Local Cross-Sectoral Operational Plan

Pöttsching (Alpine-Carpathian Corridor)

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

ENVIRONMENT AGENCY AUSTRIA umweltbundesamt
Environment Agency Austria

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SaveGREEN

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

Danube Transnational Programme, DTP3-314-2.3

December 2022


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About SaveGREEN

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

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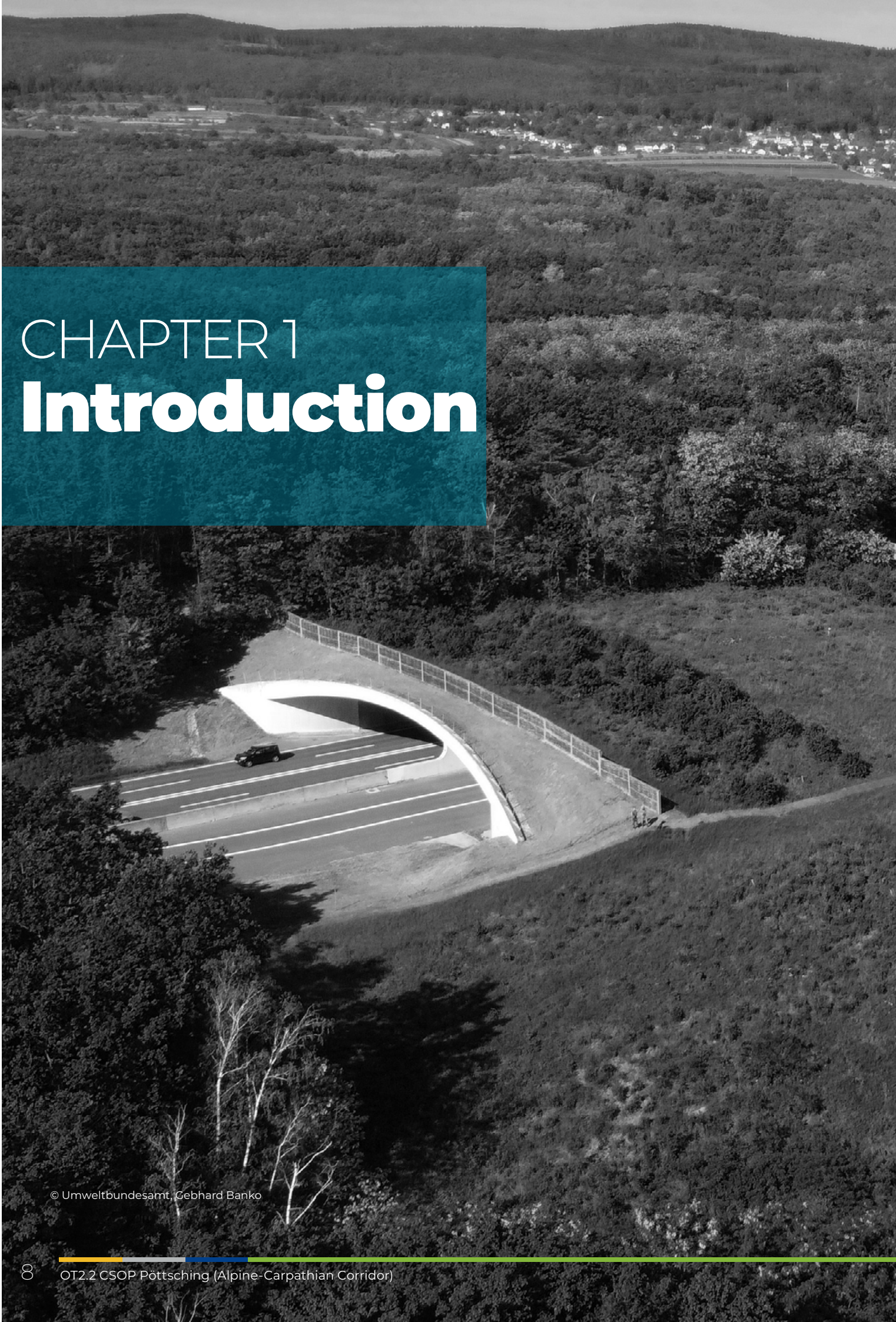
Introduction



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The main objective of the SaveGREEN project was to develop specific solutions and recommendations for future activities in the pilot area to preserve, improve or restore the functionality of key ecological corridors in the Carpathian, Alpine and Bulgarian mountain valleys, where human activities as well as critical points for wildlife migration centralise and thus the potential for conflict is the highest.

As the proposed approach is to foster cross-sectoral and transnational cooperation and building of know-how for integrated planning at landscape level, general pressures or threats to be considered when landscape connectivity is of concern were coupled with connectivity-specific objectives.

By screening each sector of interest, we highlighted the potential sectoral impacts – an important reference for managers to investigate the current or potential problems that need to be addressed by targeted measures. At pilot area level, the experts worked with local stakeholders to identify and prioritise these problems and propose measures to overcome them through particular actions, informed also by the situations in the other pilot areas of the project and by constant collaboration with project partners and external experts.

This common logical framework, which facilitates the logical path from pressures/threats to specific actions, forms the structure of the Cross- Sectoral Operational Plans (CSOPs). It represents the original response of SaveGREEN to threats to connectivity and the basis for implementation of practical measures in the 8 pilot areas of the project.

Working directly with stakeholder groups in the pilot areas and involving them actively, in a participatory manner, in the development of the CSOPs of the pilot areas should create long-lasting ownership of the plans and ease the future implementation.

The CSOPs are addressing the complex issue of landscape connectivity and should be considered a medium to long-term effort. While some of the actions have been (partially) implemented during the SaveGREEN project, most of them need to be implemented in the future. Moreover, constant assessment and adaptation of the actions is needed in order to respond to the dynamic of the multitude of factors affecting the landscapes, as well as to the capacity, resources and available expertise of the stakeholders.

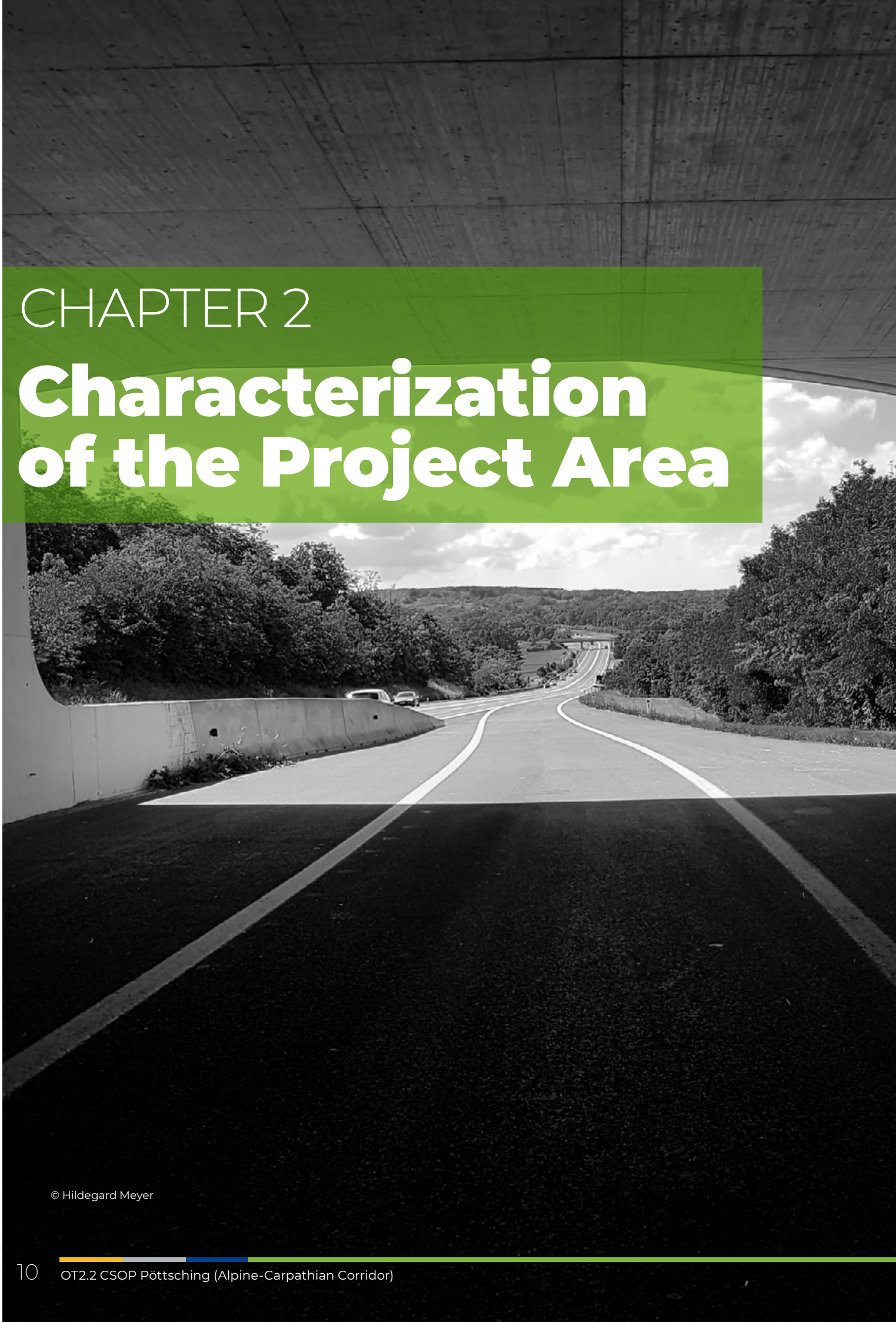
SaveGREEN proposed the CSOPs as an informal tool to foster inter-sectoral cooperation and synchronised particular actions at landscape level, irrespective of the formal agreements.

At the same time, the logical framework of the CSOPs will ensure an easy integration within local/regional sectoral (management) plans while ensuring synergies between them, which is a significant gap at present. Basically, by filtering CSOPs for any of the sectors of interest, one will have available a sectoral action plan for connectivity. Of course, whenever the case, the measures of the CSOPs could be taken on board within protected areas management plans.

By identifying the specific problems and required actions on the ground, CSOPs are valuable instruments to pinpoint potential gaps and shortcomings at the legislative, capacity and funding levels which should support adaptation at national or European level.

CHAPTER 2

Characterization of the Project Area



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The pilot area Pöttsching represents a bottleneck in the real sense of word, constituting a larger open land area between the woodland dominated Leitha Mountains in the north and the Rosalia Mountains in the south. These ranges are offshoots of the Alps and form the most important connection to the Carpathians: the Alpine-Carpathian corridor. Hence, this area is also significantly important on the national and transnational level. The studied bottleneck area is, therefore, of particular importance for wildlife migration and is highly sensitive due to intensive agricultural use, the proximity to the growing metropolitan areas of Wiener Neustadt, Eisenstadt as well as Mattersburg, and in addition the presence of the highway A3 and the expressways S4 and S31. To overcome these high-level roads, two green bridges were established as narrow passages within the area, which is also a bottleneck as a whole (Figure 1). These green bridges are, therefore, particularly critical points for maintaining the corridor connectivity.

2.1 Climate

Located in the border area between the federal states of Lower Austria and Burgenland, the pilot region of Pöttsching is situated at a climatic transition zone and is, thus, characterised by Pannonian as well as continental climate. The average temperatures are between -2 °C and -4 °C in January and about 21 °C in July. With average annual temperatures between

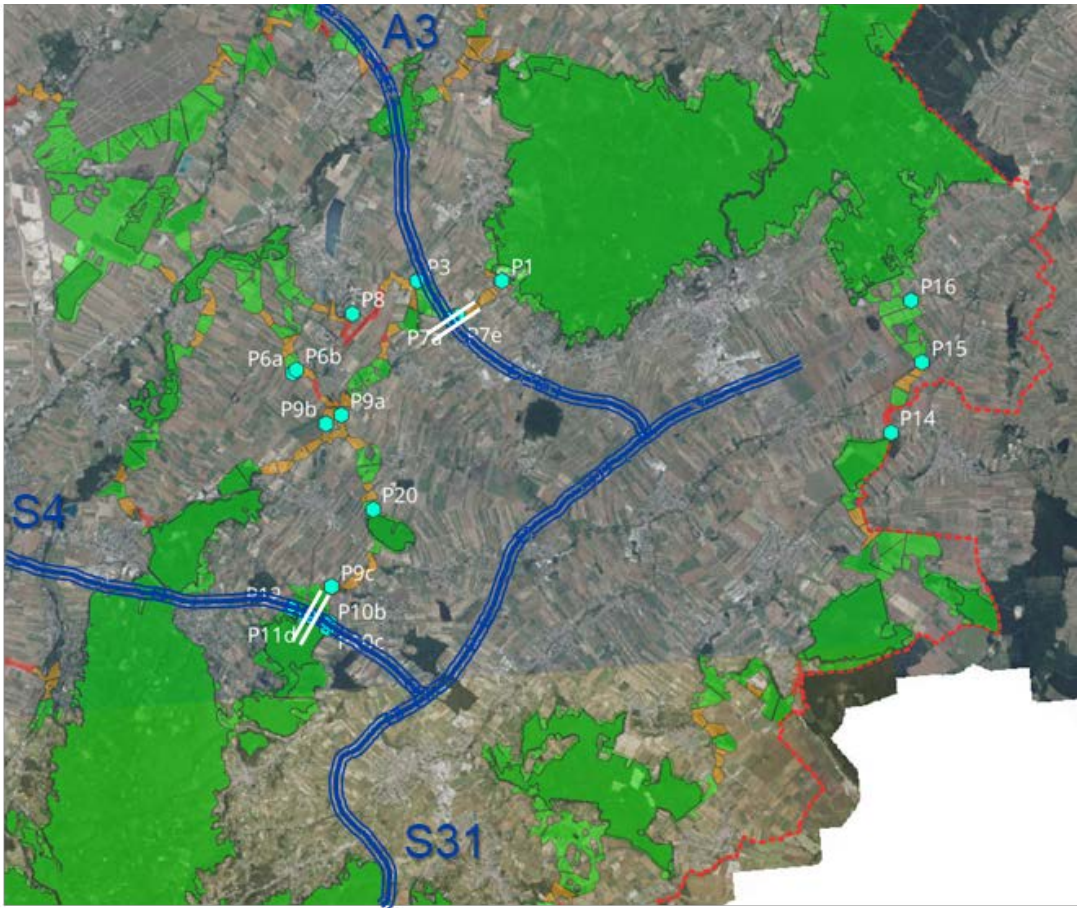


Figure 1 Overview of the pilot area Pöttsching indicating motorways (blue) as well as green bridges (white) © Christoph Plutzar, Environment Agency Austria, based on basemap.at

9 and 10 °C, the climate is relatively mild. The annual average rainfall is about 750 millimetres, which allows for the intensive agricultural use of the area.

2.2 Topography

The morphological depression between the Leitha Mountains in the north and the Rosalia Mountains in the south reveals an area of vast open land. Accordingly, this area was suitable for comprehensive road expansion, offering high-ranking traffic connections between Wiener Neustadt and Mattersburg as well as the Hungarian metropolitan region of Sopron near the border. From a morphological viewpoint, the pilot region is largely located in a flat or undulating hill country consisting of a slightly elevated pre-glacial sedimentary plain, the Zillingdorfer Platte, which forms the watershed between the Leitha and Wulka rivers.

2.3 Geomorphology

The Leitha River dug several metres into the underlying strata during the post-glacial period, creating the Leitha syncline, which was later largely refilled with its own or redeposited older gravels and sands. Together with the Schwarza, it forms the main drainage channel of the Vienna Basin. The tectonic activity is considerable with earthquakes occurring from time to time. The reason for this is the subsidence of the Vienna Basin, which developed in several phases. The area of Pöttsching - Neufeld - Zillingdorf is located in the area of the eastern fault zone at the Vienna Basin eastern edge with several small fault lines crossing the area from southwest to northeast.

Calcareous black soils dominate, which have formed on the young river deposits (gravels, sands, and clay from floodplain). Along the Leitha in the west young gleysoils (groundwater influenced soils) can be found.

2.4 Typical habitats in the Pöttsching Area

According to the EUNIS habitats classification, the relevant classes (and their subclasses) for the Pilot Area Pöttsching include:

I1.1 Intensive unmixed crops

I1 Arable land and market gardens

J2 Low-density buildings

J1 Buildings of cities, towns and villages

J1.2 Residential buildings of villages and urban peripheries

G1 Broadleaved deciduous woodland

G4 Mixed deciduous and coniferous woodland

G3 Coniferous woodland

The dominant CORINE Land Cover (CLC) class in the south and the northeast of the region is composed of forests. With minor patches of pastures and heterogeneous agricultural areas interspersed, arable land dominates the area. Furthermore, the region is characterised by settlement activities, which is reflected in the high percentage and number of patches classified under the CLC as ‘urban fabric’ (Figure 1).

Linear barriers are represented by the motorways S4 and S31 as well as highway A3, though these roads are permeable through various crossing aids, including green bridges as well as over- and underpasses.

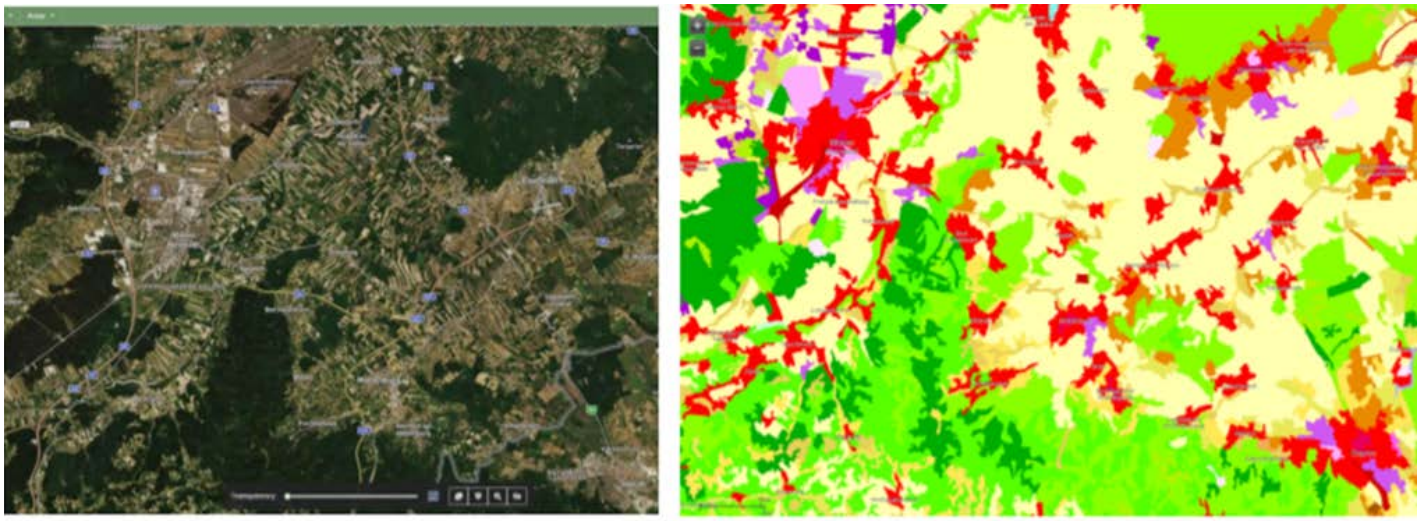


Figure 2 Land use in Pöttsching Area according to CORINE Land Cover datasets © Environment Agency Austria, based on basemap.at and CORINE Land Cover © European Union, Copernicus Land Monitoring Service 2018, European Environment Agency (EEA)

2.5 Typical species in the Pöttsching Area

Large herbivores:

- Red deer (*Cervus elaphus*)
- Wild-boar (*Sus scrofa*)

Medium-sized mammals:

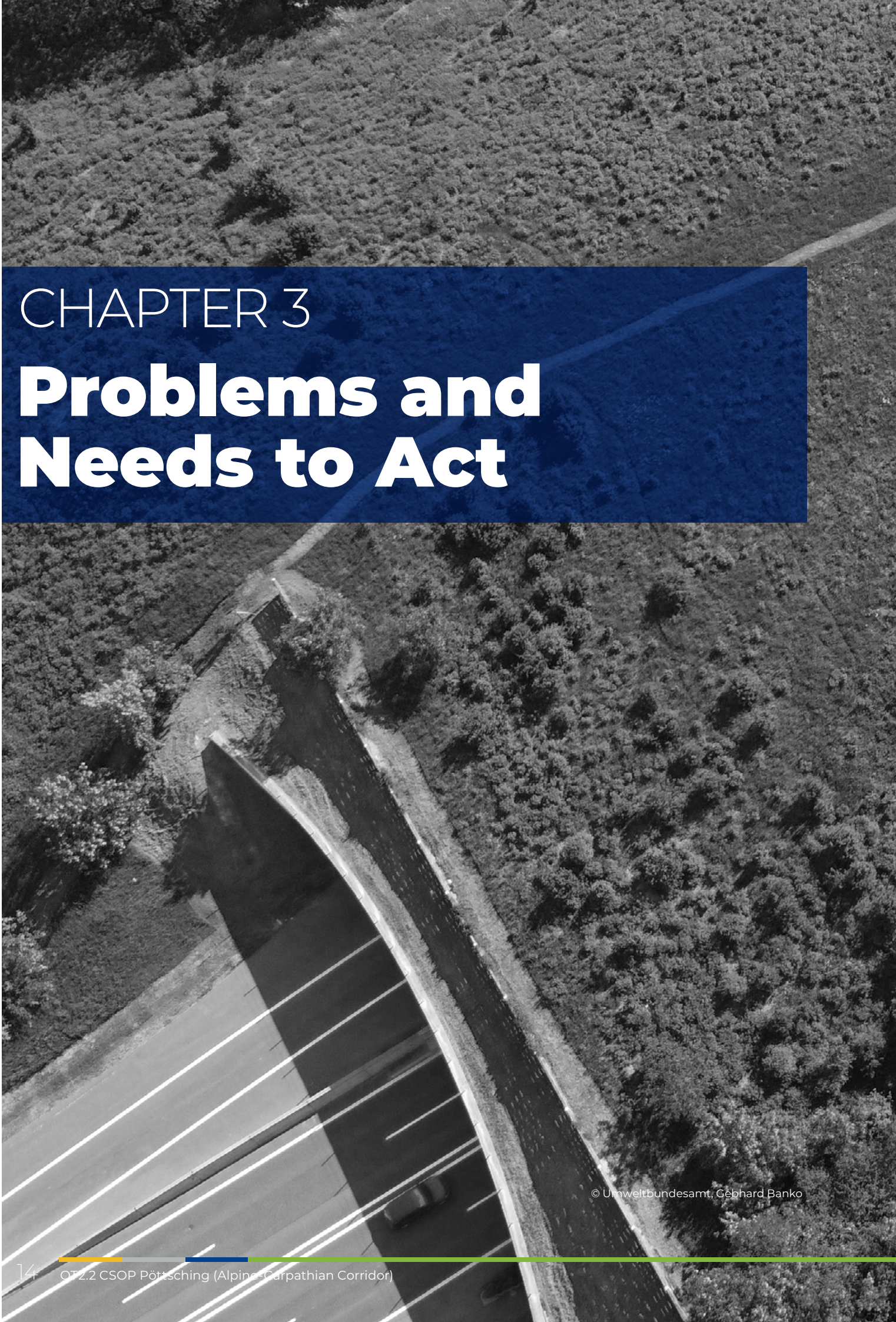
- Roe deer (*Capreolus capreolus*)
- Red fox (*Vulpes vulpes*)
- European otter (*Lutra lutra*)
- Eurasian beaver (*Castor fiber*)
- European badger (*Meles meles*)
- European wildcat (*Felis silvestris*)
- European hare (*Lepus europaeus*)
- Beech marten (*Martes foina*)
- European pine marten (*Martes martes*)

Small-sized mammals:

- Red squirrel (*Sciurus vulgaris*)
- Polecat (*Mustela putorius*)
- Hedgehog (*Erinaceidae*)
- Stoat (*Mustela ermine*)
- Least weasel (*Mustela nivalis*)
- Dormice (*Gliridae*)
- Common vole (*Microtus arvalis*)

CHAPTER 3

Problems and Needs to Act



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Roads, settlements, and other barriers divide the habitats of animals and plants and, thereby reduce their ability to find food, shelter, and mates. Reduced gene flow between populations decreases the overall resilience of the species and, as their numbers dwindle, the health and strength of the entire ecosystem begins to degrade.

The integrity and health of ecosystems are key to their ability to provide ecosystem services on which we all depend, such as clean air and water, the production of food and other natural resource production – such as timbre – and the regulation of our climate.

It is important to consider both their physical integrity (structural connectivity) and the fact which species use them and how (functional connectivity). Habitat fragmentation is one of the leading causes of biodiversity loss all around the world. Austria, where only 7 % of the territory remains in a (largely) natural state is no exception. Land consumption is proceeding by 12.9 hectares/day and, between 2005 and 2011, Austria's road network increased by 16 % to 125,000 km.

There are also two green bridges in the pilot region: one near Pöttsching and another one in the area of Müllendorf. The green bridge in Pöttsching, crossing the expressway S4, was one of the first constructed green bridges (Figure 2 and Figure 3) to restore ecological connectivity along the existing Austrian motorway network and it had an important purpose: the green bridge "Pöttsching" guarantees the Alpine-Carpathian Corridor continuity. The Pöttschinger forest is located at the front of the Rosalia Mountains. The green bridge is located in a large contiguous forest area and plays an important role for the restoration of the Alpine-Carpathian corridor continuity. The crossing connects natural deciduous forests (mixed oak woodlands) on both sides. The crossing itself has a characteristic similar to a forest clearing.

Figure 3 Detail map of pilot area S4- Pöttsching. Yellow star marks the location of the green bridge
© Environment Agency Austria/basemap.at

Figure 4 Design of a green bridge S4, Pöttsching, © Christoph Plutzar

Another green bridge is located in the Müllendorf area and crosses the A3 motorway in that point. This bridge is located in open agricultural land and has hardly any forested areas in the surrounding area.

The “Wiener Neustädter Gate” is a 13 km wide valley between the Rosalia Mountains in the south and the Leitha Mountains in the north. This section is one of the most critical bottlenecks in the Alpine-Carpathian corridor, although wildlife migration is still possible there. The motorway and expressways represent major barriers in this area. In addition, settlement areas have enlarged significantly in recent years.

The Leitha Mountains, whose highest elevation reaches 484 m, are located in the southeast of the Vienna Basin. The landscape is dominated by forests and represents a large coherent core habitat for red deer and other woodland species. The hilly landscape is an important stepping-stone within the Alpine-Carpathian corridor. There are no major infrastructure barriers in this area. The north-eastern part is protected as the Natura 2000 area “Nordöstliches Leithagebirge”; one part belonging to the nature park “Neusiedler See-Leithagebirge”.

When analysing the structural connectivity, corridor segments highlighted in green (see Figure 4) indicate high structural values while orange segments show reduced connectivity due to less permeable areas or barriers. Accordingly, the corridor section through the “Wiener Neustädter Gate” (most of the orange segments) represents one of the most critical bottleneck situations within the Alpine-Carpathian corridor.

There are two Natura 2000 Areas in the Pilot Area (Figure 6):

CODE and NAME of protected area	Type	Code on Map
AT1123323 Mattersburger Hügelland	SCI	AT1
AT1110137 Nordöstliches Leithagebirge	SCI	AT2

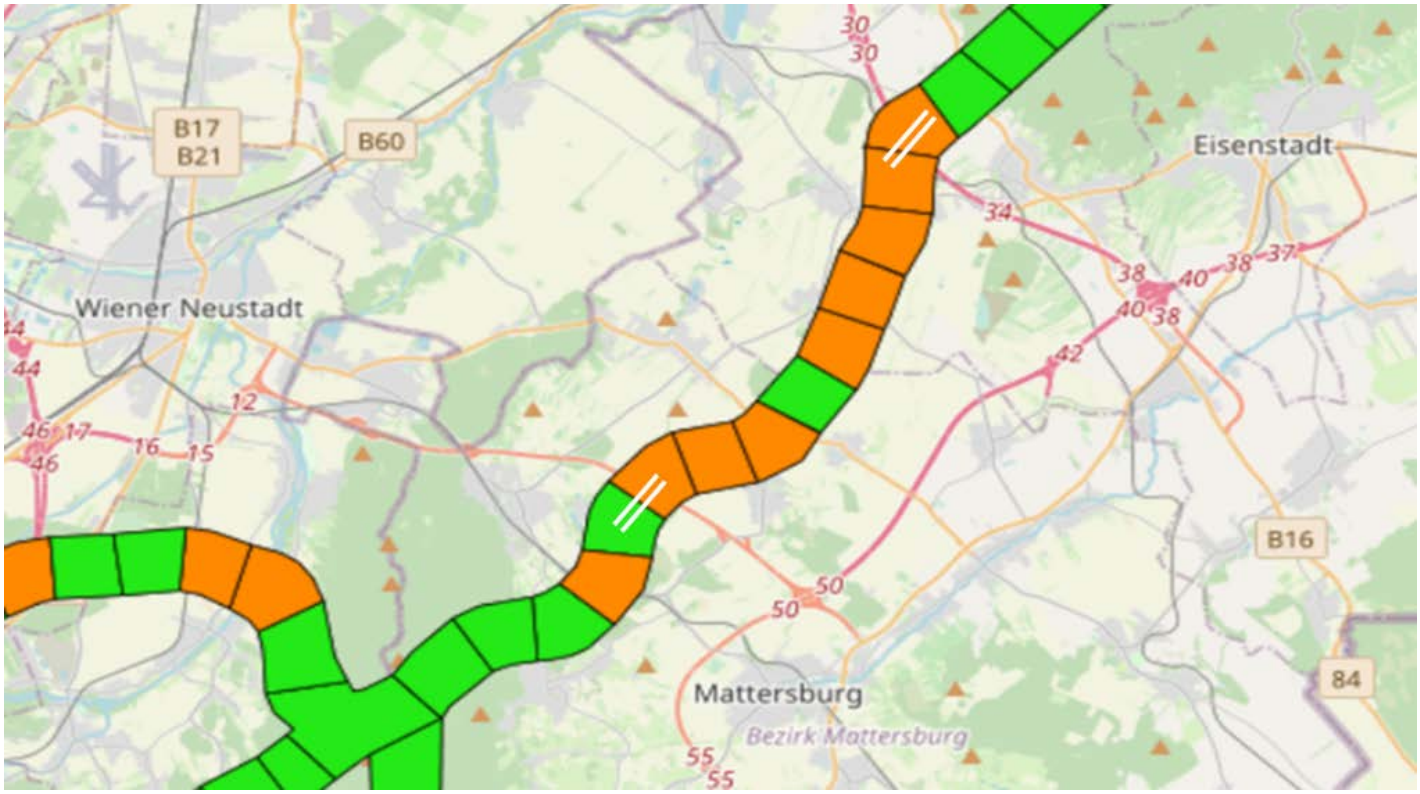


Figure 5 Designated ecological corridor and location of green bridges
© Environment Agency Austria/OpenStreetMap

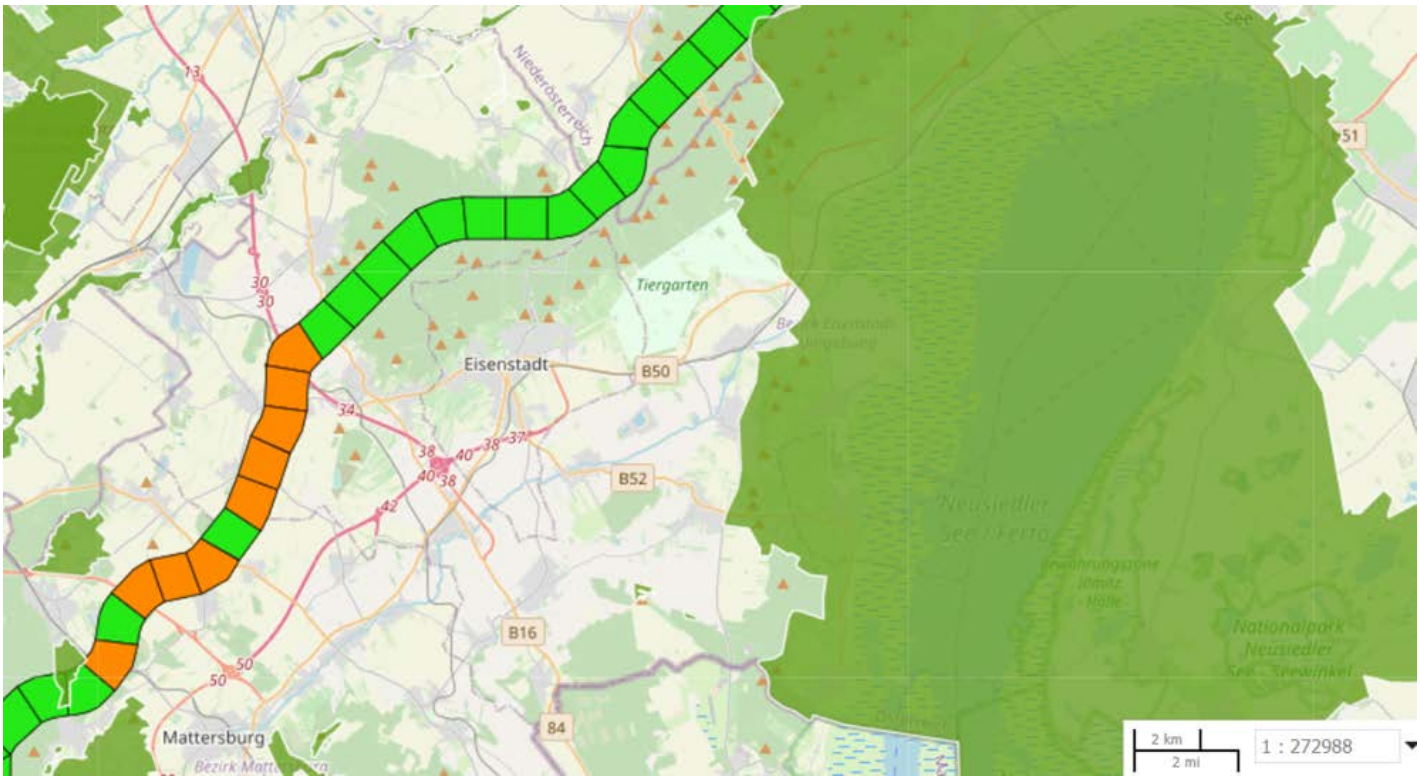
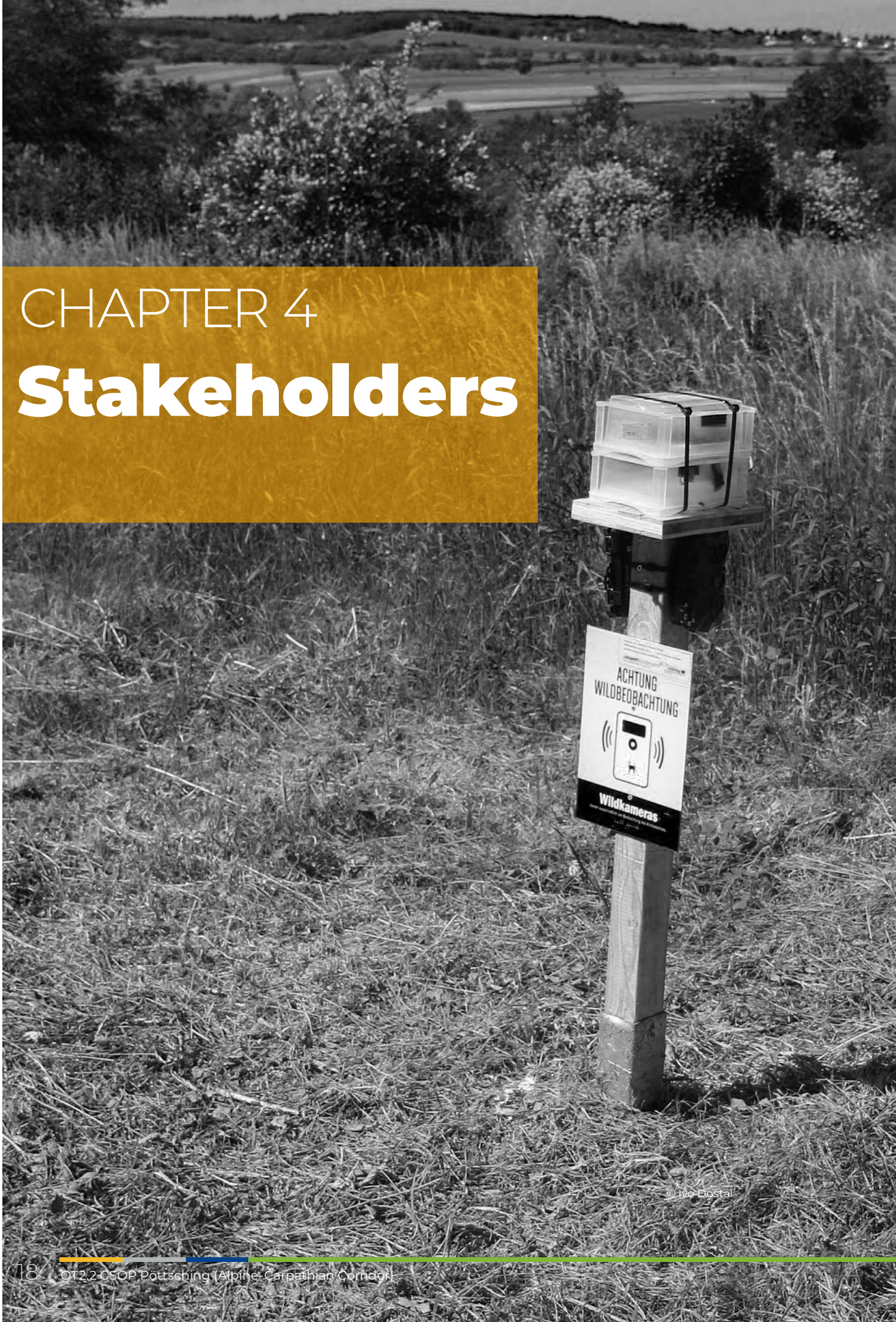


Figure 6 Location of the Natura2000-sites within the pilot area
© Environment Agency Austria/OpenStreetMap

CHAPTER 4
Stakeholders



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A stakeholder analysis for the respective region was conducted in order to understand who (relevant authorities, local experts, influential individuals, companies, organisations, etc.) would influence the development and implementation of the CSOP, anticipate what type of influence (positive or negative) they would have, and facilitate engagement work in the course of the project. In Austria, there is no legally binding regulation on the protection of ecological connectivity; all activities to safeguard connectivity are implemented on a voluntary basis. Thus, land managers and opinion leaders in the region are of utmost importance. Due to the size of agricultural fields and the use of heavy machinery that has increased dramatically over the past decades, many of the landscape structures like tree lines, single trees, groups of trees and hedgerows were cut down to allow for easy management without obstacles. Due to its location in the vicinity of the motorway and expressways, land use change from agricultural fields into light industrial areas, mainly for huge warehouses, is an increasing threat to ecological connectivity.

The following stakeholders were identified:

- Hunting association active in the districts Eisenstadt Umgebung and Mattersburg: they were interested in supporting our work for the sake of having a safe environment for healthy game.

- The corridors were located in the following communities:

  - Eisenstadt
  - Müllendorf
  - Oslip
  - Pöttsching
  - Sankt Margarethen
  - Schützen am Gebirge, Siegendorf
  - Sigleß
  - Steinbrunn
  - Trausdorf an der Wulka, and
  - Zillingdorf

In these communities, around 30 landowners and managers were contacted. They all received a letter informing them about the SaveGREEN project, the monitoring intention of the team experts and the purpose of it. They were asked for their approval to set up camera traps on their land, which some of them refused and new places had to be found. One important landowner stepped in at a later stage as they preferred a personal meeting with the Austrian SaveGREEN team to clarify all questions.

In parallel, the team contacted the Austrian Motorway Construction and Financing Company (ASFINAG), as they were part of the Alpine-Carpathian Corridor Project. Based on the results of this project, they built several green bridges and underpasses in the pilot region. They had experience with the monitoring of green bridges and certain relationships to the respective communities, where we planned to set up the monitoring. A local staff member supported our work around the green bridges.

Further stakeholders important for the implementation of actions:

Ministry of Climate Action, Ministry of Agriculture, Forestry, Regions and Tourism, Chamber of Agriculture, Regionalmanagement Burgenland GmbH, LEADER Local Action Group Nord Burgenland, BirdLife Austria, Coordination Platform for the Protection of Bats, Austrian Society for Herpetologists, Austrian Centre Bear Wolf Lynx, University of Veterinary Medicine Vienna.

CHAPTER 5
Logframe
CROSS-SECTORAL OPERATIONAL PLAN FOR THE PÖTTSCHING PILOT AREA

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This logframe represents a wide array of threats and pressures on ecological connectivity at the landscape level, which was compiled for all the pilot areas in the project to consider and select accordingly.

THREAT/PRESSURE What do we want to address?	SPECIFIC OBJECTIVE What do we want to achieve?	Problems	Measures	Actions
1	2			
1. New Transport and other Linear Infrastructure (TLI*) projects may increase the barrier effect at landscape level. ** roads, railways, navigable channels, waterways, canals, power lines, and pipelines* *The upgrade of the existing infrastructure to a new category/class normally implies new constructive works – i.e. enlargements, fencing etc. – and new environmental permits and, therefore, will be considered as a new infrastructure project).*	**01. Ensure support data for new infrastructure projects**	Not relevant in PA		
	02. Support the SEA/EIA/AA processes and procedures with relevant data and examples of good-practice	Not relevant in PA		
	03. Support the design & technical details and constructive solutions with examples of good-practice	Not relevant in PA		
	1. Maximise the functionality of underpasses (all objects)	Not relevant in PA		
	2. Maximise functionality of overpasses (all objects)	Not relevant in PA		
	3. Assign legal status and develop coherent regulations for all objects which are potential wildlife passages	Not relevant in PA		
	4. Increase permeability of embankments *(when & where fencing is not mandatory)*	Not relevant in PA		

THREAT/PRESSURE What do we want to address?	SPECIFIC OBJECTIVE What do we want to achieve?	Problems	Measures	Actions
2. Structural interventions on the existing Transport and other Linear Infrastructure (TLI) (maintenance, upgrading without changing the category/class of the infrastructure etc.) **and on other linear features may increase the barrier effect at landscape level.**	**1. Safeguard or improve the permeability of the existing transport infrastructure** (including enhancement of permeability of the existing features, when possible)	Structural changes increase the barrier effect, e.g. parking and depositing in underpasses. Limitations through narrow or very wide green bridges without suitable structure.	Suggestions for improvements related to the surrounding landscape. Implementation of expert recommendations with regard to the width of green bridges.	Transfer of information for implementation. Ensure the continuous monitoring of overpasses and underpasses that are actively used for migration.
	2. Safeguard the transversal permeability of river banks (including enhancement of permeability of the existing features, when possible)	Small river "Erlbach" flows along one corridor, crossing S4 via an underpass. The riverbed is partly made of concrete and does not offer guiding vegetation.	River banks need to be improved and riparian strips should be established.	Restoration of riverbed and creation of riparian strips.
	3. Safeguard the longitudinal permeability of rivers (including enhancement of permeability of the existing features, when possible)	Not relevant in PA		

THREAT/PRESSURE What do we want to address?	SPECIFIC OBJECTIVE What do we want to achieve?	Problems	Measures	Actions
3. Linear transport infrastructure elements (including electric power lines) cause wildlife mortalities	**1. Implement an adequate fencing system on motorways & high-speed railways, including escape gates**	Not relevant in PA, the higher road network is fenced in Austria		
	2. Direct animals towards functional underpasses and overpasses	The landscape is cleared, distances between stepping-stones are too large, and so migration is hampered.	Strategically planned green infrastructure as guiding vegetation.	Engage with relevant stakeholders. Facilitate discussion on systematic solutions for guiding vegetation related to linear infrastructure. Ensure guiding vegetation is realised for recommended areas.
	3. Warning drivers on road-kill/accident-prone areas	Relevant, but well covered in AT. Warning signs are already in place on the low-ranking road network.		
	4. Warning train conductors on rail-kill/ accident-prone areas	Relevant – however, there is only one secondary railway line with very limited frequency in the pilot region.		
	5. Prevent accidents caused by mammals being blocked in railway tunnels or on long bridges	There are no tunnels in the area, not relevant		
	6. Increase drivers/ conductors visibility on roads/railways	Relevance in PA unclear.	Identify spots of insufficient visibility.	Road maintenance could perform a mapping of traffic accidents caused by decreased visibility in the pilot area. Use special reflectors during the night.

THREAT/PRESSURE What do we want to address?	SPECIFIC OBJECTIVE What do we want to achieve?	Problems	Measures	Actions
	7. Implement special measures to avoid birds mortalities (power lines, noise barriers impact)	Relevance unclear for PA.	Evaluate mortality of birds	Get in contact with BirdLife Austria. Propose further actions based on the existing data.
	8. Implement special measures to avoid bats mortalities (light impact)	Relevance unclear for PA; bats were not monitored.	Evaluate mortality of bats	Get in contact with KFFÖ. Propose further actions based on the existing data.
	9. Implement special measures to avoid amphibians & reptiles mortalities	Relevance unclear for the PA, amphibians and reptiles were not monitored.	Evaluate mortality of amphibians and reptiles	Get in contact with ÖGH to obtain the existing data.
	10. Collect and process data to identify incident/accident critical sectors on roads, motorways and railways	The existing relevant data sources need to be identified and merged.	Road-kill application is under development.	Use road-kill app ROad.kill when finished or https://roadkill.at, supplemented with any other existing datasets.
	11. Create and/or train specialised teams to deal with wildlife-related incidents on motorways, railways, roads, including emergency interventions I.e. Bears on the motorway/railway tunnels	Data collection capabilities have been developed	Road-kill occurrence and injured animals can be reported to the University of Veterinary Medicine in Vienna, injured animals are also treated there. Road-kill data are recorded with the app roadkill.at.	In the higher-ranking road network, the road service unit removes roadkill. In the lower-ranking road network, this is carried out by the executive in cooperation with the local hunters.
	12. Develop and use an integrated database as a decision-support tool to address traffic incidents (for implementing/adjusting measures to prevent wildlife traffic-kills/damage/human casualties)	The existing data sources need to be identified and merged	Road-kill app, as a notification system, has been developed. It allows to locate road-kill in a spatially explicit way.	Use ROad.kill app, supplemented with other given existing datasets.

THREAT/PRESSURE What do we want to address?	SPECIFIC OBJECTIVE What do we want to achieve?	Problems	Measures	Actions
4. Changes in land-use may reduce landscape permeability	**1. Enforce legislation preventing changes of land-use towards a less permeable categories** (including compensatory measures targeting connectivity)	Changes in land use and agriculture led to large rural areas without a sufficient cover for migrating animals.	Analyse the connectivity of greening measures and ensure their functional and temporal existence. Safeguard the well-established structures and prevent deterioration of currently permeable corridors.	Maintain corridor permeability by avoiding construction of new or extending roads and commercial buildings, no commercial development.
	2. Facilitate/support changes of land-use toward more permeable categories I.e. through agricultural payments	Agricultural intensification, building of industrial areas and expansion of settlements cause the loss of landscape elements.	Enhancing extensification of agriculture, supporting the maintenance and establishment of ecological corridors and guiding vegetation.	Appropriate zoning of the area, municipalities (mayors) as responsible entities; create better acceptance through lobbying and knowledge transfer.
5a. Changes in land management – fencing – may reduce landscape permeability This does not refer to fencing of transport infrastructure elements.	**1. Fencing regulations and promoting unfenced areas**	In individual cases, fencing can lower the permeability in certain migration corridors. Reforestation and Christmas tree production might be relevant.	Analysis of relevance	Avoid fencing, e.g. around photovoltaic areas that could represent vegetation islands in an otherwise empty landscape.LRV Guidelines for the Assessment of the Ecological Permeability of Wildlife Corridors for Wild Mammals of Rabbit-size and Larger, see www.lebensraumvernetzung.at
	2. Develop guidelines and impose fencing-related conditions linked to agriculture/ forestry subsidies or specific programmes	Areas like forests or crops are fenced to gain a high wildlife density for hunting or to prevent feeding damage to arable crops.	Create structures along the fences for migration.	Consider the existing regulations, lead discussions with landowners. Also relevant here: LRV Guidelines – see above: www.lebensraumvernetzung.at

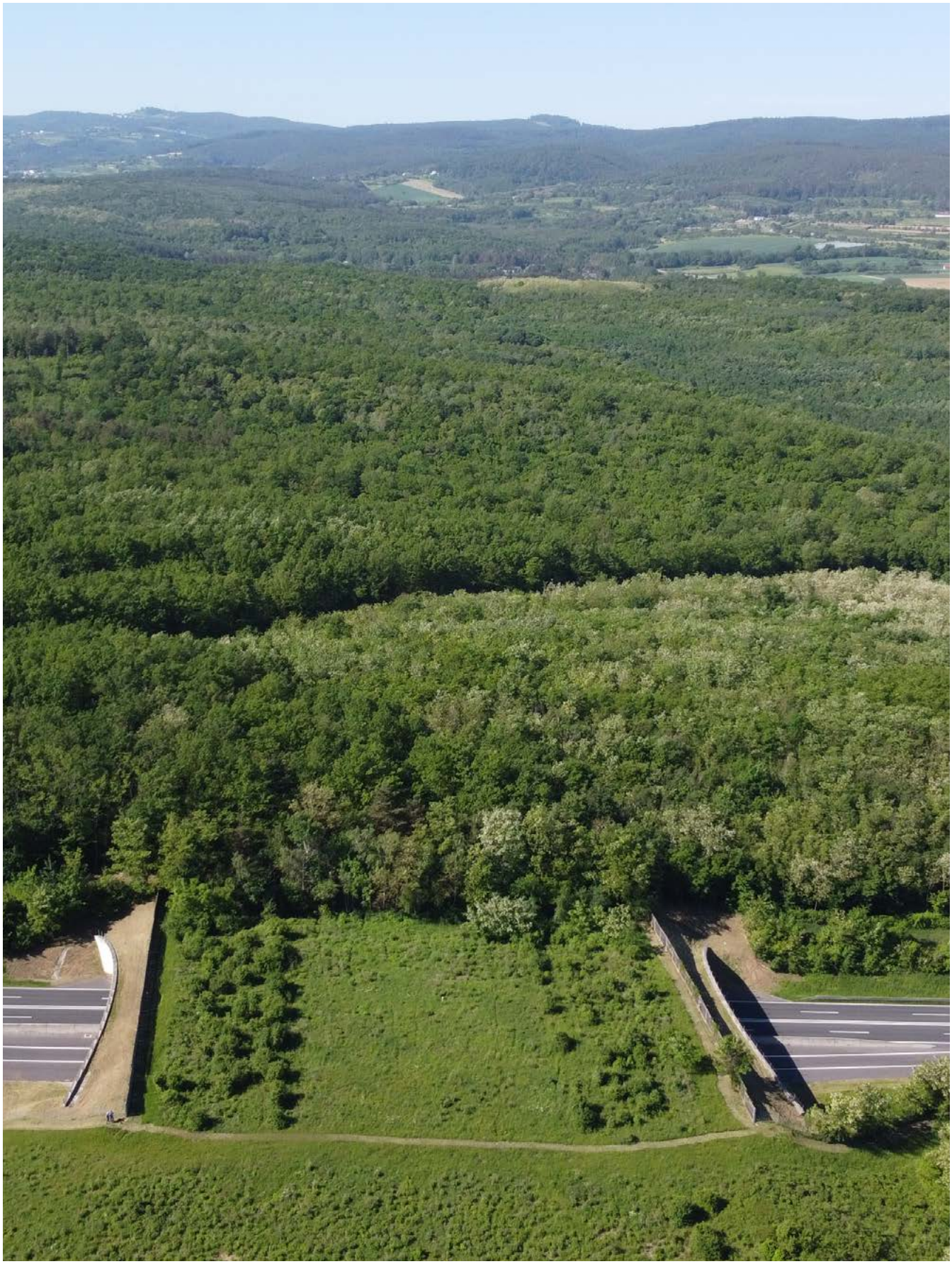
THREAT/PRESSURE What do we want to address?	SPECIFIC OBJECTIVE What do we want to achieve?	Problems	Measures	Actions
5b. Changes in land management – crop cultivation/ natural vegetation management – may reduce landscape permeability	**1. Prevent large-scale monocultures and/or facilitate & support mosaic cultivation**	Intensification and concentration of agricultural production leads to large monocultures in agriculture.	Political awareness raising	Green Deal, CAP – foresees 10% of agricultural land should be dedicated to biodiversity, raise awareness among stakeholders
	2. Support adequate management of natural features & marginal habitats	Poor knowledge on the need for landscape structure and landscape features contributing to biodiversity.	Raise awareness among farmers, advisors and public society.	Raise awareness among farmers, advisors and public society.
	3. Support and promote development of good-practice examples of connectivity-conscious agriculture, water management and forestry practices	Connectivity measures on agricultural land are often seen as a loss of land or management hardship. Too little awareness of habitat connectivity. Farmers fear restrictions on the use if areas are classified as ecologically valuable.	Collect and actively promote good examples by opinion leaders.	Awareness raising & promotion of good practices. Consult SaveGREEN Handbook including good practice examples: Information on agricultural procedures, planting of hedges in the course of land consolidation.
5c. Land management causing degradation of natural habitats may reduce landscape permeability	**1. Prevent/control the spread of invasive plant & animal species and renaturation of invaded /degraded lands**	The black locust (*Robinia pseudacacia*), as an invasive species is widespread in the region and grows on the covered green bridges.	In general, information campaigns for landowners should take place to raise awareness of the problem.	Invasive species should be managed in the respective area of responsibility, e.g. by the road operator.
	2. Prevent/enforce legislation on fire occurrence	Not relevant		
	3. Prevent alteration of water bodies, restore hydric system and support renaturation of wetlands	The small stream Erlbach runs along a corridor, crossing the S4 motorway via a wide, but sealed underpass without any vegetation.	Watercourses should be designed close to nature so that they do not represent barriers but enhance the habitat and its connectivity.	Renaturation of the watercourses with accompanying vegetation and natural structures. Consultation with responsible water boards, federal state department of water management and ASFINAG

THREAT/PRESSURE What do we want to address?	SPECIFIC OBJECTIVE What do we want to achieve?	Problems	Measures	Actions
5d. Land management through mineral extraction may reduce landscape permeability	**1. Develop coherent management plans and apply the EIA/ AA procedures** in order to avoid-mitigate-compensate for impacts, and to renaturate the sites	There is an active chalk mine near Müllendorf. However, it is not relevant for the pilot area.	Return the surfaces to a near-natural state after extraction.	Ecological restoration according to local vegetation.
6a. Other anthropogenic activities - game management – may reduce landscape permeability	**1. Develop coherent game management plans and apply the EIA/AA procedures** in order to avoid-mitigate-compensate for impacts	Very high game populations and therefore high bark stripping damage on silvic cultures and orchards. High densities of roe deer and wild boar in fenced areas, as these are used for hunting.	Fenced areas are often in private ownership, an intervention is difficult. Migration routes along these areas should be provided or maintained.	Raise awareness among private and public landowners to maintain or create migration routes.
	2. Facilitate data-collection on key-species	Hunters know very well about the species' occurrence.	For future monitoring programmes in the area, cooperation with stakeholders should be applied.	Contribution through the monitoring data collected within SaveGREEN.
	3. Harmonise game management with Natura 2000 and connectivity-related objectives	Not relevant, as hunting is allowed also in the Natura 2000 sites.	Generally, game population is high, but migration is hampered due to barriers.	No restrictions for hunting as the animal density is high, but increased connectivity of the landscape is required.
	4. Implement poaching prevention and control	Not relevant in PA		

THREAT/PRESSURE What do we want to address?	SPECIFIC OBJECTIVE What do we want to achieve?	Problems	Measures	Actions
6b. Other anthropogenic activities – human-wildlife encounters – may reduce landscape permeability	**1. Facilitate the implementation of legislation on damage compensations**	Information on damage compensation must be readily available, including information on the evidence.	Informing farmers about damage compensation procedures.	Information of farmers through specialised events.
	2. Facilitate the implementation of traditional shepherding	Traditional shepherding declined during the 20th century. The potential return of large carnivores can cause significant damage due to abandonment of traditional methods of protection.	Informing farmers about methods of traditional shepherding.	Information of farmers through specialised events. The Austrian Centre Bear Wolf Lynx provides information on protection measures and compensation. https://baer-wolf-luchs.at/
	3. Facilitate the implementation of modern methods for prevention	Financing preventive measures is often complicated and difficult to implement for farmers.	Information and support for farmers on modern methods of prevention and the possibilities for funding.	Information of farmers through specialised events. Support farmers in applying for subsidies for preventive measures.The Austrian Centre Bear Wolf Lynx provides information about protection measures. https://baer-wolf-luchs.at/
	4. Facilitate increased subventions based on large carnivores conservation	No large carnivores in the project area.		
	5. Regulate other anthropogenic activities, which could increase the level of conflicts (waste management, unsustainable development & tourism activities etc.)	Fast development of industrial zones, urban sprawl, soil sealing.	Develop a map of ecological connectivity as a tool for lobbying and awareness raising. Information about localities used as a core habitat by protected species.	Lobbying and awareness raising on the topic of soil sealing with regional development authorities, mayors, landowners etc. Spreading the information on core habitats.
	6. Facilitate rapid intervention in special situation related with wild animals	Relevance unclear for PA.		

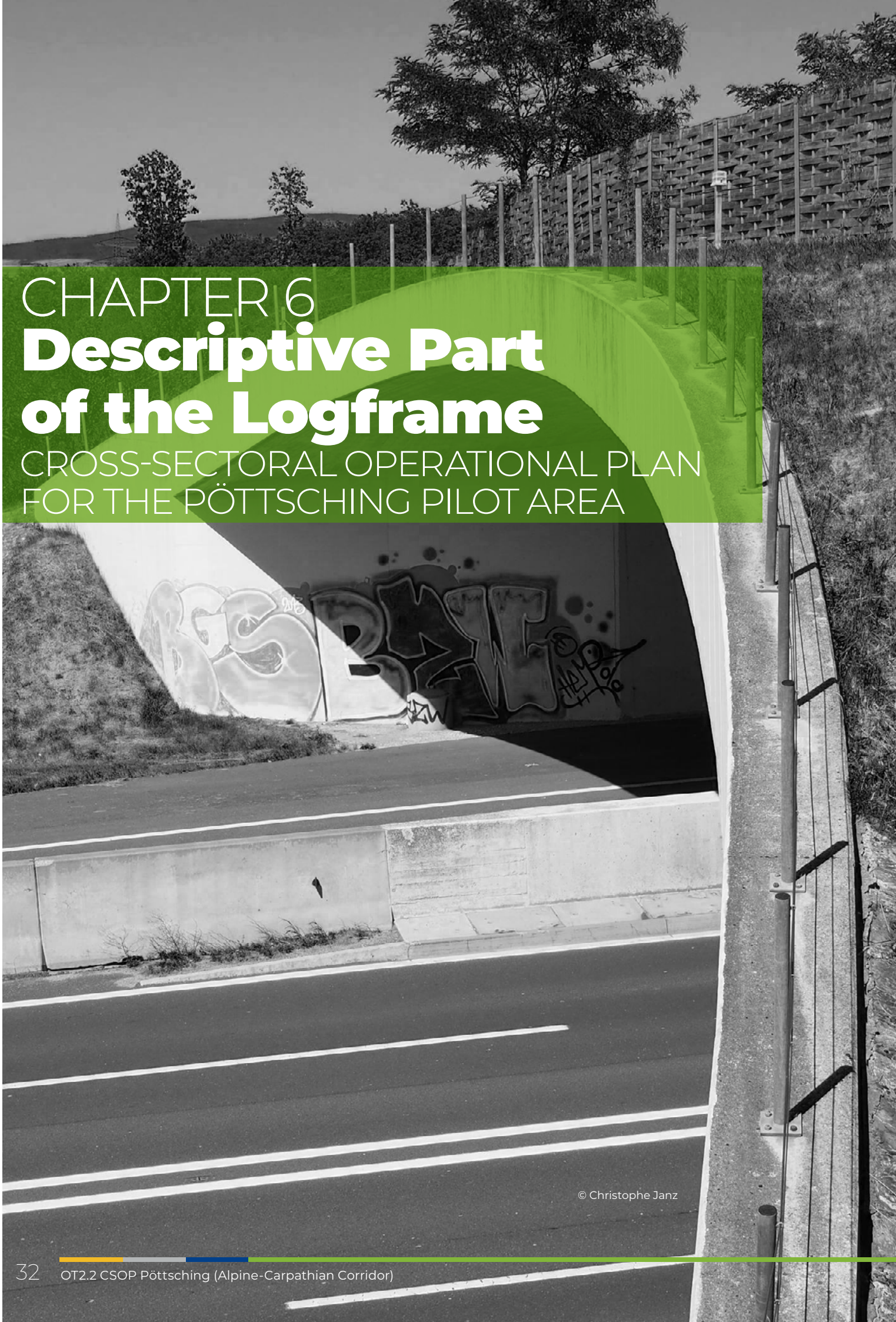
THREAT/PRESSURE What do we want to address?	SPECIFIC OBJECTIVE What do we want to achieve?	Problems	Measures	Actions
7. Lack of coherent monitoring at landscape level and adaptation of solutions	**1. Facilitate the implementation of an integrated monitoring programme – procedures, database, indicators, and assessments**	The monitoring required to avoid negative effects to habitat connectivity does not always take place and data are not collected systematically. Central databases are missing. New threats to connectivity are constantly occurring. A monitoring of conceptions and projects considered for the SEA and EIA must be performed constantly to prevent risks for connectivity.	Monitoring the effectiveness of the existing migration axes and permeability in general. Monitoring as an important part of the SEA and EIA.	Lobbying at federal ministries BMK and BML, spread methodology on monitoring of functional connectivity in Austria, cooperation with the platform Lebensraumvernetzung Österreich. Constant monitoring for the SEA and EIA relevant projects. Creation and implementation of a durable monitoring plan.
8. The support of stakeholders for an cross-sectoral & integrated approach at landscape level is reduced	**1. Facilitate networking and develop a common platform and database**	Representatives of different sectors do not have formalised exchanges; they mainly stick to their professional networks. Competences are split hierarchically making super-regional planning difficult Missing formal binding legal designation of ecological corridors; depending on good will.	Establish formal/informal exchange platform among relevant stakeholders	Connect to LRV platform Support implementation of LE14-20 “Lebensraumvernetzung für Insekten” project; SaveGREEN capacity building events, transnational workshops, and local stakeholder meetings.
	2. Facilitate information, awareness, education, communication	Awareness of the need for ecological corridors is low among relevant stakeholders and the general public.	Targeted information campaigns and broader awareness raising campaigns	Events at local school and kindergarten, info day, press field trip, and personal meetings with relevant stakeholders.

THREAT/PRESSURE What do we want to address?	SPECIFIC OBJECTIVE What do we want to achieve?	Problems	Measures	Actions
	3. Support research and studies focused on connectivity; **facilitate inter-sectoral capacity building and development of new professional opportunities** **(mainstream biodiversity to other sectors)**	Scientific data often unavailable or status unclear. Biodiversity is a cross-cutting issue that is still not sufficiently recognized in different sectors	Targeted information campaigns. Further research Capacity building events.	Research ongoing; EAA aims to publish scientific papers that are relevant for connectivity in this region.
	4. Facilitate the development of a regional identity and promote the area – nature, culture, services **(connectivity as one of the topics)**	LEADER-region Nord Burgenland plus, whereof Pöttsching is a part, website is under construction https://www.nordburgenlandplus.at/	Establish and improve ecological connectivity and protection of local biodiversity as elements of local heritage.	Establish dialogue and cooperation with the LEADER Local Action Group.
	5. Facilitate the development & alignment of local strategies into the regional sectoral strategy **(connectivity as one of the topics)**	Regional strategies do not consider ecological corridors, but there is the commitment to preserve and secure (semi-) natural landscapes	Raise awareness on the multi-scale nature of ecological corridors	LEADER Research into suitable regional development plans, Integration into the forest development plan
	6. Facilitate and support complementary initiatives (connectivity as one of the topics)	Projects and involved experts often show unwillingness to share generated information or knowledge	Offer networking between relevant projects.	LEADER LRV, LE-Insekten, Dare2Connect, MaGICLandscapes, ConnectGREEN, campaigns on soil protection, WWF-Austria.



Pöttsching green bridge ©Umweltbundesamt, Gebhard Banko

CHAPTER 6
Descriptive Part of the Logframe
CROSS-SECTORAL OPERATIONAL PLAN FOR THE PÖTTSCHING PILOT AREA



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6.1 General considerations

The Pöttsching pilot area plays an important role in habitat connectivity between the Alps and the Carpathians. As part of the analysis of structural connectivity, several corridors have been identified whose permeability was verified by wildlife monitoring. Two of the main corridor complexes are described in the following; the landscape conditions are discussed and suggestions for improvement are made.

The pilot region represents a bottleneck in the real sense of word, constituting a larger open land area between the woodland dominated Leitha Mountains in the north and the Rosalia Mountains in the south (7A). These ranges are offshoots of the Alps and form the most important supra-regional connection to the Carpathians. The studied bottleneck is, therefore, of particular importance for wildlife migration and is highly sensitive due to intensive agricultural use, the proximity to the growing metropolitan areas of Wiener Neustadt in the west, Eisenstadt in the east as well as Mattersburg in the south. Further, the presence of high priority roads in the form of the transversal highway A3 and the intersecting expressways S4 and S31 causes fragmentation. Based on the modelling of the major corridors in the pilot region, two main strands have emerged (7B) and been subsequently subjected to functional monitoring using various methods.

6.2 Actions proposed to address threats and pressures indicated in Chapter 2.1 Logframe

In the pilot area of Pöttsching, the following threats and pressures out of the overall logframe have been identified:

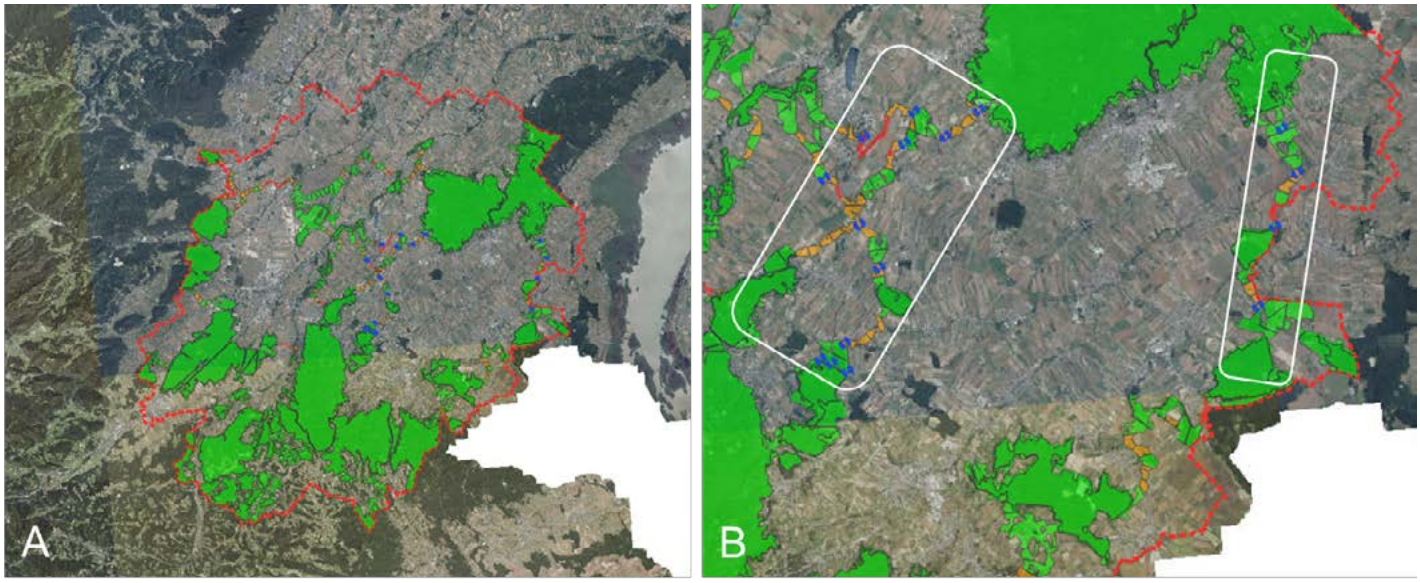

Figure 7 (A) Main core habitats and modelled corridors in the pilot area Pöttsching; (B) Main monitored corridor strands, blue markers indicate monitoring sites, © Environment Agency Austria/Geoland Basemap

Threat/Pressure 2: Structural interventions on the existing transport and other linear infrastructure

Specifics of the threat/pressure in the Alpine-Carpathian Corridor:

This area of the Alpine-Carpathian corridor is already heavily used; it is expected that an expansion of the existing infrastructure will have negative consequences on the functionality of the corridor.

Along the motorway A3 and the expressways S4 and S31, new industrial areas and huge warehouses are being built that hamper ecological connectivity. Green bridges exist, but it needs to be ensured that the ecological corridors will not close the still existing migration corridors for large mammals.

The Erlbach River flows along one ecological corridor and crosses S4 via an underpass. Unfortunately, the riverbed is partly made of concrete and does not offer guiding vegetation, which hampers the potential function of such a crossing structure for wildlife.

Objectives:

- Currently, there is insufficient information on whether the corridor sections connected by the green bridges are restricted in their functionality or not. Therefore, both the green bridges themselves and landscape areas that serve as feeders to the green bridges are to be subjected to wildlife monitoring. This is to identify potential bottleneck situations that only have limited functionality as wildlife corridors.

- In Pöttsching, in addition to the green bridge, the nearby crossings in Müllendorf will also be monitored in order to obtain an overall view of this critical area. This should help to protect the Pöttsching forest.

- To be able to guarantee the functionality of the Alpine-Carpathian corridor in the long term, the support of the local population is needed.

Objectives set to address the threats are:

2.1. Safeguard or improve the permeability of the existing transport infrastructure (including enhancement of the existing features, when possible)

2.2 Safeguard the transversal permeability of riverbanks including enhancement of permeability of the existing features

Problems:

Structural changes along the motorway A3 and the expressways S1 and S31, where reclassification of rural land into building land is taking place and huge warehouses are being built, increase the barrier effect of the ecological corridor. Additionally, green bridges and underpasses are used by people for parking or depositing machines and other items, and the function of green bridges might be limited due to their width or improperly equipped vegetation. The Erlbach River flows under an underpass that potentially could function as a good crossing structure for animals. However, the riverbed is partly made of concrete and does not offer guiding vegetation.

A lack of information on wildlife activities in order to estimate the impacts of structural interventions on the existing transport and other linear infrastructure that may increase the barrier effect at landscape level.

Measures:

Measure 2.1.1. Develop suggestions for improvements of the situation

Based on monitoring results (described in D.T2.2.3 Local Monitoring Plan of the Pöttsching pilot area and under Threat/ Pressure 7 below, recommendations with regard to the width and the equipment with vegetation in relation to the wider surrounding of the bottleneck areas shall be made by experts.

Measure 2.2.1 Improvement of the Erlbach riverbed

Improvement of the riverbank toward a better guiding structure for wildlife.

Actions required

- Monitoring of bottleneck areas along linear transport infrastructures and the riverbed, ensure permanent monitoring of overpasses and underpasses that are actively used for migration – see below, Threat/Pressure 7
- Transfer of monitoring results and recommendations to relevant experts and decision-makers
- Develop recommendations for improvements of the bottleneck areas:
  - For spatial planning (community leader, provincial government) – visualisation of ecological corridors along the linear transport infrastructures, raise awareness on how the constructions influence the function of ecological corridors (see Threat/Pressure 8 below).
  - ASFINAG: make sure that the underpasses are not blocked with cars or other vehicles; equip the green bridge with vegetation islands and strips of bushes, if recommended by the experts.
  - For landowners and managers: establish measures to restore the riverbed and to create riparian strips along the Erlbach riverbed at the underpass (find out the landowner of concern, support for finding financing of the action).

First steps:

A set of locations were identified to monitor the functionality of the corridor in this pilot area. The gathered information will help to assess the impacts on wildlife activities due to new/updated infrastructure.

Figure 8 Crossings in the Pöttsching forest, © Environment Agency Austria/Geoland Basemap

Figure 9 A green bridge in the Pöttsching forest © Christoph Plutzar

Figure 10 An overpass in the Pöttsching forest© Christoph Plutzar

Figure 11 An underpass in the Pöttsching forest © Christoph Plutzar

A special situation is the Forest Pöttsching, where an underpass and an overpass can also be used by wildlife for crossing the S3 (see Fig. 8 and Fig. 9, 10, and 11), aside from the existing green bridge. For a better overall understanding of this situation all three objects will be monitored.

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

Specifics of the threat/pressure in the Alpine-Carpathian Corridor:

Higher situated roads, motorways and expressways are principally fenced in Austria, hence, this threat is not particularly pronounced in this area, at least related to the higher road network. Also, warning signs are already in place on the low-ranking road network. Still, there is wildlife mortality in the region that could be diminished.

Objective:

» To reduce wildlife mortality in the entire pilot area addressing the problems of the various animal species from mammals to insects.

Actions required:

» Evaluate the mortality rates of different animal groups with different methods in collaboration with organisations that work with the animals of concern (BirdLife Austria, Coordination Platform for the Protection of Bats, Austrian Society for Herpetologists, hunters, University of Veterinary Medicine Vienna)

» Introduce SaveGREEN ROad.kill app, which is a citizen science tool as well as the Austrian https:/roadkill.at tool.

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

Specifics of the threat/pressure in the Alpine-Carpathian Corridor:

Agricultural intensification, building industrial areas, also ones that are further away from the motorways and expressways, and the expansion of settlements cause a loss of landscape elements, fragmentation and decreasing space for wildlife habitats. By this, ecological corridors gradually narrow down, and slowly lose the guiding vegetation necessary for stepping-stones and shelter.

Objectives:

- Increase or safeguard the existing landscape permeability
- To be able to guarantee the functionality of the Alpine-Carpathian corridor in the long term, the support of the local population and local decision-makers is needed.

Objectives set to address the threats are:

4.1 Enforce legislation to prevent changes of land-use towards less permeable categories including compensatory measures that target connectivity

Problem:

In Austria, ecological connectivity is not reflected in any law. The maps or ecological corridors harmonised across Austria by the Environment Agency are recommended to be used for spatial planning and other development plans (forest development plans). They are considered as a professional basis. However, many of the local decision makers are not aware of these maps and do not consider them. In addition, there is a lack of political will. Unfortunately, all actions toward the improvement of ecological connectivity are voluntary based.

Measures:

Measure 4.1.1 Analyse the connectivity of greening measures and ensure their functional and temporal existence

A solid analysis of not only structural but also functional connectivity represents a good basis for the negotiation with stakeholders at all levels.

Measure 4.1.2 Safeguard well-established structures and prevent deterioration of currently permeable corridors

Actions required:

- Monitor the structural and functional connectivity and landscape features, such as stripes of trees, hedgerows, islands of trees etc., important for migrating animals
- Maintain corridor permeability by avoiding reclassification of rural land into construction zones, no commercial development
- Analyse funding instruments for maintaining ecological connectivity (Common Agricultural Policy, Biodiversity Strategy, Rural Development Funds, etc.)
- Develop recommendations for funding measures and lobby for them
- Raise awareness in groups of local decision-makers, landowners and managers and support funding applications (see Threat/Pressure 8), ideally alongside the national level for the integration of ecological corridors in spatial planning

Threat/Pressure 5: Changes in land management

Specifics of the threat/pressure in the Alpine-Carpathian Corridor:

Managing agricultural and other rural and forested land bears risks for the functionality of ecological corridors. On the one hand, they represent a good prerequisite for the functioning of ecological corridors, but on the other hand, they can hamper

them substantially. In the pilot area, we face the problem of "empty" landscapes of monocultures without guiding vegetation and/or stepping-stones. According to experts, the newly planned photovoltaic areas could function as new stepping-stones in case no fencing is established. Invasive species like black locust are spreading across the area, displacing local plant species and enriching the soil with nitrogen that causes alterations in species composition and structure.

Objectives:

- Increase the number of landscape elements as guiding structures for wildlife
- Raise awareness of the needs for the functioning of ecological corridors
- Analyse funding mechanisms for measures that support the improvement of ecological corridors

5a Objectives regarding fencing set to address the threats are:

5a.1 Implement fencing regulations and promote unfenced areas

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

Problem:

In individual cases, fencing can lower the permeability in certain migration corridors, especially when put up to achieve a high wildlife density or prevent feeding damage to arable crops. Fencing of reforestation areas or Christmas tree production spots might be a problem.

Measures:

Measure 5a.1.1 Analyse the relevance in the area

The project team is not aware yet of any problems related to fencing in the pilot area, thus, a related analysis would be helpful.

Measure 5a.2.1 Create structures along the fences for migration

Actions required:

- Analyse the area with regard to fencing and based on that develop recommendations
- In case new photovoltaic plants are planned for the region, get in contact with the constructors and owners to explain to them how they can contribute to the improvement of permeability for wildlife by refraining from fencing the system.
- Promote the "Guidelines for the Assessment of the Ecological Permeability of Wildlife Corridors for Wild Mammals of Rabbit-size and Larger" that were developed by the Environment Agency Austria, and contain recommendations for fencing. Source: https://www.interreg-danube.eu/approved-projects/savegreen/outputs
- Raise awareness for farmers, foresters, landowners and managers (see Threat/ Pressure 8 below)

5b Objectives on crop cultivation/natural vegetation management set to address the threats are:

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

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

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

Problem:

In this pilot area, intensification and concentration of agricultural production leads to large monoculture spots. There is little knowledge on the need for green landscape structures and features contributing to biodiversity and ecological connectivity. Many stakeholders have little awareness of habitat connectivity and do not look beyond their property or community land. Connectivity measures on agricultural land are often seen as a loss of land or management hardship.

Farmers fear restrictions regarding the use if areas are classified as ecologically valuable.

Measures:
Measure 5b.1.1 Lobby for the integration of ecological corridors into other sectors at the political level

Measure 5b.2.1 Raise awareness of the topic adequate management of natural features and marginal habitats among farmers, advisors, and public society

Measure 5b.3.1 Collect and promote good examples for adequate management that considers ecological connectivity

Actions required:
- Get engaged in relevant policy processes at the regional and national levels promoting land management that takes ecological corridors into account (Common Agricultural Policy, Green Deal that foresees that 10% of agricultural land should be dedicated to biodiversity) – e.g.: vegetation stripes along fields support the 10% goal

- Promote the SaveGREEN "Handbook of Best Practices for Planning and Implementation of Mitigation Measures" that, besides holding other types of information, relates to agricultural procedures like planting hedges in the course of land consolidation. Source: https://www.interreg-danube.eu/approved-projects/savegreen/outputs

- Organise events at the local level to raise awareness on the topic, and provide knowledge to the respective stakeholders.

5c Objectives on degradation of natural habitats set to address the threats include:
5c.1. Prevent/control the spread of invasive plant & animal species and renaturation of invaded/degraded lands

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

Problem:
Concerning invasive species, the black locust (Robinia pseudacacia) is widespread in the area and has reached the green bridges. The tree can generate nitrogen on its own and displaces autochthone species. Expanding further, it will change the original vegetation cover. The Erlbach riverbed is mainly sealed with concrete, lacking any guiding vegetation. Wildlife would benefit from riverbed restoration.

Actions required:
- Management of invasive species by land managers, e.g. ASFINAG to take care of the green bridges and underpasses.

- Renaturation of the watercourses with accompanying vegetation and natural structures.

- Awareness raising (see Threat/Pressure no. 8)

5d Objectives on mineral extraction set to address the threats are
5d.1 Develop coherent management plans and apply the EIA/AA procedures

Description of situation:
There is an active chalk mine near Müllendorf, which per se does not represent an obstacle. On the contrary, animals use it as shelter during night time. In case extraction is stopped, the mine surface shall be restored into a local near-natural state.

Threat/Pressure 6: Other anthropogenic activities

Specifics of the threat/pressure in the Alpine-Carpathian Corridor:

The area is used for hunting, thus, high game numbers is present that cause bark damage on silvicultures and orchards. Some areas are fenced especially to keep game in a certain region for hunting events. Data on game are available and collected by the hunters. In case human-wildlife conflicts occur,

there are compensation measures in place. People might not be aware of them and additionally, they are often difficult to access or implement.

Objectives set to address the threats include:
6a.1 Find a balance between the game numbers and their impact on cultivations (forestry and agriculture)

6a.2 Enrich data collected by the hunters with further monitoring data generated in the project

6b.1 Increase knowledge on compensation measures for animal damage

6b.3 Facilitate the implementation of modern methods for prevention of wildlife damage

6b.5 Regulate other anthropogenic activities which could increase the level of conflicts – unsustainable development

Actions required:
- Raise awareness among private and public landowners to maintain or create migration routes in dedicated events
- Foster cooperation with local hunters on future monitoring programmes in the area and contribute with SaveGREEN monitoring data to their database.
- Organise special events to inform farmers and foresters about damage compensation procedures, applying for subsidies for preventive measures to avoid human-wildlife conflicts. Source: The Austrian Centre Bear Wolf Lynx https://baer-wolf-luchs.at
- Lobbying and awareness raising on the topic of soil sealing and reclassification of land with regional development authorities, mayors (decision makers at the local level), landowner etc. based on the created maps of ecological connectivity indicating also core habitats (see Threat/ Pressure 8 below)

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

Specifics of the threat/pressure in the Alpine-Carpathian Corridor:

See description of the pilot area. It is important to maintain and improve the Alpine-Carpathian corridor as an internationally important ecological corridor.

Problem:
The monitoring required as a basis for decisions to avoid negative effects on habitat connectivity has not been conducted in a systematic approach.

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

SaveGREEN provided resources to develop a monitoring tool to capture structural and functional connectivity.

The monitoring methods to assess corridor permeability focused on evidence of red deer, roe deer and wild boar.

The monitoring of animal activity was conducted by the following stationary monitoring devices:
- Camera traps
- Light sensors
- Sound sensors

Actions already conducted including results:
Field mapping was done by mapping direct species observations, track observations and other activity signs. Additionally the data of road-kill incidents were collected.

In addition, the quantity and quality of over- and underpasses was monitored as well as the number, location and expansion of landscape

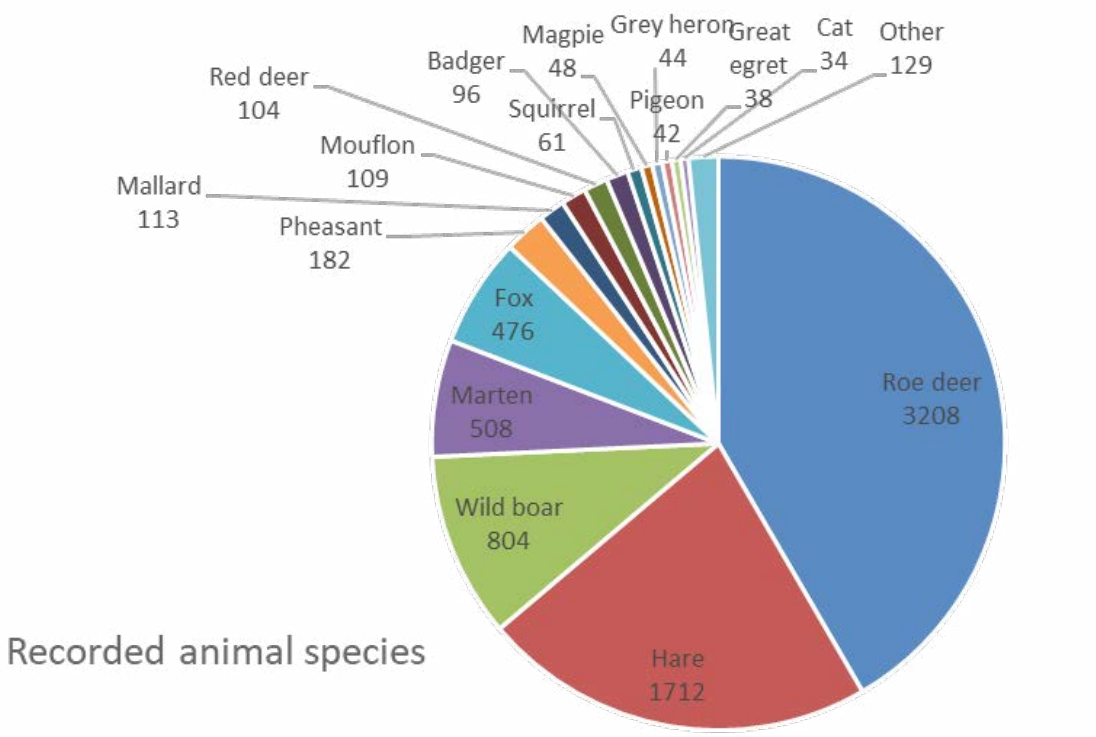

Figure 12 Recorded animal species in the pilot area of Pöttsching, © Environment Agency Austria

elements (linear/punctiform), as well as the existing barriers in the field.

In total, 26 monitoring sites were equipped with camera traps, and the data collection took place from December 4 2021 – May 29 2022 in the first phase and continued until the end of 2022. The day and night activated cameras were triggered by wildlife and other movements in the closer surroundings. This resulted in 12,252 specific sightings for this first phase of monitoring.

For the entire pilot region combined, mainly roe deer (3208 sightings), followed by hare (1712), wild boar (804), marten (508), fox (476),

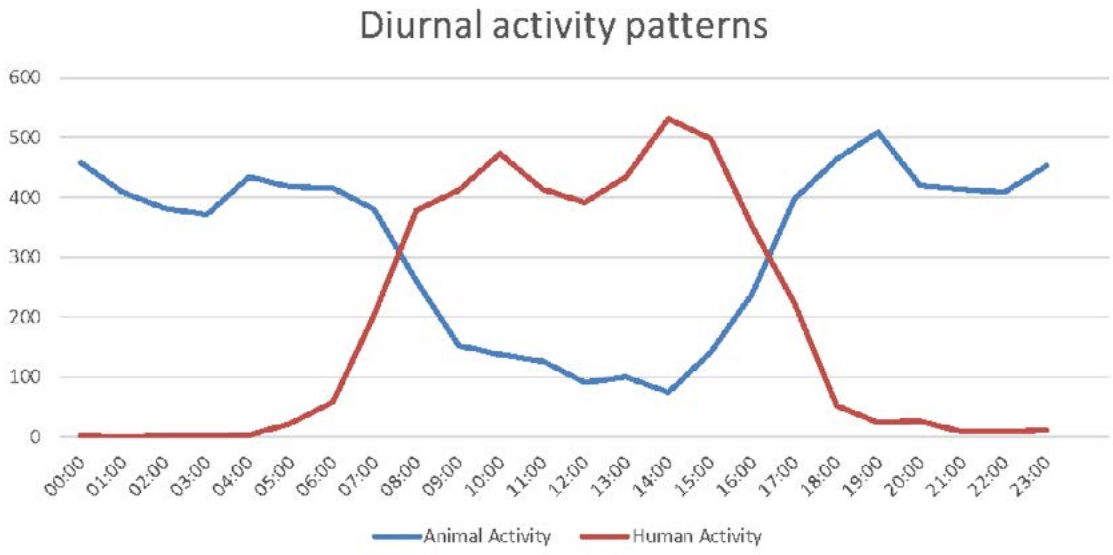

Figure 13 Diurnal activity patterns of humans and animals in Pöttsching combined, © Environment Agency Austria

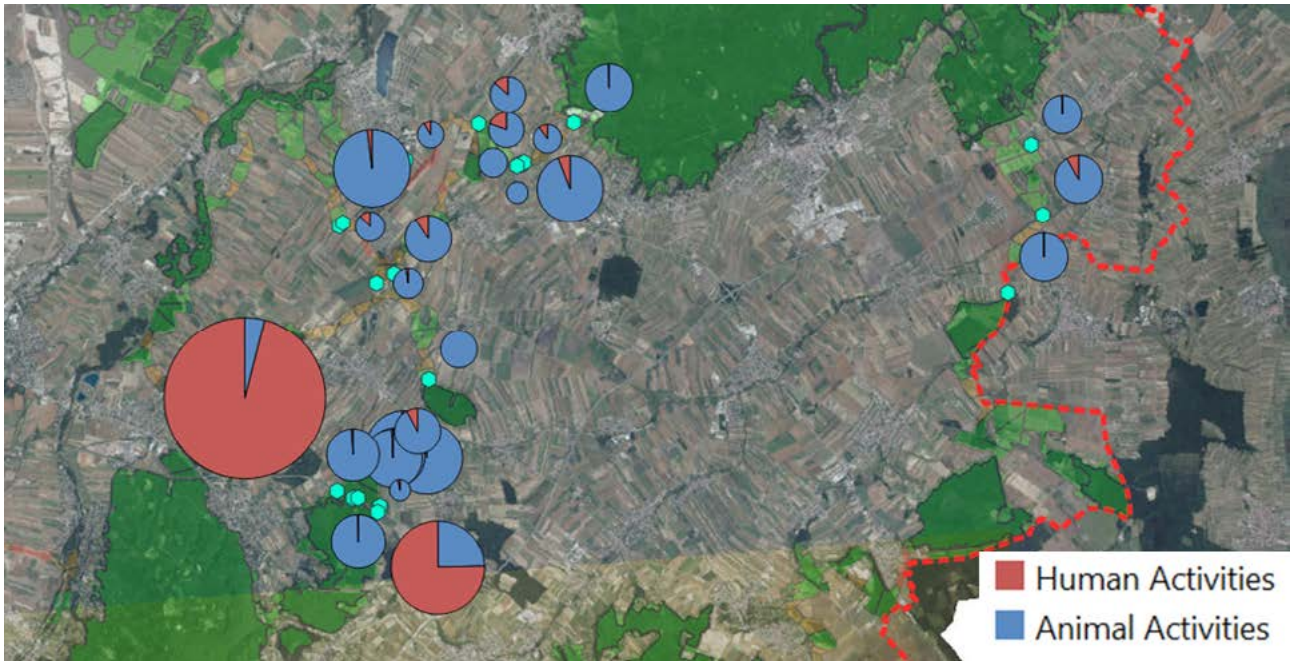

Figure 14 Monitoring of human and animal activities, © Environment Agency Austria/Geoland Basemap

pheasant (182), mallard (113), mouflon (109) and red deer (104) could be detected (Figure 12).

The different activity periods of animals and humans are clearly evident: while the activity levels in animals decrease from 7:00 in the morning and increase again from 15:00, human activity peaks at 10:00 and 14:00 (Figure 13).

In addition to presenting the results combined for the entire pilot region, the spatially explicit visualisation of the activity evidence along the corridors and across the entire bottleneck is of greatest interest.

Here, the varying potential for disturbance from human activity across the different crucial areas also becomes obvious (15).

Figure 15 Monitoring of animal activities clustered according to species group, © Environment Agency Austria/Geoland Basemap

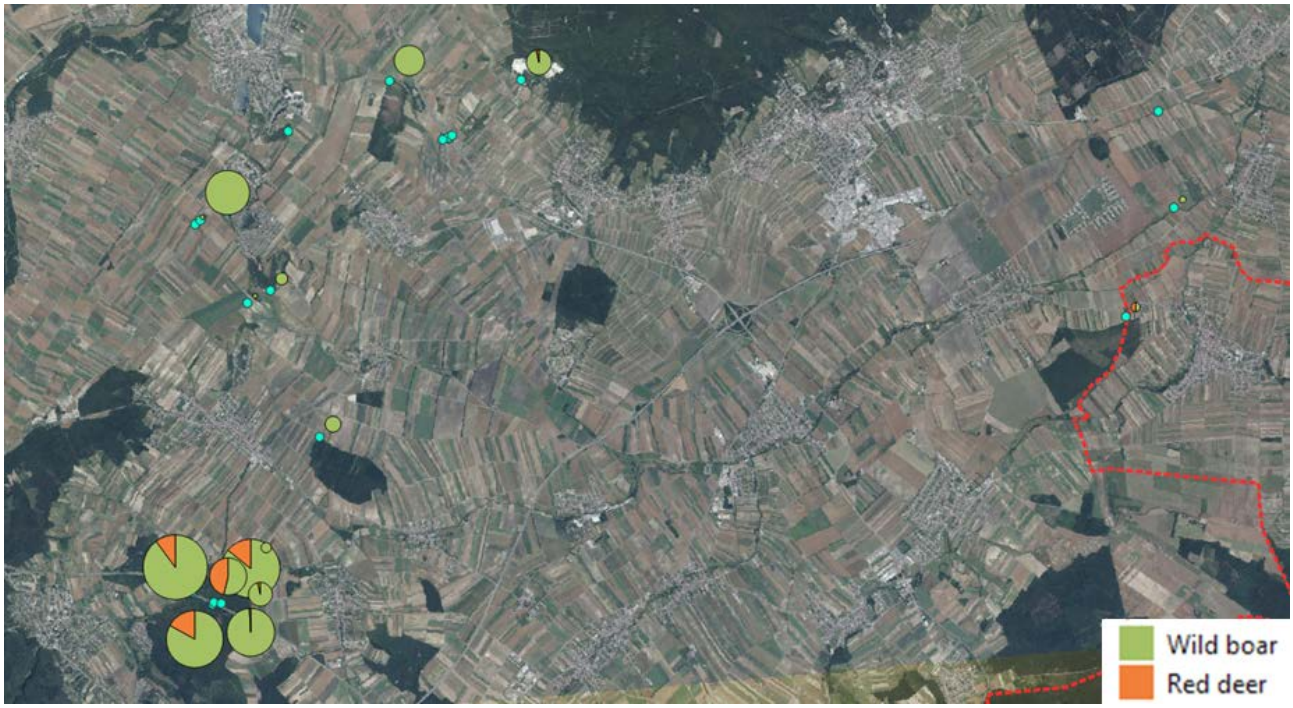

Figure 16 Monitoring of animal activities for target species of wild boar and red deer, © Environment Agency Austria/Geoland Basemap

In contrast, when looking at groups of species or individual target species, the very different use and thus the functionality of the corridor also becomes evident: while animals of the open land could be detected in similar frequencies over the entire bottleneck, forest-bound species and generalists are limited to woodland, copses and structurally rich areas of the study area (Figure 15).

This becomes particularly clear if we consider only the two target species – red deer and wild boar (Figure 16).

The results of the wildlife cameras also coincide with the results of the field survey methods, i.e. the mapping of direct species observations, track observations and other activity signs. The interpretation of the heat maps of these field-collected activity records also indicate a severely restricted permeability of the bottleneck for forest-bound species, including the target species (Figure 17).

However, the section remains easily passable for a wide range of wildlife (Figure 18).

Naturally, these considerations can also be illustrated at other spatial levels – for example, to consider neuralgic points such as the green bridges and crossing aids in the region.

A detailed analysis of the Müllendorf green bridge for the species of roe deer, red deer and wild boar shows, for example, that the green bridge is only used by roe deer and that red deer and wild boar do not migrate from the forest in the north across the cleared agricultural landscape (Figure 19).

In the area of the green bridge of Pöttsching, the target species cross the motorway over the green bridge in large numbers, but the nearby underpass, which even features a watercourse as a structural and guiding element with the stream “Erlbach”, is only marginally used for migration (Figure 20). Besides the particularly high human disturbance, this is probably also due to the hard-banked streambed and the lack of accompanying vegetation.

Nevertheless, the green bridges studied are located at suitable sites in the bottleneck

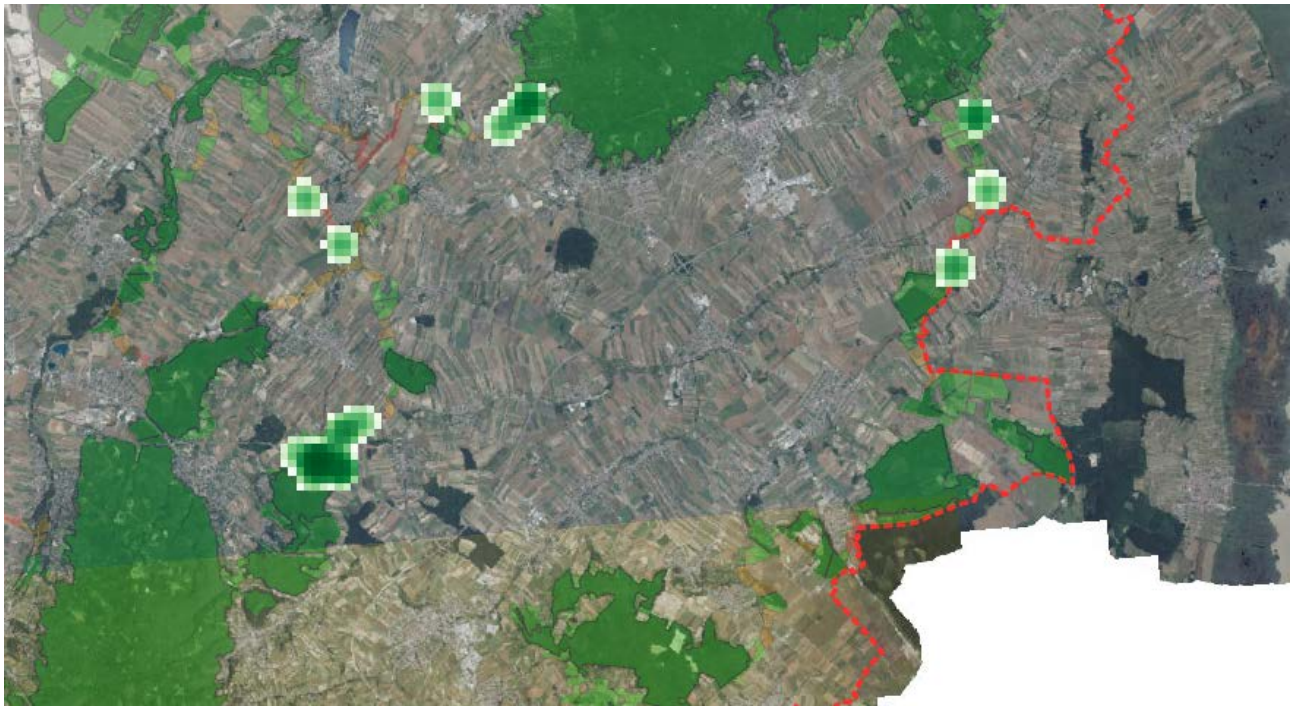

Figure 17 Heat map of activity signs of woodland species, © Environment Agency Austria/Geoland Basemap

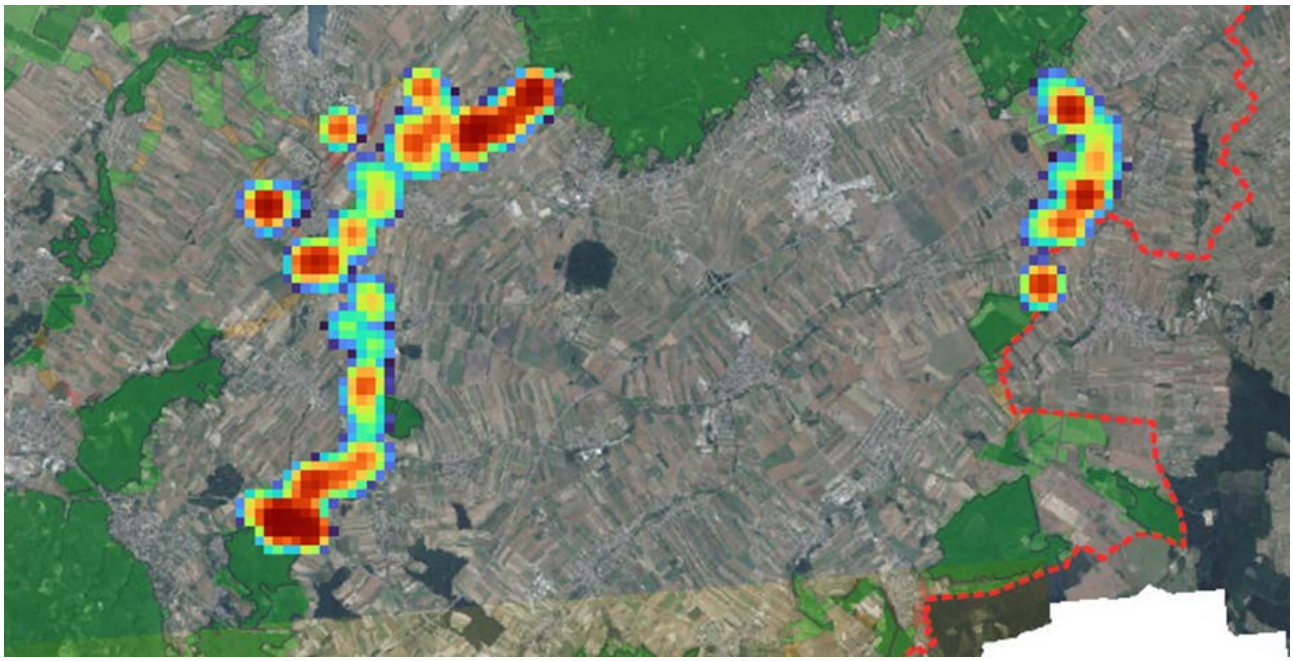

Figure 18 Heat map of activity signs of all recorded species, © Environment Agency Austria/Geoland Basemap

area and they clearly have structural and functional connectivity to support animal migration. However, the surrounding landscape, which integrates the bridges into the larger biotope network or corridor in the first place, does not support the structural and functional connectivity or even has a barrier effect, especially for the forest-bound target species wild boar and red deer. Moreover, the most advanced green bridges in the ideal locations need a well-structured environment with landscape elements as

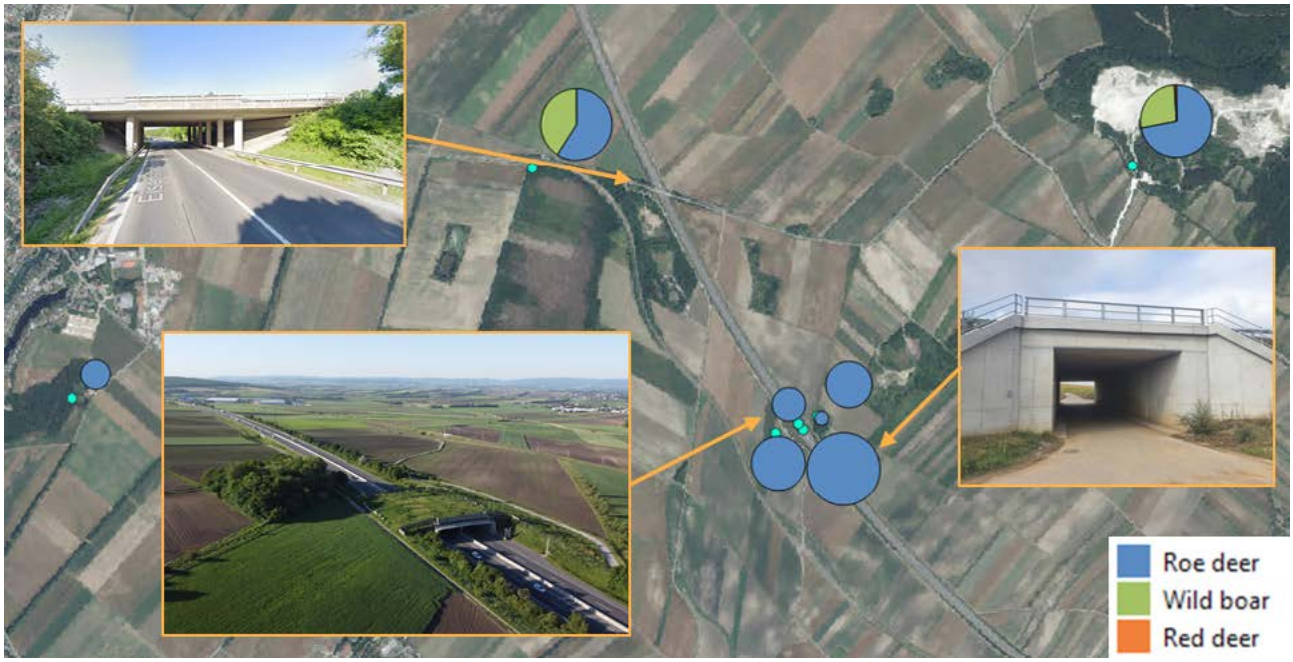

Figure 19 Monitoring of animal activities for target species of wild boar and red deer at green bridge Müllendorf (A3), © Environment Agency Austria/Geoland Basemap

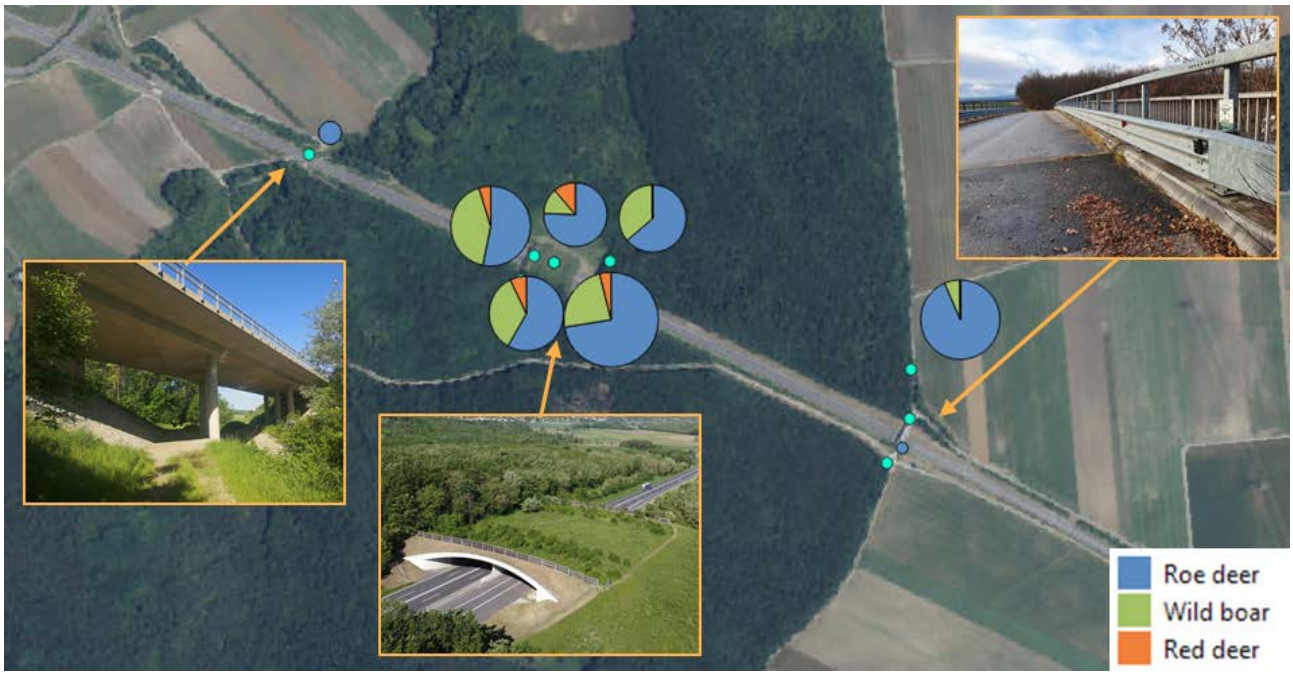

Figure 20 Monitoring of animal activities for target species of wild boar and red deer at the green bridge of Pöttsching (S4), © Environment Agency Austria/Geoland Basemap

guiding features and stepping stones to support animal migration.

In conclusion, the biggest risks to wildlife migration can be summarised as the following:

- Intensive land use practices and featureless landscape
- Sprawl of human settlements
- Sprawl of industrial sites
- Noise and light pollution
- A subordinate railway line
- The A3 and S4 highways

Further actions addressing Threat/ Pressure 7 include:

- Lobbying at the federal ministries for climate action and agriculture and forestry for the better use of the online platform of ecological connectivity (Plattform Lebensraumvernetzung) at www.lebensraumvernetzung.at
- Conduct constant monitoring for the SEA and EIA relevant projects in the area.
- Create and implement a durable monitoring plan.
- Inform stakeholders constantly on the monitoring results (see Threat/Pressure 8 below).

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

Specifics of the threat/pressure in the Alpine-Carpathian Corridor

Engaging with stakeholders is of utmost importance in order to raise awareness, reach understanding and consult with them their own knowledge or contribution to the topic of ecological connectivity. Engaging with stakeholders is time-consuming and mostly there is not enough time planned in.

In this region, our most important stakeholders were the hunting association, community representatives, landowners and managers, ASFINAG and the Ministry of Climate Change, and the Ministry of Agriculture. The topic of safeguarding ecological connectivity in the Alpine-Carpathian corridors has been known in the area. Prior to the SaveGREEN project, the transnational Alpine-Carpathian Corridor (AKK) project settled the way forward on how to keep the corridors while the area underwent heavy changes. New motorways and feeder roads were built, together with the changes of land-use along the newly established infrastructure. Several green bridges have been established based on the results of the AKK Project. The Austrian project team wanted to monitor whether the mitigation measures work and whether they are connected to the surrounding landscapes. To do so, many stakeholders are of importance, especially those who own land or take decisions at the local level.

Objectives

- Without specific legislation in place aimed at protecting ecological corridors, priority must be given to voluntary implementation within the existing legal framework. Therefore, it is necessary to meet with relevant stakeholders from all sectors, such as spatial planning, rural development, agriculture, forestry and hunting, and discuss how to safeguard or improve ecological connectivity. We all know that this is likewise a matter of politicians.
- Within the project, we focus on awareness raise regarding the importance of ecological connectivity for local communities, representatives of different sectors concerned and decision makers, and seek for the implementation of measures outlined in this document. We will provide

scientific sound maps of ecological corridors to be considered for future strategic planning. This will be done through activities addressing different stakeholders presented below.

Objectives set to address the threats are
Objective 8.1. Facilitate networking and develop a common platform and database

Objective 8.2 Facilitate information, awareness, education, communication

Objective 8.3 Support research and studies focused on connectivity, facilitate inter-sectoral capacity building and development of new professional opportunities

Objective 8.4 Facilitate the development of a regional identity and promote the area – nature, culture services

Objective 8.5 Facilitate the development & alignment of local strategies into regional sectoral strategy

Objective 8.6 Facilitate and support complementary initiatives

Problems:
It is not well-known that ecological connectivity goes beyond the construction and landowners are reluctant to agree on certain measures that would be necessary to keep or improve the functionality of ecological connectivity. From bottom-up we notice that landowners do not want to be restricted in their activities on their property, from top-down we see that the competences for implementing respective legislation with regard to spatial planning is spread across different hierarchical levels of units (state with little competences, provinces, and communities with most competences); and thus it is very complicated.

Local communities make decisions about what kind of development they would allow on their territory. There is a competition between communities for companies to settle in their communities as this stands for good income. There are attempts to work together beyond the territory of a community as indicated in certain regional development plans. The term of ecological connectivity is not anchored as a category in spatial planning in Austria. Thus, all measures taken to improve ecological connectivity are on a voluntary basis. Stakeholders need to be informed, involved and their knowledge taken up in decision taking. The following measures were selected to overcome the issue:

Measure 8.1.1. Establish formal/informal exchange platform(s) among relevant stakeholders

Description/examples of identified problem:
Instead of a dedicated set of laws at the national level, spatial planning in Austria, with its federal system of government, is based on coordination and cooperation between sectors and regional political subdivisions. In this system of multi-level-governance, the nine federal states, the Länder, are the main legislating entities, while the authority to carry out spatial planning decisions lies primarily with the 2,098 municipalities. When implementing their decisions, the municipalities are bound by the laws set out at the state, federal and EU levels.

The development of spatial plans in Austria occurs at three levels: regional spatial plans are developed by the *Länder*, while municipalities can develop spatial plans for their territories within the framework provided by the *Länder*. The federal government has no planning authority, with the exception of four specific sectors: forestry, water management, transportation (federal roads, railways, waterways, air travel) and energy.

In the absence of a national planning authority, there is a significant need for coordination of spatial planning activities. The coordination at the national level, as well as between the national and regional governments, occurs in an informal manner under the competence of

the Ministry of Climate Change, the Ministry of Agriculture, Forestry, Regions and Water, Chamber of Agriculture and the Austrian Conference on Spatial Planning (ÖROK). Decisions by ÖROK are non-binding in nature.

In light of this strong division of planning and decision-making authority, effectively addressing supra-regional and cross-sectoral issues such as ecological connectivity in a coherent manner throughout the country is very challenging. Coordination of a nationwide network of wildlife corridors depends heavily on the legislative support of the nine *Länder* and the goodwill of the municipal authorities.

Existing resources:

- ÖROK (2016) "Flächen sparen, Flächenmanagement, und aktive Bodenpolitik", *ÖROK Empfehlung Nr. 56*, available here.
- ÖROK (2021) "ÖREK 2030-Umsetzungspaket 'Bodenstrategie für Österreich' - Strategie zur Reduktion der weiteren Flächeninanspruchnahme und Bodenversiegelung bis 2030", available here.
- ÖROK (2018) *Raumordnung in Österreich und Bezüge zur Raumentwicklung und Regionalpolitik*, available here.
- WWF Austria (2021) *WWF-Bodenreport 2021 - Die Verbauung Österreichs*, available here.

Actions required:

- *Short-term:* Feed data gathered in the course of the SaveGREEN project into the *Lebensraumvernetzung* platform, which represents the primary database for centralised data on ecological connectivity in Austria.
- *Short-term:* Promote use of the *Lebensraumvernetzung* (*LRV*) platform among relevant stakeholders by means of capacity-building workshops and targeted stakeholder meetings. Source: www.lebensraumvernetzung.at

In their Recommendations No. 56 on 'Reducing land consumption, land management and active spatial policy' (2016), ÖROK recommends the following:

- *Long-term:* Develop common understanding of ways to achieve reduced levels of land consumption by building awareness among the public and relevant stakeholders through dedicated advisory and awareness programmes.
- *Long-term:* Creation of a "Sustainable land-use" platform that convenes stakeholders from relevant sectors and institutions nationwide, as well as international experts. The platform should serve as a catalyst for regular knowledge-transfer and develop strategies, measures and campaigns promoting sustainable land-use practices.
- *Long-term:* Set overarching aims in supra-regional and national spatial plans to secure sustainable allocation and management of land in the long-term.
- *Long-term:* Spatially define maximum limits for the sprawl of settlements for municipalities across Austria that experience strong pressure for the allocation of land.
- *Long-term:* Based on the set quantitative targets for future allocation of land for construction, municipalities are to report on the amount of land currently in use. To allow for effective comparison and analysis, the data must be gathered and catalogued according to common standards. On-going analysis across all levels of government and subsequent inter-stakeholder discussions are to be held under the auspices of ÖROK.

Measure 8.2.1. Targeted information campaigns and broader awareness raising

Description/examples of identified problem:

Awareness of the importance of ecological connectivity among the general public as well as many relevant stakeholder groups is low in

Austria. The fact that spatial planning in the country is organised according to a multi-level-governance system means that there is no one decision-making entity that can initiate the steps required to secure wildlife corridors. Awareness raising activities cannot, therefore, be limited to one stakeholder in particular, but must address a multitude of actors at all levels of government.

Existing resources:

- Pro natura (2017) *Unterichtshilfe: Wildtierkorridore*, available here.
- WWF Austria (2021) *WWF-Bodenreport 2021 - Die Verbauung Österreichs*, available here.
- Leitner H., Grillmayer R., Oberleitner I., Leissing D., Leissing J., Stejskal-Tiefenbach M. (2018) *Lebensraumvernetzung in Österreich: Biodiversität ist Leben - Leben ist Bewegung,* brochure, available here.
- Leitner H., Grillmayer R., Oberleitner I., Leissing D., Leissing J., Stejskal-Tiefenbach M. (2018) *Lebensraumvernetzung in Österreich: Biodiversität ist Leben - Leben ist Bewegung,* flyer, available here.

Actions required:

a. Short-term: Conduct awareness raising activities in the municipalities of the Austrian pilot areas, making use of different channels (on-site events, media, written communication, etc.) and tailored to specific target audiences (hunters, farmers, inhabitants of concerned municipalities, school children, etc.)

b. Long-term: Develop common understanding of ways to achieve reduced levels of land consumption by building awareness among the public and relevant stakeholders through dedicated advisory and awareness programmes (ÖROK, Recommendations No. 56, 2016)

c. Long-term: Creation of a "Sustainable land-use" platform that convenes stakeholders from relevant sectors and institutions nationwide, as well as international experts. The platform should serve as a catalyst for regular knowledge-transfer and develop strategies, measures and campaigns promoting sustainable land-use practices (ÖROK, Recommendations No. 56, 2016).

Measure 8.3.1. Promote further research on the preservation of ecological connectivity and ensure knowledge transfer and uptake

Description/examples of identified problem:

To support outreach and awareness-raising measures (measure 8.2.), robust, comparable and up-to-date data on ecological connectivity and spatial plans is required.

Existing resources:

- Platform for Ecological Connectivity: www.lebensraumvernetzung.at

Actions required:

- *Short-term:* EEA and external expert to use data gathered during monitoring in AT pilot areas and along linear transport infrastructure in Austria to contribute to scientific publications on ecological connectivity.
- *Short-term:* Provide capacity building workshop for relevant stakeholders on the importance of ecological connectivity and the role of spatial planning in securing its preservation
- *Long-term:* Creation of a nationwide spatial planning database with harmonised methods of data collection
- *Long-term:* Creation of a "Sustainable land-use" platform that convenes stakeholders from relevant sectors and institutions nationwide, as well as international experts. The platform should serve as a catalyst for regular knowledge-transfer and develop strategies, measures and campaigns promoting sustainable land-use practices (ÖROK, Recommendations No. 56, 2016).
- *Long-term:* Based on the set quantitative targets for future allocation of land for

construction, municipalities are to report on the amount of land currently in use. To allow for effective comparison and analysis, the data must be gathered and catalogued according to common standards. On-going analysis across all levels of government and subsequent inter-stakeholder discussions are to be held under the auspices of ÖROK (ÖROK, Recommendations No. 56, 2016).

Measure 8.4.1 Support building in ecological connectivity into regional development plans as part of regional identity

Description/examples of identified problem:
The pilot area of Pöttsching located in the Alpine-Carpathian corridor is characterised by agriculturally shaped and used areas with centres of business along the transport infrastructure and in the outskirts of bigger settlements that are growing in size.

The LEADER Local Strategy of North Burgenland (2014-20) says beside other topics (social, energy etc.) that nature is central for potential development, especially for soft tourism. Awareness-raising on the value of nature and its appreciation is high on the agenda of the strategy. LEADER funds projects, which are assessed toward their contribution to sustainable development.

However, ecological connectivity is not a subject of the strategy.

Existing resources:
» LEADER Nord Burgenland: Lokale Entwicklungsstrategie (LES), 2015

Actions required:
a. Short-term: Awareness-raising: get in contact with the LEADER Local Action Group Nord Burgenland in order to discuss ecological connectivity as part of their valuable natural heritage. Discuss the importance of this last remaining supra-regional green corridor that connects the Alps with the Carpathians. Discuss the possibilities of how local actors can substantially contribute to its conservation.

b. Long-term. Support agricultural projects, e.g. organic farming taking care of wildlife corridors by planting trees, hedgerows, and extending orchards to support the functioning of the wildlife corridors.

Measure 8.5.1 Support the integration of ecological connectivity into various local development plans

Description/examples of identified problem:
Based on a desktop research, the following strategies have been found and analysed with regard to ecological connectivity. In the following you will find a short content analysis and its relations to strategies on the provincial and federal levels.

Local strategies/guidance principles:
» **LEADER Nord Burgenland Regional Development Strategy** (2015): see more information above!

» Regionalmanagement Burgenland GmbH is the regional development agency of the province of Burgenland. As **Burgenland's competence centre for regional development**, it is the contact for municipalities, associations, institutions and regional actors for implementing development initiatives in their region.

The goals of Regionalmanagement GmbH are to secure and strengthen the attractiveness, quality of life, competitive strength and cross-border cooperation of the Upper Austrian regions. This includes dynamic economic development, social cohesion, attractive jobs, sustainability and long-term oriented spatial planning, as well as the positive development of soft location factors such as housing, leisure, nature and cultural offerings in the Burgenland regions.

» **Forest development plans** for the different counties in the region that visualise ecological corridors in exceptional maps.

- **Local development concepts** prepared by communities within the framework of the local zoning plan:

  Every municipality is required to enact, maintain and regularly review the zoning plan by ordinance so as to carry out the tasks of local spatial planning. The zoning plan consists of the local development concept and the zoning part. The local development concept is to outline basic development options for a longer-term planning period. The zoning section – based on the concept – specifies the intended uses that can be implemented in the short term in a particular and parcel-specific manner. The zoning section must not contradict the planning and textual specifications of the local development concept.

  The competent planning authority for the tasks of local development planning is the municipal council. A supervisory approval by the provincial government is required.

National strategies/policies:
Together with the relevant stakeholders, the Austrian Spatial Planning Conference (ÖROK) described in detail above developed the **Austrian Spatial Planning Concept (ÖREK)** that indicates the following measures to be taken for open spaces that we consider a term for ecological connectivity, among others:

- Establish an ÖREK Partnership for "Development of open spaces, resource protection and climate change"

- Analyse models for financial and fiscal consideration of ecosystem-based services and present their spatial impacts

- Develop guidelines for resolving conflicts between densification and urban greening, and prepare good practice examples

ÖROK can give recommendations only.

The **Common Agricultural Policy for Austria** (GAP, submitted to EC in December 2019) includes chapters for conservation of biodiversity, improvement of ecosystem services and safeguarding habitats and landscapes. Rural development interventions are recommended to include environmentally sound management that promotes biodiversity. However, economic pressure and heavy workload cause farmers to leave fallow cultivable land, or cut down hedgerows and trees that are not "productive".

One part of GAP is the so-called **agro-environmental program** (ÖPUL) that regulates payments for organic farmers and farmers that manage or support biodiversity-rich landscapes/areas. Ecological connectivity is mentioned; farmers get paid for planting trees, hedgerows or groups of trees that increase the functionality of ecological connectivity. However, the measures are considered at the level of a single farmer only, and are not based on a supra-regional plan. Farmers take this offer to contribute to contractual nature protection.

Actions required:
a. Short-term: Provide the map with the supra-regional, regional and local wildlife corridor, its local branches and critical areas for decision-makers and discuss how they can contribute to the conservation of this important ecological connection.

b. Short-term: Organise meetings to spread the project results and actions that could be taken by local players.

c. Long-term: Seek ecological connectivity anchored in the legislation/spatial plans at the national level. Attempts to bring this topic high on the agenda have already started a long time ago. It will be a lengthy process as the system is complicated.

Target groups: Federal Ministry of Climate Change, Federal Ministry of Agriculture, Forestry, Regions and Tourism, LEADER Local Action Group, communities, Regional management Burgenland, Province of Burgenland – Department of Nature Conservation.

Measure 8.6.1 Establish an exchange of information platform for initiatives that work on ecological connectivity

Description/examples of identified problem:
At the national level, there are different organisations, institutions and universities that deal with the identification of ecological corridors and related topics like soil sealing, often within the frame of EU funded projects (Interreg Alpine Space, Interreg Central Europe, Interreg Danube Transnational Programme, Interreg Cross-border Cooperation Programmes, Horizon, etc.). However, there is no synopsis of the initiatives and projects to learn from each other, discuss the findings and develop position papers together addressing the decision makers.

The Environment Agency Austria is developing a platform to display data, interactive maps and related publications on a common platform; the so-called information platform "Lebensraumvernetzung".

Resources:
- Platform "Lebensraumvernetzung"
- Programme Rural Development
- LEADER strategy
- The projects of ConnectPLUS as well as Connect Forest Biodiversity by BFW – Austrian Research Centre for Forests
- "Unser Boden" campaign by the Lower Austrian agricultural district authority
- Interreg DTP Dare2Connect Project
- Interreg Cross-border Cooperation AT-CZ NatReg Project
- WWF Soil campaign
- etc.

Actions required:
a. Short-term: provide an interactive exchange platform (LRV platform?)

b. Short-term: identify initiatives and inform them about the topic and the attempts to strengthen the LRV Platform

c. Long-term: organise meetings of representatives of relevant initiatives on a regular basis

General actions to engage stakeholders:
- Identify opinion leader
- Organise face-to-face meetings to learn the local setting of hierarchy and extend the group of stakeholders step by step
- Hold bilateral meetings in the municipalities with all relevant stakeholder groups
- Organise info day to introduce ecological connectivity and the role of their region to the general public
- Run capacity-building workshops for decision-makers and management authorities working in sectors of relevance for ecological connectivity including relating compensation measures and financing, damage prevention etc.
- Collaborate with as many stakeholders as possible and keep them informed about the process and results
- Hold end-of-project meeting with all engaged parties to inform them about the final results and possible local next steps

7. Conclusions

With regard to future developments, the main concern is to maintain the permeability of the landscape and not endanger the quality of the landscape through future changes in land use and additional barriers, such as fencing for photovoltaic plants. Based on the aerial photos and geodata, the intensive land use becomes obvious: over long stretches, landscape elements and near-natural habitats are missing as cover. Better accompanying structures should be created in this area, field margins should be re-naturalised and the Erlbach stream should be improved as a migratory axis. By restoring the regulated and straightened water bodies in the region and establishing accompanying structures of vegetation, animal migration and overall connectivity could be improved significantly to support the functionality of the local ecological network as well as the Alpine-Carpathian Corridor.

Measures to safeguard and restore the corridors include: settlement activities and the associated land consumption must be limited in order to guarantee the continuum of the Alpine-Carpathian corridor, especially in the rapidly growing metropolitan areas close by. Furthermore, programmes that make extensive agriculture more attractive would make a significant contribution to ensuring the permeability of the corridor. To integrate the green bridges into the ecological network, targeted restoration of degraded landscapes over the entire bottleneck situation and especially in the feeder areas of green bridges is urgently needed. However, to be successful, local stakeholders need to be informed, involved, and organised during the project implementation, for their buy-in and support realising ecological connectivity. Much more time would be needed to get a broader consensus of the importance of ecological connectivity and its conservation.

PILOT AREAS:

Austria

1 Kobernausser forest

2 Pöttsching (Alpine-Carpathian Corridor)

Czech Republic/Slovakia

3 Beskydy-Kysuce CZ-SK cross-border area

Hungary/Slovakia

4 Novohrad-Nógrád SK-HU cross-border area

Ukraine

5 Zakarpattia region

Romania

6 Mureş valley (Arad-Deva)

7 Mureş Valley (Târgu Mureş – Târgu Neamţ)

Bulgaria

8 Rila-Verila-Kraishte corridor

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Project partners:

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

Bulgaria: Black Sea NGO Network, Bulgarian Biodiversity Foundation

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

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

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

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

Associated Strategic Partners:

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

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

Czech Republic: Ministry of the Environment, Nature Conservation Agency

France: Infrastructure and Ecology Network Europe (IENE)

Germany: Bavarian State Ministry of the Environment and Consumer Protection

Greece: Egnatia ODOS S.A.

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

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

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

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

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

DTP3-314-2.3, July 2020 – December 2022

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