is steel) is present in the conflict zone. These barriers are not continuous in a long distance but rather short.

#### **Landscape features important for animal migration**

On both sides of the road there are two forested areas, the creek running through the area may attract wildlife to drink and move along the creek.

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### Field report – animal tracks

No migration zone was reported at the conflict zone but wildlife may migrate through this to reach the Aggtelek National Park.

**Overall rating of permeability for large mammals:** C2 middle impermeable

### Land use plan

No plans in effect to change or create new infrastructure in the area.

### Summary

The “Szalonna” conflict zone is found northeast of the Bükk National Park and southeast of the Aggtelek National Park. In order to move from one habitat patch to another there are a number of barriers present for the small and large mammals which may create danger to them. As one side of the main road is a steep hill, animals may slip and slide right on the road. Creating a barrier along this side of the road can decrease the danger for both the driver and wildlife.

## 15. Nearby Village - Perkupa (48° 28'44" N, 20° 41'31" E)

### Landscape Characteristics

The conflict zone is a flat area with some agricultural land beside the main road. However both the migration and habitat patch zones are densely vegetated mountainous areas. River Bódva flows through with a distributary of Jósva creek flowing in this area.

### Dispersal Barrier:

- Road: There are two roads within this conflict zone, Road 27 and Road 26116 this is a one lane street and it may not be as busy as the main road, but this is still considered a designated road and can be used by vehicles.
- Railway: A single lane railway is present which goes straight through the conflict area.
- Bike lane: A designated bike lane is present right beside Road 27
- Settlement: Small areas of communities are present this includes industrial buildings and these properties are fenced in. right beside the property are windmills as well.
- Road barrier: The barrier is seen along Road 27 only at one section where the train tracks are closer to the main road. This barrier is made out of steel.

### Landscape features important for animal migration

On one side of the conflict zone the habitat patch can be found where the other side of the road is the migration zone which connects to another habitat patch which is the Aggtelek National Park.

### Field report – animal tracks

Migration zone has been identified beside the conflict zone, this may be frequently used by mammals as this helps them move from one large habitat to the next.

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**Overall rating of permeability for large mammals: C2 middle impermeable**

#### **Land use plan**

There are no changes planned within this conflict and migration zone and the near habitat patches as well, therefore no disruptions will be created.

#### **Summary**

The “Perkupa” conflict zone is found northeast of the Bükk National Park and southeast of the Aggtelek National Park. This is an important area as both small and large animals will migrate through to reach the habitat patches. There are a number of barriers present within this zone.

### **16. Nearby Village - Sajólád/Sajópeti (48° 01'39" N, 20° 53'50" E)**

#### **Landscape Characteristics**

It is a flat landscape with many agriculture and pasture lands. The Sajó River flows through this area and there are patches of vegetation only along the river. The Sajópetri Mining Lake is here and it can be used for fishing, the surrounding area of the lake consists of many human activities.

#### **Dispersal Barrier**

- Road: The main road is Road 3606, this is a high traffic zone because it allows access to the highway which runs parallel to this road. The main road also goes over the river creating a bridge. This road is also taken to go reach the nearby big city (Miskolc).
- Settlement: 2 smaller communities are present beside the conflict zone and other individual industrial buildings can also be found mainly by agricultural fields.
- Road Barrier: There is a continuous barrier present only at a section of the conflict zone; this area is where the bridge and where the road branches off to access the highway.
- Bike Lane: A bike lane is present along the main road and beside the river, however this could also be used for walking purposes.

#### **Landscape features important for animal migration**

There are no habitat patches present, but the river which flows through the conflict zone and the migration zone creates a route for mammals to migrate and guide them this allows them to reach the habitat patch that is located to the northeast.

#### **Field report – animal tracks**

Migration zone has been identified on both ends of the conflict zone, smaller mammals may pass through this area and use the river as a resting place.

**Overall rating of permeability for large mammals: C2 middle impermeable**

### Land use plan

No plans in place for changes in infrastructure within and the surroundings area of this conflict zone

### Summary

The “Sajopetri” conflict zone is located to the west of the Bükk National Park and it is in close distance to Miskolc. This area is high in traffic and human activities as there are many industrial and manufacturing structures/buildings present, some areas may be fenced in but other are freely accessible. Within this area agriculture is also present where heavy and loud machinery may go through the fields and roads.

## 17. Nearby Village - Hernádbúd (48° 17'43" N, 21° 08'09"E)

### Landscape Characteristics

This area is flat with both patches of vegetation and agriculture fields. Vegetated hills are present as well. The Hernád River flows through this conflict zone.

### Dispersal Barrier

- Road: The main road which crosses this area vertically is Road 3707. Side roads are also present in areas where there are residential houses. The road which goes through the settlements are relatively narrow and they are one lane. Another major road runs horizontally which is Road 39.
- Settlement: Multiple small communities are present along the conflict area, these are Pere, Hernádbúd and Gibárt. The properties in these communities are fenced in.
- Road barrier: barrier is present near another water source which can be found on the way of Hernádbúd. Many of the areas do have some type of barrier made out of not too strong materials (wire, wood).

### Landscape features important for animal migration

The river presents a clear route for migration, although there is a habitat patch present to the west of this conflict zone there is no safe passage or migration zone to this area.

### Field report – animal tracks

Migration zones have been identified at each end of the conflict zone, this area may be used by small mammals.

**Overall rating of permeability for large mammals:** C2 middle impermeable

### Land use plan

There is a planned construction of a road in place at one of the communities within the conflict zone, this planned main road will go through the community of Pere.

### Summary

The “Hernádbúd” conflict zone is located northeast of the Bükk National Park and southeast of the Aggtelek National Park. Since there are many communities along the conflict area there may be constant movement of cars this can create danger to the species in this area. At some parts of the communities streetlights can be seen these may also cause a distraction to the wildlife in these areas. Creating a designated area along the river can help mammals migrate safely in this zone.

## 18. Nearby Town - Felsőzsolca (48° 05'41" N, 20° 51'28"E)

### Landscape Characteristics

The area is flat, vegetation is present in some areas these are continuous and in some they are more scattered. The area is highly dense with transportation infrastructure including roads and railways as well. Many towns are present with differing population size. The main water sources are Sajó River and Csorba Lake. There are agriculture fields primarily beside the main roads and near the lake.

### Dispersal Barrier

- Road: The main highways in the area are M71, M3, however other main roads, side roads and dirt roads are also present.
- Railway: Multitrack railway is at the edge of the conflict zone which then continues in the direction of Miskolc, multiple train stops as well.
- Settlement: Many villages and towns are present but also industrial and commercial properties can be found.
- Road Barrier: The roads within the conflict zone have traffic barriers along, this is continuously made out of steel material.

### Landscape features important for animal migration

The river provides a safe route for animals to migrate through also the vegetation by the river side is more dense this can also be beneficial.

### Field report – animal tracks

Migration zone has been identified however no habitat patches are connected to these areas.

**Overall rating of permeability for large mammals: C2 middle impermeable**

### Land use plan

There are plans in place to build an extension of the main highway northeast from the conflict area.

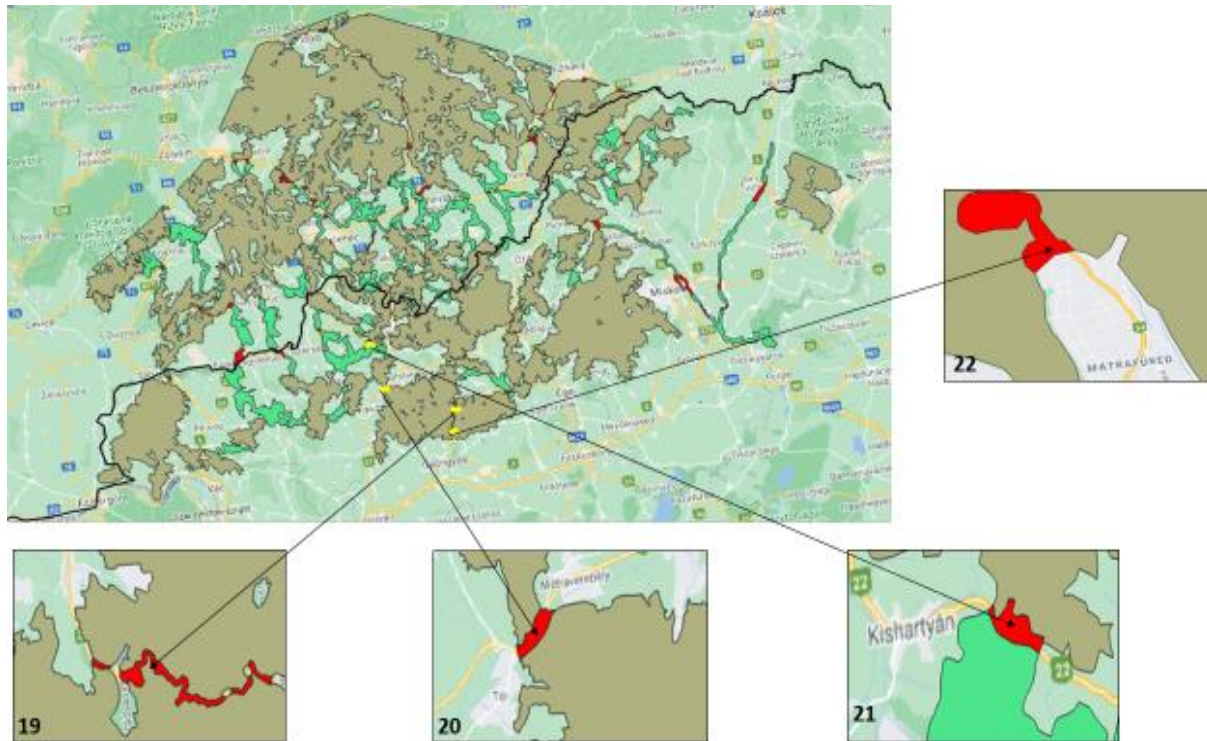
### Summary

The “Felsőzsolca” conflict area is located east of the Bükk National Park and this conflict area is

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in close proximity to Miskolc. There is a lot of transportation infrastructure and the roads can be congested with traffic. Since the conflict zone branches into two directions one towards the river while the other is by the highway it would be important to divert the animals toward the river.

## CRITICAL ZONES 19 to 22



Cards of Critical Zones:

### 19. Nearby Village - Parádsasvár (47° 54'43" N, 19° 59'24"E)

#### Landscape Characteristics

Mountainous landscape with dense vegetation throughout the zone. The Köszörű Stream flows parallel to the conflict area, and a distributary of the Parádi-Tarna Stream also flows close vicinity to the conflict area.

#### Dispersal Barrier

- Road: The main road in this conflict area is Road 24, few dirt roads open up from the main road and they lead to a parking lot or rest stop.
- Road Barrier: Along the main road barriers are implemented as this zone is in high elevation and it is a meandering road, this may decrease the speed of the cars.
- Settlement: A small village is in the area, but there are a number of parking areas, rest spots and restaurants are along the main road

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### **Landscape features important for animal migration**

On both sides of the road there are two large forested areas, many small streams and creeks are found which may attract wildlife.

### **Field report – animal tracks**

There is no migration zone identified in the area, but these habitat patches may be suitable for both large and small mammals.

**Overall rating of permeability for large mammals:** C2 middle impermeable

### **Land use plan**

No changes to the transportation infrastructure in place

### **Summary**

The “Parádsasvár” conflict zone is located in the Mátra Mountains. This area has a diverse vegetation and therefore it provides habitat for a number of species. The main road is highly used by locals and visitors and the conflict zone extends well to the north along the two habitat patches.

## **20. Nearby City - Mátraverebély (47° 58'14" N, 19° 46'03"E)**

### **Landscape Characteristics**

The area includes both flat and mountainous areas which are mostly covered by vegetation. River Zagyva flows through the conflict zone and the habitat patch. The vegetation has been cleared where there is current construction taking place.

### **Dispersal Barrier**

- Road: The main road is a multilane highway this is M21, another road branches off from the highway which is a two lane road and it runs parallel to the main road. From this road other dirt roads lead into the forested area.
- Road Barrier: This is seen along the main highway on each side but there is also a divider barrier between the lanes. The material along the side of the road is made out of wood and wire at some parts while at other areas the material is steel.

### **Landscape features important for animal migration**

On each side of the main road two large habitat areas are present. There is a green bridge that goes over the highway that allows migration of wildlife from one patch to another.

### **Field report – animal tracks**

Migration zone has not been identified.

**Overall rating of permeability for large mammals:** C2 middle impermeable

### **Land use plan**

There are currently plans in place and construction of the main road is undertaking within the conflict area.

### **Summary**

The “Mátraverebély” conflict zone is located in the Mátra Mountains and this area is currently under development, which may cause disturbance to the wildlife in the area, such as noise disturbance and increase human activities. However the green bridge may provide some relief and safety to these animals in the area and the river can help them move along without getting in contact with humans.

## **21. Nearby Village - Kishartyán (48° 04'51" N, 19° 43'32"E)**

### **Landscape Characteristics**

Vegetated hills, flat areas can be seen beside the main road. The Ménes Creek flows through the conflict area.

### **Dispersal Barrier**

- Road: The main road in the conflict area is Road 22, this is a two lane road.
- Road Barriers: Only present at one section of the main road in a short distance.

### **Landscape features important for animal migration**

On one side of the main road there is a habitat patch while on the other side a migration zone is present.

### **Field report – animal tracks**

There are many migration zones identified around the area.

**Overall rating of permeability for large mammals:** C2 middle impermeable

### **Land use plan**

No plans in effect to change or create new infrastructure in the area.

### **Summary**

The “Kishartyán” conflict zone is located northwest of the Mátra Mountains. There are many hiking trails and other recreational activities open to the public as this zone is part of the Sósartyáni Hencse Mountain Nature Reserve.

## **22. Nearby Village - Mátrafüred (47° 50'07" N, 19° 57'51"E)**

### **Landscape Characteristics**

Densely vegetated mountainous area, one road intersects the conflict area. The closest water source is Sástó which is located closer to one of the habitat patches.

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### Dispersal Barrier

- Road: It is a two lane road, Road 24. Narrow side roads also open up from the main road going into the forested area.
- Road Barrier: Steel barriers can be seen along some parts of the main road.
- Settlement: Two small communities surround the conflict area, where restaurants, gift shops and other small stores are here. Resting spots and wood cabins can be found in the forested area.

### Landscape features important for animal migration

Two large habitat patches are present on each side of the main road; these habitat patches have small creeks and streams which may help guide mammals moving through the area. Along the main road there are multiple conflict zones as well.

### Field report – animal tracks

No migration zone has been detected.

**Overall rating of permeability for large mammals:** C2 middle impermeable

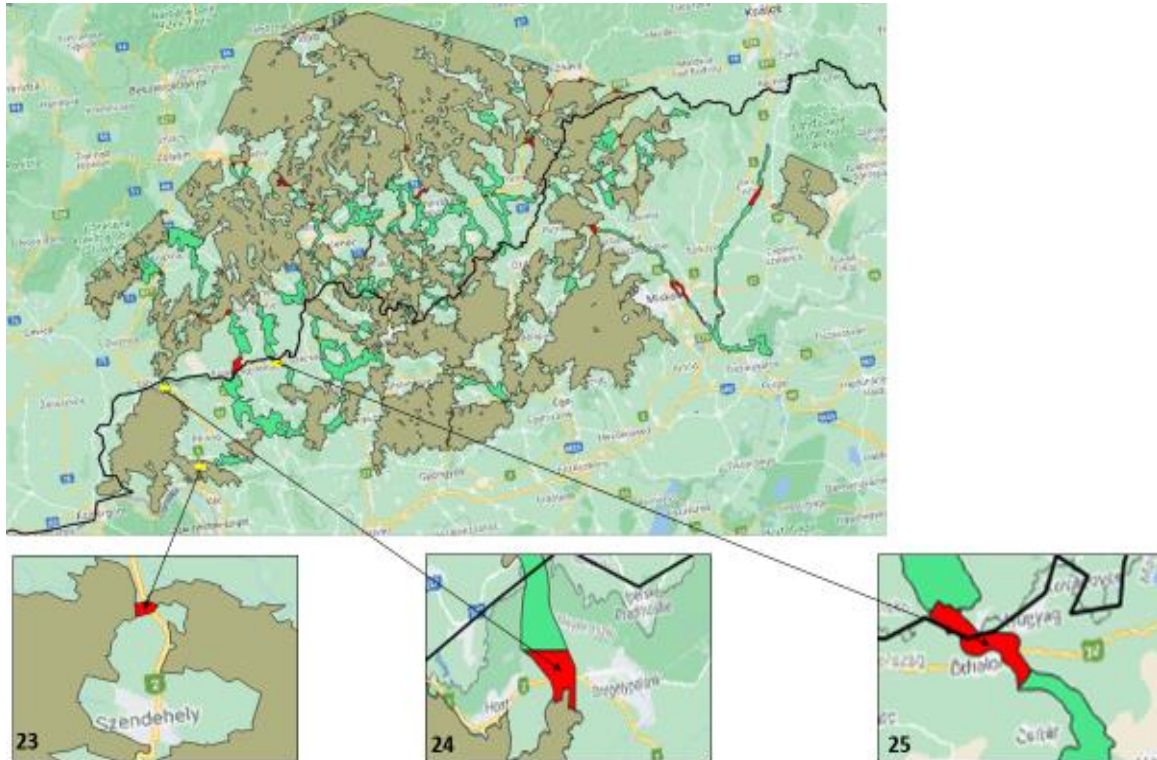
### Land use plan

There are no plans in place to change the transportation infrastructure at this conflict zone.

### Summary

The “Mátrafüred” conflict area is located in the southern part of the Mátra Mountains and the nearest city is Gyöngyös. This zone is highly visited and many recreational and leisure activities are available. Due to this wildlife may be disturbed and create conflict when migrating.

## CRITICAL ZONES 23 to 25



Cards of Critical Zones:

### 23. Nearby Village - Szendehely (47° 52'30" N, 19° 06'18"E)

#### Landscape Characteristics

A continuous vegetation patch present along the main road, many agriculture fields therefore this area is flat, but some smaller hills are dispersed throughout. No water source in the conflict zone however in the habitat patch the Hangya Creek flows through

#### Dispersal Barrier

- Road: The main road in the conflict zone is E77, this is a 3 lane road.

#### Landscape features important for animal migration

On either sides of the main road, two large forested areas can be found

#### Field report – animal tracks

No migration zone in the area

**Overall rating of permeability for large mammals C1 critical impermeability**

### Land use plan

There are currently plans in place to create highway in this area.

### Summary

The “Szendehely” conflict zone is located in the Nógrád County, it is the furthest zone in the west from the study area. The only barrier present is the main road, and there is no designated area for wildlife to migrate and animal crossing signage is also very limited.

## 24. Nearby Village - Drégelypalánk (48° 03'08" N, 19° 01'33"E)

### Landscape Characteristics

Flat landscape with grassland and agriculture land on the sides of the main road. Some densely vegetated areas also exist within this conflict zone. Csítár Creek flows in the conflict zone, but in the migration zone which extends over the border of Slovakia River Ipoly flows. Both the migration and habitat zone consists of vegetated hills/mountains.

### Dispersal Barriers

- Road: The main road in the conflict zone is Road 2
- Bike Lane. Runs parallel to the main road

### Landscape features important for animal migration

One side of the main road is the habitat patch while the other side of the road consists of the migration zone.

### Field report – animal tracks

Migration zone has been identified and this zone stretches over the border into Slovakia

**Overall rating of permeability for large mammals:** C1 critical impermeability

### Land use plan

Plans are in place to build a main road by this conflict area.

### Summary

The “Drégelypalánk” critical zone is located by the North Hungarian Mountain Range (Börzsöny) where Ipoly River flows through. There are multiple hiking locations and since this critical zone is close to the border it is highly visited by both sides. The dense forest provides suitable habitat for mammals and both water sources attract wildlife.

## 25. Nearby Village - Órhalom (48° 04'32" N, 19° 24'51"E)

### Landscape Characteristics

Forested vegetation, large open green spaces, a few hills are also present. The conflict zone has some agricultural lands. Water sources in the area are Ipoly River and Burós Creek

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### **Dispersal Barrier**

- Road: The main road that goes over the conflict area is Road 22. Some side/dirt roads are also present.
- Railway: The one lane railway track goes through the conflict zone

### **Landscape features important for animal migration**

The migration zone is connected to the suitable habitat patch where small creeks and streams are present. The migration zone has a number of agricultural lands but continuous vegetation patches are also present which is suitable for migration.

### **Field report – animal tracks**

Migration zone is present on both ends of the critical zone (One being on the Slovakia side)

**Overall rating of permeability for large mammals:** C1 critical impermeability

### **Land use plan**

There are no plans in place to change or improve the transportation infrastructure in this area.

### **Summary**

The “Órhalom” critical zone is located by the North Hungarian Mountain Range. This critical zone extends over the border into Slovakia which may create increased human activity in the nearby areas. It also creates a connection between the two migration zones.

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## SUMMARY OF MITIGATION MEASURES

Almost all the area is featured by the appearance of signs referring to the - at least scattered - presence of large carnivores, although settled, permanent populations were registered only on a few sites.

Almost all the areas are featured by the feeding of big game populations, and its seasonal change, that can substantially alter the movement as well as daily and seasonally.

Some other typical conflicts are (actually on the territory of the Bükk National Park Directorate)

- The large scale harvesting of non-native spruce plantations for economic mitigation measures, as they are considered “adventitious” nowadays and threatened by the bark beetle.
- Still there are large scale harvesting of native forests, followed by the necessary construction of protecting fences in order to protect the regrowing forestation from the damage of ungulates chewing.
- There are certain obligations for each hunting association - even in protected areas - that require reduction of especially ungulate and boar populations.

These three factors cause significant modifications in large mammals' movement, creating a modified structure of the biome, in space and time .

We provided 3 main type of recommendation which is summerized in the Table 1. Summary chart of mitigation measures

- Habitat preservation/development;
- Infrastructure development/modification;
- Capitalization/awareness rising.

**TABLE 1. SUMMARY CHART OF MITIGATION MEASURES**

Critical Zones/ Recommendation types	Capitalization/awareness rising	Infrastructure development/modification	Habitat preservation/development
<p><b>Szarvaskő</b></p>	<p>Animal crossing signs have been already put on both sides of the road, maintenance and further signs to be built to attract drivers' attention</p> <p>Information signs and "ethical codex" to be made for tourist, on possible occurrence of large carnivores over the nearby busy "Blue-line" international tourist track</p> <p>Info-days to be organized by the National Park Directorates for local people to raise awareness of the possible presence of large carnivores, especially on proper behavior in the presence of these species</p>	<p>The already existing tunnels which were built for the crossing stream under the road, should be reconstructed and enlarged for the appropriate size for big mammals. Minimal installation 5 x 5 m, rectangular, soil grounded</p> <p>Small tunnels should be built further from the creek tunnel</p> <p>Railway bridges should be widened and/or under the main bridge surface a second (under) level should be constructed for smaller animals. The animals should be attracted by the creation of this under level bridge, using natural materials and small native species for covering. Speed limits for trains should be implemented in the area of the bridge. The 2 levels of the bridge should be separated in order to avoid any accidents</p>	

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<p><b>Felnémet</b></p>	<p>Info-days to be organized by the National Park Directorates for local people to raise awareness of the possible presence of large carnivores, especially on proper behavior in the presence of these species</p> <p>Information signs to be made for tourist, on possible occurrence of large carnivores over the nearby “Blue-line” international tourist track</p> <p>Animal crossing signs have been already put on both sides of the road, maintenance and further signs to be built to attract drivers’ attention</p>	<p>Tunnels should be built under the railway and the road for small mammals passing in the area</p>	
<p><b>Dédestapolcsány</b></p>	<p>Information signs to be posted in the recreational areas of the Lakeshore for possible occurrence of large carnivores nearby</p>		<p>Ecological diversification of big arable lands should be done by new hedgerows, tree alleys</p>

<b>Vadna</b>	Animal crossing signs should be implemented and placed on both sides of the road		Narrower eco corridors should be created on the agricultural area  Planting of trees and shrubs along the main road as this is very limited in the area
<b>Dubicsány</b>	Animal crossing signs should be put on both sides of the road, attracting drivers attention	Small tunnels should be built connecting from the main road to the river, creating an underpass by the railway, into the migration zone	
<b>Tipászó</b>	Animal crossing signs are not present, they should be put along the main road, attracting drivers attention and decreasing speed limit	Narrow ditch/corridor could be implemented along one side of the main road to guide the smaller animals	Highly forested area no further tree plantation needed
<b>Szentdomonkos</b>	Animal crossing signs to be placed along the main road to attract drivers attention		Highly forested no further tree or shrub plantation needed
<b>Szúcs Bányatelep</b>	Animal crossing signs to be implemented on both directions of the main road	Corridor to be created along the road connecting it to the river flowing in this area	Ecological diversification of big arable lands should be done by new hedgerows, tree alleys.  Additional shrubs and trees could be planted along the main road

<b>Ivád</b>	Animal crossing signs should be put on both sides of the road, maintenance and further signs to be built to attract drivers' attention		
<b>Felső Sirok</b>	Animal crossing signs to be placed along the road  Further information signs for tourists and visitors to raise awareness of possible mammals migrating in the area	Creating an underpass by the railway to allow mammals to migrate safely in this conflict zone	
<b>Sirok</b>	Animal crossing signs to be placed along the road to attract drivers attention		
<b>Egerbakta</b>	Animal crossing signs should be put on both sides of the road, maintenance and further signs to be built to attract drivers' attention		Highly forested no further tree plantation needed in the area
<b>Szendrőlád</b>	Animal crossing signs should be put on both sides of the road, maintenance and further signs to be built to attract drivers' attention	Smaller tunnels should be built under the main road and railway track.	

<b>Szalonna</b>	Animal crossing signs to be placed along the road to decrease vehicle speed limit	The underpass created at this zone by the railway could be reconstructed for larger mammals passing by can do it safely	Additional trees and shrubs could be planted along/between the main road and the railway as some sections lack this
<b>Perkupa</b>	Animal crossing signs to be placed along the road  Further information signs for tourists and visitors to raise awareness of possible mammals migrating in the area	An underpass is already present in the zone, some adjustments could be made to clear the debris and make it more suitable for mammals to pass	Trees and shrubs to be planted to divide the open agriculture lands with the forested area
<b>Sajólád/ Sajópeti</b>	Animal crossing signs should be put on both sides of the road, maintenance and further signs to be built to attract drivers' attention	Narrow ditch/corridor could be implemented along the side of the main road to guide the smaller animals through the area  Additional barrier could be placed near the industrial site to protect migrating animals from human activity	Eco-corridors should be created on the agricultural areas (e.g. hedgerows, bounds)  Additional trees/ shrubs planted along the main road as some areas lack this landscape feature
<b>Hernádbúd</b>	Animal crossing signs should be implemented and place on both sides of the road to attract drivers attention for animal migration in the area		Wider eco-corridors should be protected and created along the Hernád-river

<p><b>Felsőzsolca</b></p>	<p>Animal crossing signs should be put on both sides of the road, maintenance and further signs to be built to attract drivers' attention as this is a highly trafficked area</p>	<p>Creation of green bridge over the highway will allow larger mammals to pass safely</p> <p>Additional corridors to be put in place to divert animals from the city toward the more natural area</p>	<p>Wider eco-corridors should be protected and created in order to divert the animals toward the river</p>
<p><b>Parádsasvár</b></p>	<p>Animal crossing signs should be put on both sides of the road, maintenance and further signs to be built to attract drivers' attention</p> <p>Information signs and info days to be made for tourists, on possible occurrence of large carnivores over along the tourist tracks</p>	<p>Small corridor can be constructed along one side of the main road to provide a safe passage for small mammals</p>	<p>Highly forested no further tree plantation needed in the area</p>
<p><b>Mátraverebély</b></p>	<p>Animal crossing signs should be implemented and place on both sides of the road to attract drivers attention for possible animals in the area</p>	<p>A green bridge is already present in the area however improvements could be made to increase usage by larger mammals</p> <p>Additional underpass could be created between the two roads creating a path towards the river</p>	

<p><b>Kishartyán</b></p>	<p>Animal crossing signs should be placed on both sides of the road to attract drivers attention</p> <p>Additional signs along the hiking trails should be added</p> <p>Information days/events organized for visitors and tourist regarding the potential animals in the area</p>	<p>An underpass created that goes from the migration zone toward the habitat patch</p>	<p>No further three/shrub plantation is needed in the area</p>
<p><b>Mátrafüred</b></p>	<p>Information signs to be made for tourists, on possible occurrence of large carnivores over along the tourist tracks</p>		
<p><b>Szendehegy</b></p>	<p>Increase animal signage in the area, possibly on both sides of the main road</p>		<p>No further tree plantation is needed in the area</p>
<p><b>Drégelypalánk</b></p>	<p>Information signs to be made for tourists, on possible occurrence of large carnivores (both languages) as many people may cross the border</p> <p>Increase animal signage in the area</p>		<p>Additional trees/shrubs to be planted along the main road to create safety for mammals migrating through the area</p> <p>Ecological diversification of big arable lands should be done by new hedgerows, tree alleys</p>

<p><b>Órhalom</b></p>	<p>Information signs to be made for tourists, on possible occurrence of large carnivores (both languages) as many people may cross the border</p> <p>Increase animal signage in the area</p>		<p>Ecological diversification of big arable lands should be done by new hedgerows, tree alleys</p>
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