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Feasibility Study

for a transnational

Alpine-Carpathian-Corridor Project

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Preface

In the past centuries, ecological connectivity has been identified as one of the key factors for safeguarding biodiversity. On an international level, the Council of Europe and the EU Commission and Council (Habitat Directive 92/45/EWG, COST Action 341) have established a scientific, legal and policy framework to trigger activities and measures to secure ecological connectivity.

The first profound survey that identified the need for ecological connectivity in Austria was done in 2001. The Austrian federal ministry of traffic, innovation and technology (bmvit) contracted the Institute of Wildlife Biology and Game Management to identify corridors on a supra-regional level and barriers within the national motorway network. An important legal basis, the Directive for Game-safety in the traffic system followed, which was released by the FSV (Forschungsgesellschaft Straße-Schiene-Verkehr) and adopted by the bmvit.

Soon a priority was noted to safeguard the connection between the Alps and the Carpathian mountains. Because of an increasing barrier effect of infrastructure, increasing settlement-area and intensive land use, the protection of an ecological corridor – the so-called Alpine-Carpathian Corridor (ACC) – has been determined as the measure necessary to safeguard migration and genetic exchange, going beyond the protection of ecological connectedness. This has also been considered within concepts for the regional development of the cross-border area between Vienna, Bratislava, Sopron and Brno. The Joint Regional Development Strategy (JORDES+) by the PGO mentions the Alpine-Carpathian Corridor as one possible implementation project.

A series of subsequent activities enabled first implementation measures: In Burgenland a wildlife-passage over the S4 was completed in 2006. Wolf et al. (2002-2006) compiled necessary measures on a local level, elaborated strategies for the implementation into spatial planning and contributed in terms of public awareness. While the University of Natural Resources and Applied Life Sciences (Grillmayer et al. 2002) finally have elaborated research techniques in a model-area between the Danube floodplains and the Leithagebirge, the University of Veterinary Medicine Vienna (Reimoser et al. 2001) contributed with Wildlife-Ecological Zoning for one important section of the corridor.

Völk & Kalivodova (2000) located the Alpine-Carpathian Corridor on the Slovakian side and proposed wildlife passages in this area. This work was completed by Longa & Sedlák (2007) with a feasibility study for a wildlife passage over the D2 in Slovakia.

In 2006, WWF assessed the precautions for safeguarding the ACC and identified the need for a comprehensive and trans-boundary cooperation. It is not only important to safeguard the whole range of the corridor, but also to charge all sectors that can have a positive or negative impact on the connectivity within the corridor area. Keep in mind that safeguarding an ecological corridor can be seen as a multi-dimensional approach, whereby every dimension has to be covered in a holistic implementation project. Otherwise singular measures may be contradicted by other sectors.

Within this feasibility study, WWF acquired necessary partners to verify that measures in all sectors can be undertaken in a coherent way. The results have been incorporated in a concept for a trans-national EU-funded project.

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1. Introduction

1.1. Objective

To safeguard the Alpine Carpathian Corridor, it is important to secure the whole range of the corridor (approx. 120 km), and also to charge all sectors that can have a positive or negative impact on the connectivity within the corridor area. The aim of the Alpine-Carpathian Corridor feasibility study was to prove that all possible barriers in the corridor area can be addressed within a comprehensive implementation project, and that the achieved connectivity can be permanently secured. To do so, relevant sectors were identified and investigated in terms of feasible activities. In critical areas, where we lack experience from preliminary work, implementation tools were tested. In the next step, relevant authorities were pinpointed and approached to identify specific instruments.

A set of necessary and feasible measures has been compiled to a project concept. To prepare a cross-border and cross-sectoral project, partners and funding possibilities have been elaborated.

Table 1 Aims of the feasibility study

I	**Identification of relevant sectors, instruments and preliminary work**
II	Inquiring implementation possibilities
III	Involvement of relevant stakeholders
IV	Development of a project concept
V	Accompanying communication

1.2. Methodology

To approach the set tasks, a cross-border team of experts was established to conduct the main work of the feasibility study. Meetings where held in 03/07, 05/07, 06/07 08/07 and 09/07. Relevant further experts and implementation bodies were involved to address specific subjects, such as spatial planning. In a series of four workshops and two field-excursions, relevant sectors, instruments and necessary preliminary work were identified, elaborated and compiled.

The draft results were compiled to a project outline, which was distributed to additional experts, stakeholders and authorities for further input. In a large cross-border workshop, held on September 28th, 2007 in Schloss Orth in the Donau-Auen National Park, the preliminary project outline (aims, need for action, instruments, partners) was discussed with a broad selection of stakeholders and experts.

To investigate further instruments of spatial planning, four meetings with regional spatial planning authorities and experts were organized.

To test the results form the scientific background, possible measures in the field of landscape restructuring were elaborated in the model area between the Leithagebirge and the Danube floodplains. Additionally, implementation and funding possibilities were discussed with local land-users and funding authorities.

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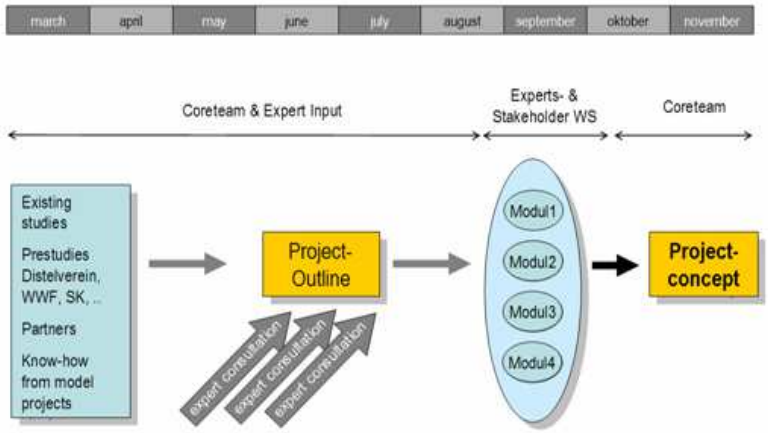
Fig. 1 Project workflow for the feasibility study 2007



In terms of environmental education, tools and education materials applied in the past were examined. Key messages for environmental education and communication were elaborated to address relevant media and to conduct a test-school lesson in a 5th grade school class in June 2007.

Table 2 Cross-border core-team of the ACC feasibility study

Participants	Institution	Field of expertise
Gerhard Egger	WWF Austria	Project management
Bernadette Strohmaier	WWF Austria	Project assistance & Ecology
Paul Weiß	Distelverein	Wildlife ecology & Land use
Milan Janák	DAPHNE	Project management & Ecology
Dušan Valachovič	Sprava CHKO Zahorie	Wildlife ecology & Land use
Slavomir Findo	Carpathian Wildlife Society	Wildlife ecology
Maroš Finka	SPECTRA Centre (Slovak Technical University)	Spatial planning
Georg Frank	Donau-Auen National Park	Protected area management
Klaus Hackländer	Institute of Wildlife Biology and Game Management (University of Natural Resources and Applied Life Sciences)	Wildlife ecology
Franz Suppan	Institute of Surveying, Remote Sensing and Land Information (University of Natural Resources and Applied Life Sciences)	GIS
Roland Grillmayer	University of Applied Sciences Wiener Neustadt for Business and Engineering Ltd., Austria	GIS

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Table 3 Expert consultations and Testing of Implementation Instruments

Date	Participants	Subject
21/02/07	Core team, Landscape ecologists, Infrastructure experts	Field-excursion to existing greenbridges & Landscape restructuring
12/05/07	Wildlife experts & Local consultants	Field-excursion on Landscape restructuring and funding possibilities
05/06/07	Spatial planning authorities of Lower Austria	Spatial planning & Wildlife ecology
08/08/07	Spatial planning authorities of Burgenland	Spatial planning & Wildlife ecology
13/08/07	Spatial planning experts Slovakia	Spatial planning & Wildlife ecology
26/09/07	Local Spatial planning authorities and experts in model area	Spatial planning & Wildlife ecology
28/09/07	Cross-border Stakeholder Workshop in Schloss Orth	Cross-sectoral approach to ecological connectivity

In addition, the proposed project and need for action have been presented to and were discussed with various stakeholders and possible implementation bodies.

Table 4 Project presentations

Date	Participants
09/01/07	NDSAS & Traffic Ministry SK
16/02/07	PGO
27/03/07	UNEP ISCC Expert group
17/04/07	Round table Lower Austria
04/05/07	Austrian state forest enterprise (ÖBf AG)
07/05/08	Advisory board of the National Park Danube Floodplains
08/05/07	Hunting association Burgenland
10/05/07	Green belt focal point Austria / Naturschutzbund NÖ
23/05/07	Environmental Education Workshop
19/06/07	Ministry of Transport, Ministry of regional Development, NDSAS and regional Government of Bratislava Region
28/09/07	Stakeholderworkshop in SchlossOrth
19/10/07	PEEN expert group
03/12/07	Consultation with ETC authorities of Lower Austria and Vienna
05/12/07	ORF presentation to UNIVERSUM department
18/12/07	Consultation with ETC authorities of Bratislava

Furthermore, the project concept was presented to the national funding authorities and focal points for the ETC cross-border programme of Austria and Slovakia, and the Central European-Transnational programme.

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1.3. Accompanying Communication work

In cooperation with partners and supporters, the Alpine-Carpathian Corridor and ecological connectivity have recently been presented in various media, including a new website of the Austrian Ministry for traffic, innovation and transports, which contains information about wildlife, traffic and about the pending ACC project (www.bmvit.gv.at).

Fig. 2 Special interest publication by Ms Elisabeth Schenkir in spatial planning media

Dialog regional

Elisabeth Schenkir / Abteilung Raumordnung und Regionalpolitik

Der Alpen-Karpaten-Korridor.

Wildtierwanderungen mit System.

Alpen und Karpaten beherbergen große Wildtiere wie Hirsch, Luchs, Bär oder Wolf – Tierarten, die zum Schutz ihrer Überlebensräume auf den Menschen angewiesen sind.

Der Alpen-Karpaten-Wildtierwanderkorridor verbindet diese beiden Gebirge und stellt damit nicht nur den Erhalt dieser Tierarten, die zum Europäischen Naturerbe zählen, sicher, sondern ermöglicht auch den langfristig unverzichtbaren innereuropäischen Austausch von Erbmaterial [Genflusskorridor].

Artenschutz unter dem Druck der Zivilisation. Im östlichen Niederösterreich quert der Alpen-Karpaten-Wildtier-Korridor den Raum zwischen Bratislava, Sopron und Wien, der in vielerlei Hinsicht unter einem großen Entwicklungsdruck steht. Hier hat der verstärkte Ausbau von Siedlungen, von Betriebsgebieten und besonders der Verkehrsinfrastruktur die Landschaft schon stark zerschnitten, sodass es für die auf Wanderschaft befindlichen Tiere nicht mehr möglich ist, ihrer traditionellen Wanderroute zu folgen. Die Tiere müssen sich mit so genannten Trittsteinhabitaten begnügen, wie sie etwa das Leithagebirge als großes, zusammenhängendes Waldgebiet, der Nationalpark Donau-Auen [die auf mehreren Kilometern beiderseits unverbauten Uferstrecken ergeben bestmögliche Wildwechselmöglichkeiten] oder die March-Auen darstellen.

Mit der Erhaltung bzw. Wiederherstellung eines breiten Landschaftsstreifens mit Gehölzstrukturen, Brachen und Wäldern als Verbindung zwischen diesen Trittsteinhabitaten ermöglicht der Alpen-Karpaten-Korridor die Wanderung der Tiere. Somit stellt dieser Korridor eine bedeutende ökologische Lebensader von europäischer Dimension dar, für deren Erhalt Österreich und die Slowakei die Verantwortung tragen.

Naturschutz auf europäischem Format. Seitens der Europäischen Union werden die Mitgliedsstaaten verpflichtet, jene verbindenden Landschaftselemente zwischen Natura 2000-Gebieten, die im Zuge der Wanderungen die geographische Verbreitung und den genetischen Austausch der Arten gewährleisten, zu pflegen und im Rahmen der Landnutzungs- und Entwicklungspolitik zu fördern. In der FFH-Richtlinie[1] sind sowohl der besondere Schutz dieser Wanderkorridore, die zur genetischen Erhaltung der Wildtierarten erforderlich sind [siehe Artikel 10 der FFH-Richtlinie], als auch der besondere Schutz gegen Störungen während der Wanderungszeiten [Artikel 12.b.] angeordnet. Diese beiden Verpflichtungen erfordern jedoch zukünftig einen Schutz von Wildtierwandergebieten durch die Verbindung der Trittsteinhabitate, auch wenn diese Gebiete bisher aus naturschutzfachlicher Sicht nicht als schutzwürdige bzw. gefährdete Bereiche oder Biotope bewertet wurden. Über das EU-Förderprogramm „Europäische Territoriale Zusammenarbeit" werden künftig derartige Projekte auch von der EU unterstützt. Daher versucht der WWF mit der Österreichischen Bundesforste AG, den Ländern Niederösterreich und Burgenland sowie der Slowakei den Alpen-Karpaten-Korridor für Wildtiere wieder zur Gänze durchgängig zu machen.

Grundlagenarbeit in Österreich. Vom BMVIT wurden bereits einerseits die Unfallhäufungspunkte mit Wild und andererseits die Folgen dieser Barrierebildung der seit dem Jahr 1998 zwingend vorgeschriebenen Wildzäune an Schnellstraßen und Autobahnen untersucht. Die von der ASFINAG in Auftrag gegebene, vom WWF erstellte Studie „Strategische Planung für die Lebensraumvernetzung in Österreich" beschreibt die Wanderrouten des Wildes sowie die lokale Situation und zeigt Abhilfen zur Unfallvermeidung auf.

1) Fauna-Flora-Habitat-Richtlinie

Dialog regional

RAUM DIALOG Herbst '07 Seiten 14/15

Von Seiten des BMVIT wurde als wesentlicher Beitrag eine Informationsstudie zur praxisgerechten Anwendung der Richtlinie RVS 3.01 „Wildschutz" erstellt, um somit auch die UVP-Verfahren hinsichtlich Wildquerungshilfen effizienter abwickeln zu können. Weiters wurde eine Liste mit erforderlichen Grünbrücken als Wanderhilfe für das Wild über Schnellstraßen und Autobahnen herausgegeben, und beispielsweise an der Ostautobahn im Burgenland [20 km vom Alpen-Karpaten Korridor entfernt] wurden sechs Landschaftsbrücken errichtet. Käme es zur Umwidmung etwa von Grünland in Bauland im Bereich dieser Grünbrücken, könnten diese kostenaufwändigen Querungshilfen vom Wild nicht angenommen werden und blieben funktionslos – Regionalplanung und örtliche Raumordnung sind daher gefordert, vorausblickend solchen Konflikten entgegenzuwirken.

Empfehlungen für NÖ. Die Empfehlung, im Bereich Arbesthal-Göttlesbrunn an der A4 eine Grünbrücke zu errichten wurde noch nicht realisiert, wodurch seit der Fertigstellung dieses Abschnittes der A4 im Jahr 1990 der Alpen-Karpaten-Korridor unterbrochen ist.

Da seit Juni 2005 das Landschaftsschutzgebiet Wienerwald von der UNESCO als Biosphärenpark anerkannt worden ist, müssen die Bestrebungen des Biosphärenpark-Managements zum Schutz des Rot- bzw. Rehwilds in der Regionalplanung berücksichtigt werden.

Aufgabe für die Regionalplanung: Vernetzung. Die Regionalplanung steht nun mit dem Wissen um die Wildtierwanderkorridore bei der Neuüberarbeitung und digitalen Aufbereitung der Datengrundlagen der Regionalen Raumordnungsprogramme für das nördliche und südliche Wiener Umland vor der besonderen Herausforderung, mit den zur Verfügung stehenden Mitteln der Regionalplanung (regionale Grünzonen, regionale Siedlungsgrenzen und erhaltenswerte Landschaftsteile) sowohl den Schutz der Oberflächengewässer (EU-Wasserrahmenrichtlinie), den erforderlichen Überflutungsbereich für den Hochwasserschutz und die Migrationsachsen für die Wildtierwanderkorridore, als auch die für die Bevölkerung sehr wichtigen Grünräume sowie Erholungsflächen langfristig freizuhalten und somit abzusichern. Wichtiges Hilfsmittel wird eine detaillierte GIS- Modellierung der Wildtierkorridor-Daten vom Institut für Feminformation und Vermessung der Universität für Bodenkultur in Wien sein, deren Inhalte auch über i-map und NÖGIS als wichtige Informationsbasis abrufbar sein werden.

TSCHECHISCHE REPUBLIK
Breclav
Malacky
SLOWAKISCHE REPUBLIK
Wien
Donau
Bratislava
March
ÖSTERREICH
Wiener Neustadt
Eisenstadt
Neusiedler See
Sopron
UNGARN

1. Rosalienge
2. Fragmentierter Bereich zwischen S4 und A3
3. Leithagebirge
4. Fragmentierter Bereich zwischen Leithagebirge und Ellender Wald
5. Ellender Wald
6. Nationalpark Donau-Auen
7. Fragmentierter Bereich zwischen Hainburg und Marchegg
8. Flugsandgebiete des Marchfelds
9. Marchauen
10. Matzner Wald
11. Wälder der Zahorie
12. Zahorska Nizina und Zahorsky Bor

Table 5 Sample of press clippings

Date	Media
03/10/2007	Kronen Zeitung
04/10/2007	Kurier Burgenland Süd
04/10/2007	Kurier Burgenland Nord
11/10/2007	News
20/10/2007	Der Standard
10-14/12/07	Vom Leben der Natur Ö1 Serie
10/07	Spatial planning newspaper “Raum Dialog”

Furthermore, an information leaflet about the Alpine-Carpathian Corridor was produced in German, English and Slovak with support from the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management.

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2. Description of the Study Area

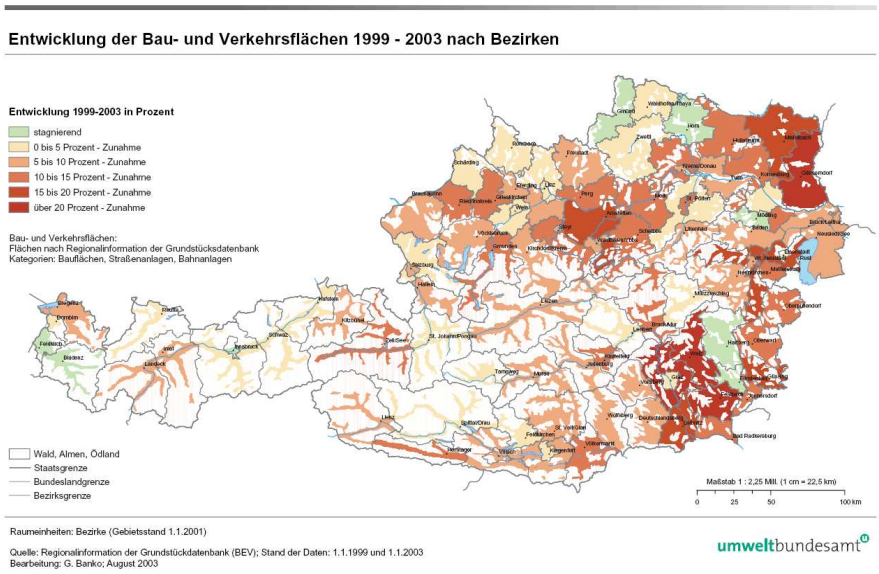
Embedded between the great natural sites of the biosphere reserve Wienerwald, National park Neusiedlersee-Seewinkel and Morava-Dye floodplains, the corridor connects Europe's greatest mountain ranges, the Alps and the Carpathian mountains, along with a chain of close natural sites, such as the Leithagebirge and the Danube floodplains. The corridor belongs to a subset of corridors of intra-regional importance to Eastern Austria, Slovakia and Hungary as identified by land-surveying (Köhler, C. 2005). Older records of indicator species and knowledge of local hunters are a very good indication as to where the corridors have to be located.

The course of the corridor runs from the Eastern Alps across the Hochwechsel and the Rosalien-gebirge, and can be seen as a continuation of the Koralm corridor coming from the Dinarian mountains. It leads up to the Leithagebirge mountains and the Maria Ellender Wald, across the flood plains of the Danube and Morava rivers, and further across the Záhorie lowland to the Small Carpathian Mountains.

Considering that Figure 4 shows potentially connected areas for large forest-dwelling mammals, it becomes apparent that the connectivity between the Alps and the Carpathian mountains seems to hang by a thread. Nowadays, due to dense settlements, there is no connection remaining between the forest west of Vienna to the Matzner forest and the Morava floodplains. In the South of Vienna, there is also no direct connection left from the eastern foothills of the Alps to the Leithagebirge. Although it is well known that wildlife crosses the Danube to the east of Hainburg, the possibility for migration south of Bratislava to the Carpathian mountains is questionable. So the only pathway that can be restored is the one mentioned above.

The study area is located within the cross-border area of Austria, Hungary and Slovakia. Including Vienna and Bratislava, the region is currently populated by 3.6 Mio. people (ESPON Database). 22 districts and more than 180 municipalities are located within the closer corridor area.

Fig. 3 Development of built-up land in Austria 1999 to 2003 (Umweltbundesamt 2004)



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According to Central European Programme (2007), the area between Vienna and Bratislava belongs to the area with highest accessibility within Europe, apart from the European Pentagon. The Alpine-Carpathian Corridor crosses a region with a very high percentage of built-up land and traffic infrastructure. According to Banko (2003), the recent growth of built-up land was especially high in the eastern part of Austria. Hanika et al. (2004) assessed a regionalized development of the population in the study area that may reach a growth of up to 36% percent by 2031. In respect to safeguarding ecological connectivity, it is a big challenge to establish a sustainable development which considers and preserves natural resources.

Fig. 4 Map of the Alpine-Carpathian Corridor region, major corridors and protected areas

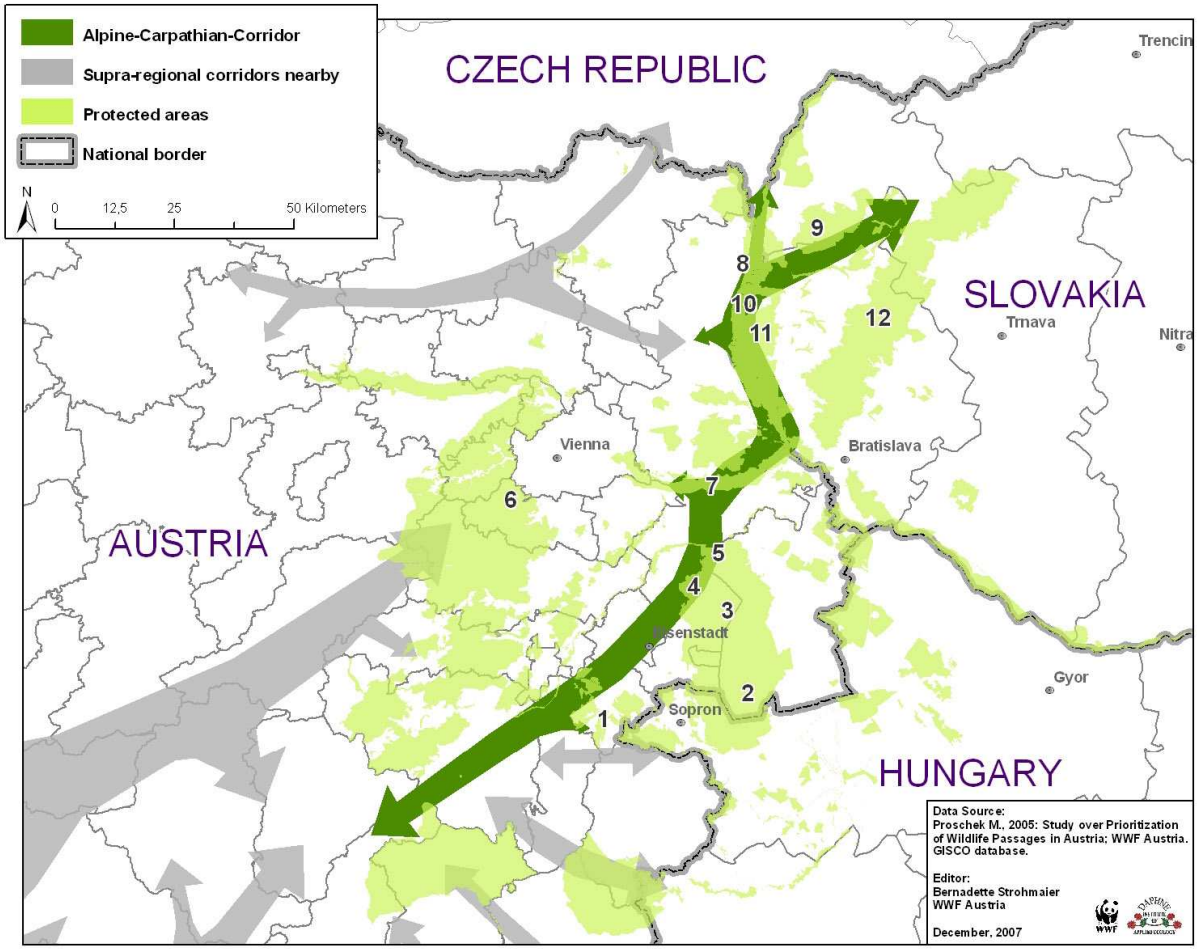

Table 6 Protected areas along the Alpine-Carpathian Corridor

1	Nature park Rosalia-Kogelberg		7	Donau-Auen National park (also N2000)
2	National park Neusiedler See - Seewinkel		8	Natura 2000 March-Thaya-Auen
3	N2000 Neusiedler See - Seewinkel		9	CHKO & N2000 Zahorie (part 1)
5	N2000 Nordöstliches Leithagebirge		10	CHKO & N2000 Zahorie (part 2)
4	Nature park Neusiedlersee – Leithagebirge		11	N2000 Zahorský Pomoravie
6	Biosphere Reserve Wienerwald (also N2000)		12	CHKO & N2000 Malý Karpaty

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2.1. Landscape ecology and spatial development

Though the Alpine-Carpathian Corridor is interrupted nowadays due to traffic infrastructure, the course of the corridor can still be identified by landscape structures, most of all by forests. These remaining green islands are important stepping stones – mainly areas which are still secured by nature conservation laws.

Bucklige Welt, Wechsel and Pitten Valley

Migrating wildlife reach the Alpine-Carpathian Corridor at the eastern edge of the Alps by passing over the Wechsel mountains, the highest peak at 1.743 metres (Hochwechsel) on the border between Styria and Lower Austria. The range of Bucklige Welt is located northeast of the Wechsel. This area is dominated by forest and qualifies as a continuous habitat for red deer, for example, and leads on to a rich structured cultural landscape, the Pitten Valley, with good migration conditions in the east. The A2 motorway crosses this section, but there are three large wildlife passages and several smaller ones which allow wildlife migration. The percentage of built-up land has increased moderately in the past years, and larger parts are located outside the permanent settled area. The valley of the Pitten itself shows increasing development. This area is wholly protected by the Natura 2000 Site „Teile des Steirischen Jogl- und Wechsellandes“ and parts are protected by the Protected Landscape Area “Waldbach-Vorau-Hochwechsel“.

Range of Rosaliengebirge

The Rosaliengebirge can be seen as the first stepping stone along the Alpine-Carpathian Corridor coming from the Alps. The mountains of the Rosaliengebirge, their highest peak at 748 meters, are the north-eastern foothills of the Central Alps and are located at the border between Lower Austria and Burgenland. In terms of land cover, most of the region is dominated by forests. The hillside in the lower parts – especially in the east – is dominated by a more or less richly structured cultural landscape, which provides good conditions for migration. Parts of the Rosaliengebirge are preserved due to the Protected Landscape Areas “Forchtenstein-Rosalia” and “Rosalia - Kogelberg” and designated as a Nature Park “Rosalia-Kogelberg”.

Wiener Neustädter Pforte

The so-called “Wiener Neustädter Pforte” is a depression of 13 kilometers width running from the Leithagebirge mountains in the northeast to the Rosaliengebirge mountains in the south. The valley bottom is dominated by agricultural land use and vineyards. According to Proschek (2005), this section is one of the bottlenecks in the Alpine-Carpathian Corridor, although migration of wildlife is still possible. The S4 Expressway and the A3 Motorway are two major infrastructure barriers in this area.

Range of the Leithagebirge mountains

The Leithagebirge, with its highest peak at 484 meters, is located in the south-east of the Vienna Basin, a tertiary depression between the Alps and the Carpathians. The Leithagebirge represents one of the last remains of a former mountain range connecting the Alps with the Carpathian mountains. The Leithagebirge is dominated by forests and represents a continuous habitat for red deer. It is an important stepping stone within the Alpine-Carpathian Corridor. There are no major infrastructure barriers in this area and the northern part is preserved by the Natura 2000 site “Nordöstliches Leithagebirge” and designated as a Nature Park “Neusiedler See- Leithagebirge”.

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Downs of Arbesthal between Leithagebirge and Danube floodplains

This area, which is located between the edge of the forests of the Leithagebirge and the floodplain of the Danube river, is predominantly situated in the so-called “Arbesthaler downs”. The area is characterized by an intensive agricultural use with moderately large agricultural parcels of land and several spots lacking considerable landscape structures. The largest forest within this area, the Ellender Wald, is not suitable for wildlife migration due to fenced hunting grounds. The corridor model identified two main branches of the Alpine-Carpathian Corridor in this area, one east and one west of Bruck/Leitha. Both are interrupted by large agricultural parcels. The A4 motorway is currently a total barrier for sensitive mammals, such as red deer. The federal roads B9 und B10 are of increasing concern in terms of their barrier effect.

Floodplains of the Danube River

The floodplains of the Danube river are protected by the protection status “National park”. Beside the status as National Park, it is designated as a Ramsar site “Danube-Morava flood plains” and as a Natura 2000 site. In addition, two nature reserves have been designated in the Danube floodplains in Vienna („Lobau-Schüttelau-Schönauer Haufen“ and „Lobau“). About 65 percent of the area is forest, which is taken out of forestry use. The National park represents an important stepping stone along the corridor, but also provides a permanent habitat for red deer. It has been proven by observations (Pausch personnel communication) that the Danube itself has a low barrier effect for wildlife.

Morava floodplain and adjoining Marchfeld

The ecological connectivity between the Danube and Morava floodplain mainly leads through intensively used agricultural land, the so called Marchfeld, which is delimited by the Morava river in the east. The Morava floodplains, which are dominated by agricultural land, forests and wet-meadows, are situated on the border between Austria and Slovakia. The Morava floodplain north of Marchegg up to Záhorská ves is an important stepping stone and habitat for wildlife. In the Marchfeld, a currently planned expressway (S8) with a bridge south of Marchegg could deteriorate the status of ecological connectivity. Regional development is currently high, with business parks and enlargements of settlements threatening the corridor. The Morava floodplains are protected as trilateral Ramsar site “Donau-March-Thaya-Auen”, Natura 2000 site “March-Thaya-Auen” and as a protected landscape area “Donau-March-Thaya-Auen” on the Austrian side and “Záhorie” on the Slovakian side. The floodplain forests between Marchegg and Záhorská ves are partly preserved due to strict nature reserves.

Záhorie Lowland

The Záhorie Lowland is part of the Vienna Basin and is characterized by three types of landscapes: The flat riverine plains spread along the Morava river, the terraces and the higher uneven plains and uplands, which are made from windblown sands. Windblown sands uniformly cover a large area and prevail in the form of long sand ridges.

The forests of Záhorská nížina Lowland are the biggest complex of lowland forests in Slovakia, covering about 52.000 hectares. These forests can be divided into two important types. On the one hand there are floodplain forests of the Morava river interleaved with wet meadows, and on the other hand there are large forests located on sand substrates.

The D2 motorway is currently only partly fenced but forms a severe barrier for migration. North of Bratislava, the regional development is very dynamic and the percentage of industrial parks and settlements is increasing.

The Protected Landscape Area Záhorie is divided into two parts, one northeast in Senica County and the second part mainly covers the Morava flood plains.

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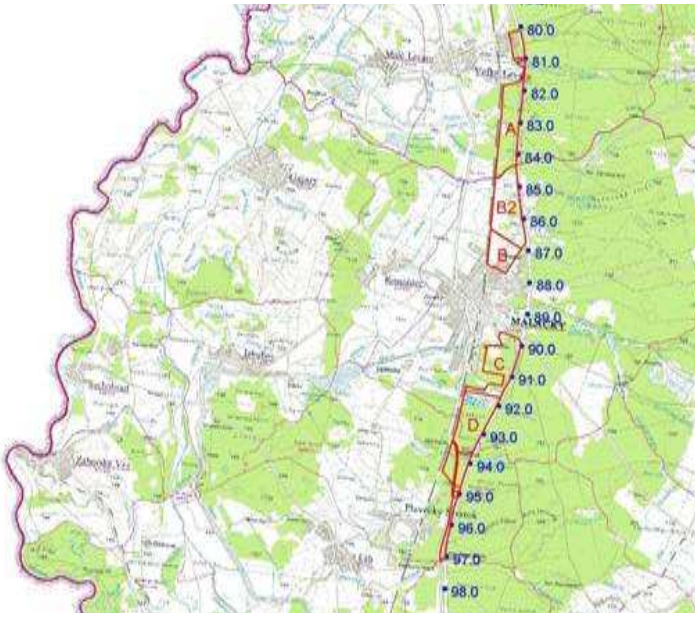
The main barriers identified in this area are: fenced areas (e.g. the military base), hunting yards, urban and village areas and large industrial areas, which are being built north of Bratislava between the railway and the motorway and pose a big threat to ecological corridors.

Fig. 5 Current spatial development plans around Malacky (Valachovič 2007)



Small Carpathian Mountains

The Small Carpathian Mountains form the south-west foothills of the Carpathians. The range covers an area of 100 kilometers in length, with a maximum width of 16 kilometers and a maximum height of 768 meters. More than 80 percent of the mountains are covered with forests, mainly deciduous forest. On the border of the closed forests, a mixed cultural landscape with grasslands, vineyards, orchards and agricultural land is located. The main barriers in this area are presented by the road 503 between Pezinok and Pernek, and four fenced hunting grounds. The whole area of the Small Carpathian mountains are protected as Protected Landscape Area “Male Karpaty”. In addition about 56.000 ha are designated as a Natura 2000 site. According to Schlumprecht (2007), increasing land use pressure in terms of forestry and recreational use pose a threat to biodiversity (especially raptors).

2.2. Administration bodies

The Alpine-Carpathian Corridor connects the two countries Austria and Slovakia, and is also interlinked with corridors reaching to and from Hungary and the Czech Republic. But the main branch concerns Austria and Slovakia, so an overview and illustration of all kinds of administration bodies in both countries is helpful for further activities.

On the Austrian side, administration is organized in provinces, districts and municipalities. Detailed lists of all Austrian (Wolf, 2006) and Slovak administration bodies situated within the area of the Alpine-Carpathian Corridor have been made. Table 6 gives an overview of provinces and districts and Slovakian regions and districts affected by the corridor, as well as relevant EU NUTS regions.

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Table 7 List of administration bodies in Austria and Slovakia intersecting the corridor area.

Country	Province / Region	District	Number of Municipalities	NUTs-3 Region
AT	Wien		1	Wien
	Niederösterreich	Wien-Umgebung	1	Wiener Umland-Nordteil
		Bruck an der Leitha	20	Wiener Umland-Südteil
		Gänserndorf	44	Wiener Umland-Nordteil & Weinviertel
		Korneuburg	12	Wiener Umland-Nordteil
		Mistelbach	37	Wiener Umland-Nordteil & Weinviertel
	Burgenland	Eisenstadt	1	Nordburgenland
		Eisenstadt-Umgebung	11	Nordburgenland
		Mattersburg	9	Nordburgenland
		Neusiedl am See	4	Nordburgenland
SK	Bratislavský kraj	Malacky		Bratislavský kraj
		Pezinok		Bratislavský kraj
		Senec		Bratislavský kraj
		Bratislava (I-V)		Bratislavský kraj
	Trnavavský kraj	Senica		Trnavaský kraj
		Skalica		Trnavaský kraj
		Piešťany		Trnavaský kraj
		Trnava		Trnavaský kraj
		Hlohovec		Trnavaský kraj
		Galanta		Trnavaský kraj
		Dunajská Streda		Trnavaský kraj
HU		Györ-Moson-Sopron	9	Györ-Moson-Sopron

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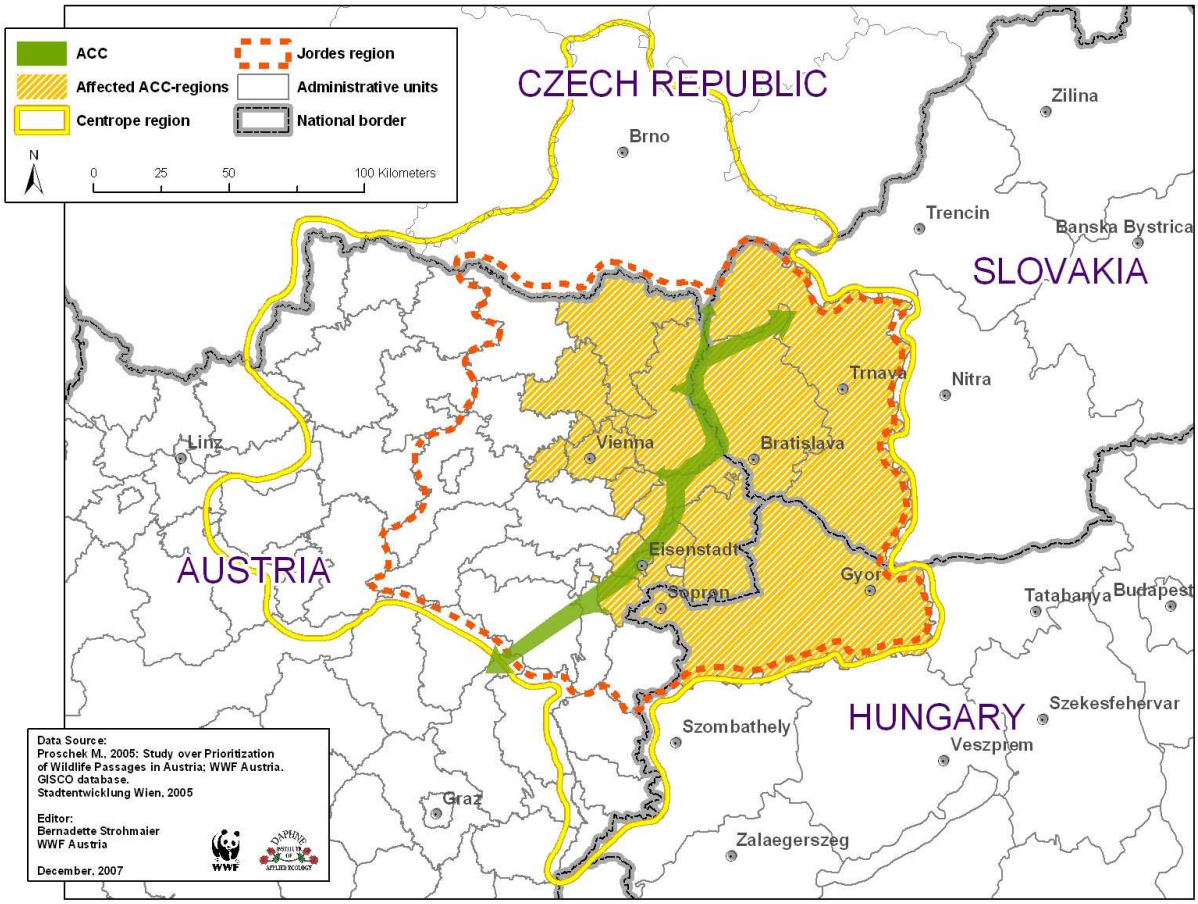
Fig. 6 Countries, regions and administration bodies in the Alpine-Carpathian Corridor area



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3. The need for ecological connectivity

3.1. Ecological connectivity to preserve biological diversity

Various forms of anthropogenic land use leads to fragmented wildlife populations. Between these, barriers like highways interfere with the exchange between populations, and thus reduce genetic variability within the isolated subpopulations. In natural populations, a genetic exchange is given by dispersing animals, especially young individuals on the search for new territories or mating partners. Consequently, the number of exchanging individuals is low but constant.

A reduced genetic variability has two negative effects on the survival probability of populations:

Firstly, isolated populations have been shown to suffer from inbreeding resulting in reduced immunocompetence, lower fertility, malformations, etc. Inbred individuals are more likely to die from bacterial or viral infectionism, they have a higher parasitic burden, they show a reduced litter size or number of litters per year and they show abnormalities in growth or coloration. All of these factors reduce the individual survival rate and population recruitment.

Secondly, a population with a reduced genetic variability has a limited adaptability to a changing environment. For example, populations cannot adapt to changes in climate (precipitation, temperature), they are not immune to evolving diseases and they are unable to gain sufficient energy from a changing food composition.

Hence, there is an urgent need to conserve a high genetic variability and to promote exchange between populations. Increasing numbers of wildlife populations in fragmented habitats (like red deer in Austria) are no indication of viability. In contrast, they bear the risk of sudden extinction without any clear sign of threat.

Fig. 7 Ratio of fragmentation of cultural landscapes (Wrbka et al. 2001)

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In order to fulfill the demand for high genetic variability within wildlife populations, one might suggest the translocation of individuals between isolated populations. This has been practiced in several species and countries. However, this strategy is unsustainable as long as we do not know the genetic quality of the translocated individuals. On the other hand, this artificial exchange bears the risk of exchanging the “wrong” individuals, carrying non-beneficial genetic information from one population to the other. Therefore, we suggest the facilitation of natural exchange between fragmented populations based on natural selection. This will lead to the dispersion of the right individuals at the right age and at the right time to the given population.

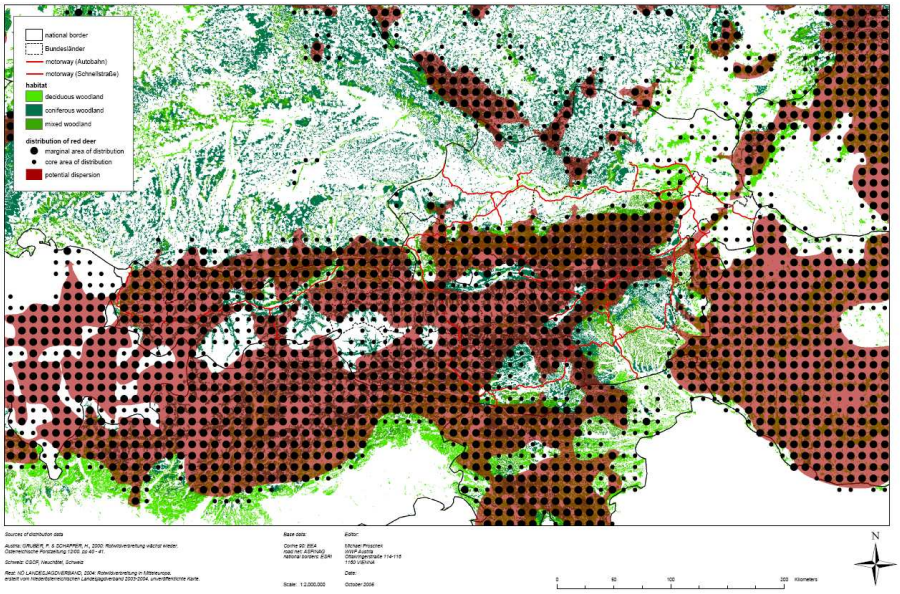
Relevant information was gathered in the last decade, e.g. in Baier, H. et al. 2006, Leitschuh-Fecht, H. & Holm, P. 2007, Kohler, Y. et al. 2004, Oggier, P. et al. 2001.

3.2. The Alpine-Carpathian Corridor and indicator species

The traditional migration route along the Alpine-Carpathian Corridor connects Europe’s greatest mountain ranges and is one of the most significant genetic flow corridors in Central Europe (cf. Völk & Kalivodova, 2000). However, the permeability of the landscape has changed significantly in the last century due to agricultural, traffic and settlement developments. The result is a fragmented landscape which especially affects species demanding large areas and with a distinct migration behavior. Large species (e.g. red deer) and animals at the end of the food chain (lynx, brown bear, wolf) have superior requirements concerning undisturbed areas (cf. Völk et al., 2001).

If good conditions are given for the migration and survival of these demanding species, other species will benefit as well. Due to this fact, red deer, lynx, brown bear and wolf have been used as indicator species in several studies concerning the evaluation of the condition of ecological corridors (cf. Völk & Kalivodova 2000, Völk et al. 2001, Grillmayer et al. 2002).

Fig. 8 Distribution and possible migration routes of red deer (*Cervus elaphus*) (Proschek 2006)



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Brown Bear – *Ursus arctos*

Though there have been indications of the brown bear in the area of the corridor every now and then in the past 50 years (Spitzenberger & Bauer, 2001), clear evidence of the past 20 years are not available for this area. On the Austrian side, Spitzenberger & Bauer (2001) the latest record was reported in the area in the Morava floodplains in Marchegg in 1994, where a plaster cast of a young brown bear was made. On the Slovakian side, there is one thirty-year-old record of a brown bear observed close to the village of Závod (Kosorínová M. et al., 2002). These indications show that the Alpine-Carpathian Corridor may have a connective function between the brown bear-population between the Carpathian mountains and those of the Ötscher-Hochschwab region in Austria, and further with the populations of the Dinaric Alps (Proschek, 2005).

Lynx – Lynx lynx

The Alpine-Carpathian Corridor has had a high impact on the radiation of the lynx population of the Carpathian mountains, especially in the 1960s and 1970s. It is believed that the noticeable concentration of lynx records in the eastern parts of the Danube point to a direct immigration from Slovakia (Spitzenberger & Bauer, 2001a). Several lynx sightings were reported in Eastern Austria since 1960 and are supposedly migrated from Slovakia (Proschek, 2005). On the Slovakian side, lynx have been permanently present in the Small Carpathian mountains in the Pezinok-Častá area since the 1980s, and according to discovered tracks, are spreading out to the Záhorska nížina lowland (Longa & Sedlák, 2007). In the Záhorská nížina Lowland, in Jakubov, the latest evidence of lynx tracks was reported in 1997 (Völk & Kalivodova, 2000).

Wolf – Canis lupus

The return of the wolf from the Slovakian Carpathians to Austria is foreseeable in the near future (cf. Boitani, 2000). In Slovakia, evidence of wolves exclusively derive from shots. According to reports from Hell (1990) (cited in Spitzenberger & Bauer, 2001b), lone wandering wolves have been shot in the district of Bratislava. 1988 wolves were shot in Častá in the Small Carpathian mountains. The latest record comes from Jablonica in the Small Carpathian mountaings in the year 1991. The absence of data from more recent years can be partly explained by an enhanced protection of the wolf in Slovakia (Valachovič personal communication).

Red deer – Cervus elaphus

Red deer occurs over a wide area both in the Alps and in the Carpathian mountains (Gruber, 1985 and 1994, cited in Völk & Kalivodova, 2000). The Alpine-Carpathian Corridor is of great significance for the migration of red deer. Before the Iron Curtain, there were active deer crossings along the corridor. But due to intensive development of traffic infrastructure, agriculture and settlements, populations are mainly isolated nowadays. Red deer populations occur at Rosaliengebirge mountains, Leithagebirge mountains, at flood plains of the Danube and Morava river, in the pinewoods of the Protected Landscape Area Zahorie as well as in the Small Carpathian mountains (Völk & Kalivodova, 2000).

In general, red deer is the most favorable species in terms of indication and umbrella species function. This is true due to the fact that the red deer is rather sensitive to disturbance. In addition, there are very good base-data and distribution data for investigating ecological connectivity. New evidence for the occurrence of the wild cat (*Felis silvestris silvestris*) in the Dyje floodplains has to be considered. The occurence of the wild cat has declined to less than 10% of its former amount in Germany and is more or less nonexistent in Austria. *Felis silvestris* is sensitive to landscape fragmentation and has a wide activity range.

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3.3. International obligations

Establishing and securing ecological corridors is at the base for preserving our biodiversity. This is reflected in several international agreements and obligations, which commit the contracting parties to implementation activities. The following list refers to CIPRA International (2006) and the text of the Carpathian Convention.

Convention on Biological Diversity (1992) and the Summit on Sustainable Development (2002)

Within the framework of the Convention on Biodiversity, all member states committed themselves to halt the loss of biodiversity. According to the resolution of the CBD referring to the 2010 goal of the Johannesburg summit, a global network of representative national and regional conservation areas shall be installed to achieve the 2010 goal. As one of the measures to achieve the 2010 goal, the Johannesburg Action Plan emphasises the creation of national and regional corridors. Austria has been a member of the convention since 1995, and Slovakia since 1994.

Bonner Convention (1979)

The Convention on the Conservation of Migratory Species of Wild animals (short: Bonn Convention) in its article V determines that every agreement, “so far as it is appropriate and feasible, should provide for but not be limited to the following: maintenance of a network of suitable habitats appropriately disposed in relation to the migration routes”. Austria is a contracting party since 2005 and Slovakia since 1995.

Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)

The contracting parties aim at the targets by establishing a trans-border network of conservation areas, amongst others, the Smaragd-system. Austria is a contracting party since 1983, Slovakia since 1996.

The Habitats Directive (1992), the Birds Directive (1979) and the Natura 2000 network of the European Union

To preserve the biodiversity on a European level, the member states of the European Union have committed themselves to establish a coherent European ecological network of protected areas, the so-called “Natura 2000 network”. To obtain an upward spatial connectivity between the protected areas of Natura 2000, the Habitats Directive advises the member states in Article 3 and 10 to endeavour to improve the ecological coherence of Natura 2000 by maintaining, and where appropriate developing, features of the landscape which are of major importance for wild fauna and flora. Austria is member state since 1995, Slovakia since 2004.

Alpine Convention (1991)

Article 12 of the protocol “Conservation of nature and the countryside” of the Alpine Convention calls for the creation of “national and trans-national networks of conservation areas, biotopes and other assets deserving of protection”. The trans-border network of conservation areas is contained in the multi-annual programme of work (MAP) 2005-2010 as well. Austria is a contracting party since 1991 and signed the protocol “Conservation of nature and the countryside” in 2002.

Carpathian Convention (2003)

The Carpathian Convention explicitly regulates the creation of a network of conservation areas (Carpathian Network of Protected Areas, CNPA) as an official intergovernmental implementation initiative. Article 4 implies that the contracting parties commit themselves to

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cooperate in order to create an ecological network in the Carpathian mountains as part of the Pan-European Ecological Network, to establish and constitute a Carpathian Network of Protected Areas and to improve the protection and the sustainable management in regions outside of the conservation areas.

The **Memorandum of Understanding for the cooperation between the Alpine Convention and the Carpathian Convention** says that efforts for enhancing networks of protected areas in the Alps (ALPARC) and in the Carpathians (CNPA) should be continued, as well as the ecological linking between the two mountain ranges.

PEBLDS and PEEN Network of the Council of Europe

Based on relevant EU agreements such as the Bern Convention, the Council of Europe developed two strategies to address the preservation of biodiversity. Within the so-called Emerald Network, a set of protected area will be established. At the 3rd Ministerial Conference “Environment for Europe”, the Pan-European Biological Diversity and Landscape Strategy (PEBLDS) was adorsed. Its main proposal: the setting up of the Pan-European Ecological Network (cf. Jongman et al. 2006).

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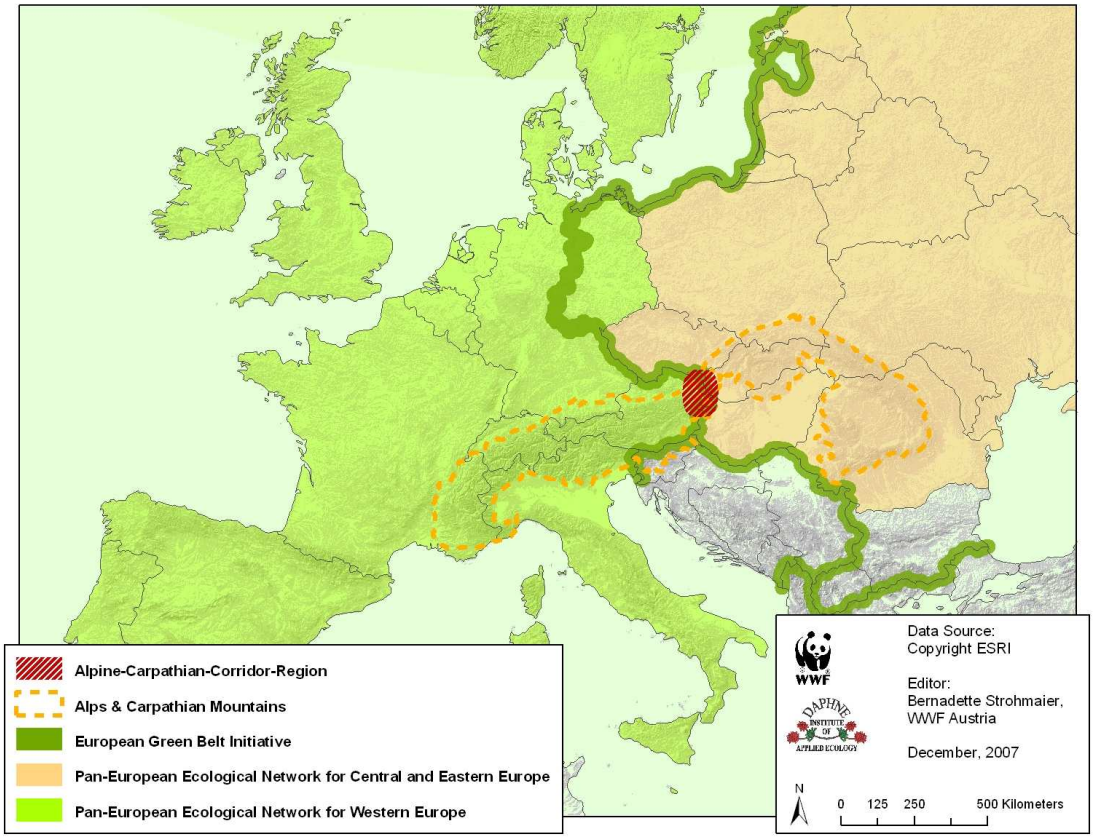
4. Implementation of ecological corridors: Assessed project instruments

Since the year 2000, interdisciplinary studies concerning wildlife corridors in Austria, also focusing on sites within the Alpine-Carpathian Corridor, have been increasingly carried out. The University of Natural Resources and Applied Life Sciences (BOKU, Vienna) had a leading part in fields of wildlife ecology and geoinformatics.

During the feasibility study, existing literature, studies and implementation projects concerning ecological corridors were assessed within the core team as well as in expert meetings. Relevant issues were discussed and elaborated at the stakeholder workshop.

Fig. 9 Existing studies and concepts with relevance for ecological connectivity



In the wider range of Europe and the Alpine and Carpathian Ecoregions, the Council of Europe has established an initiative to secure the Pan-European Ecological network, which extends across the whole range of Europe (cf. Jongman et al. 2006). This network, which the Alpine-Carpathian Corridor is a part of, is of special policy and strategic interest.

In the Alpine region, a preliminary study was conducted by Kohler (red) 2004. A follow-up project by the CIPRA, ALPARC, ISCAR and WWF currently investigates the possibilities of establishing and maintaining an ecological connectivity network within the Alps. A Network of Protected Areas (CNPA) has been established in the Carpathian region.

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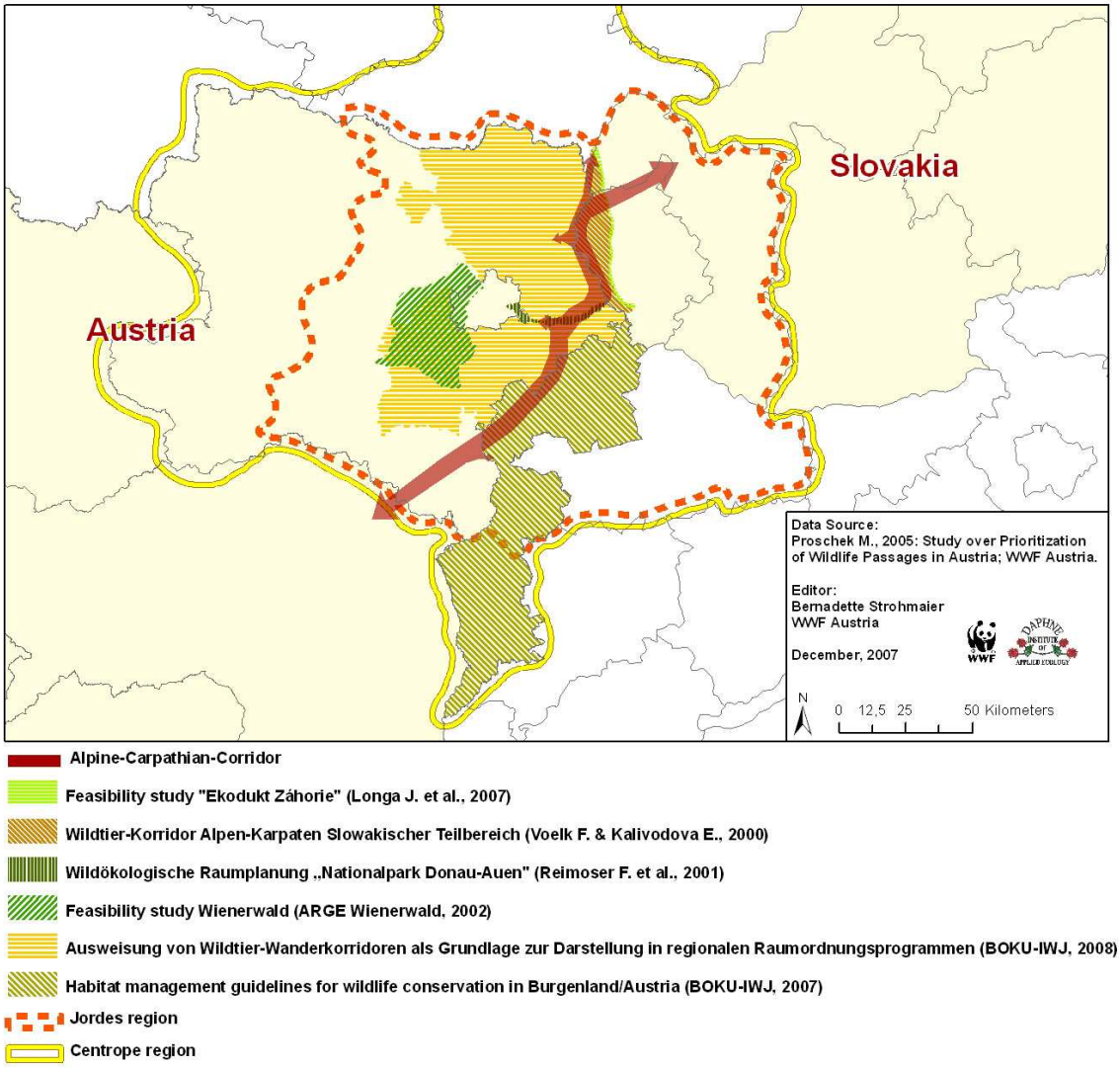
In Austria, the network of inter-regional ecological corridors was identified by Köhler C. 2005. A study with the major network of corridors for Slovakia has just recently been finalized (Findo et al. 2007).

Fig 10 Existing concepts and base-data in the study area



4.1. Identifying wildlife corridors: Geoinformatics

A sound scientific basis is a precaution for the implementation of ecological corridors and connectivity. Otherwise, initiatives could lead to low acceptance of activities and even to ineffective expenditures.

Several techniques have been applied in Austria and Slovakia to map and identify important areas of ecological connectivity. Within the feasibility study, results were tested in terms of their usability in cross-sectoral cooperation.

> **Main Outcome: Means of geoinformatics (GIS) and remote sensing are indispensable methods of developing the scientific basis, which must meet the requirement of a harmonized data set for the whole range of the corridor and surrounding areas of AT/HU/SK. The general course of the Alpine-Carpathian Corridor can be detected by using remote sensing.**

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In bottlenecks along the Corridor, and to provide a sufficient basis in terms of spatial planning, accurate placement of greenbridges and landscape restructuring, the methods have to be conducted in a more detailed fashion, such as was done at the model site between the Danube flood plains and the Leithagebirge mountains.

Accurate placement of the greenbridges on the basis of sound data is a precaution for ensuring ecological connectivity and cost-efficiency. One greenbridge has already been built near Pöttsching, but at least three more wildlife passages are required.

A sound identification of interregional corridors can be utilized in spatial development concepts, environmental impact assessment and mitigation in the future. The information can be distributed by several information tools.

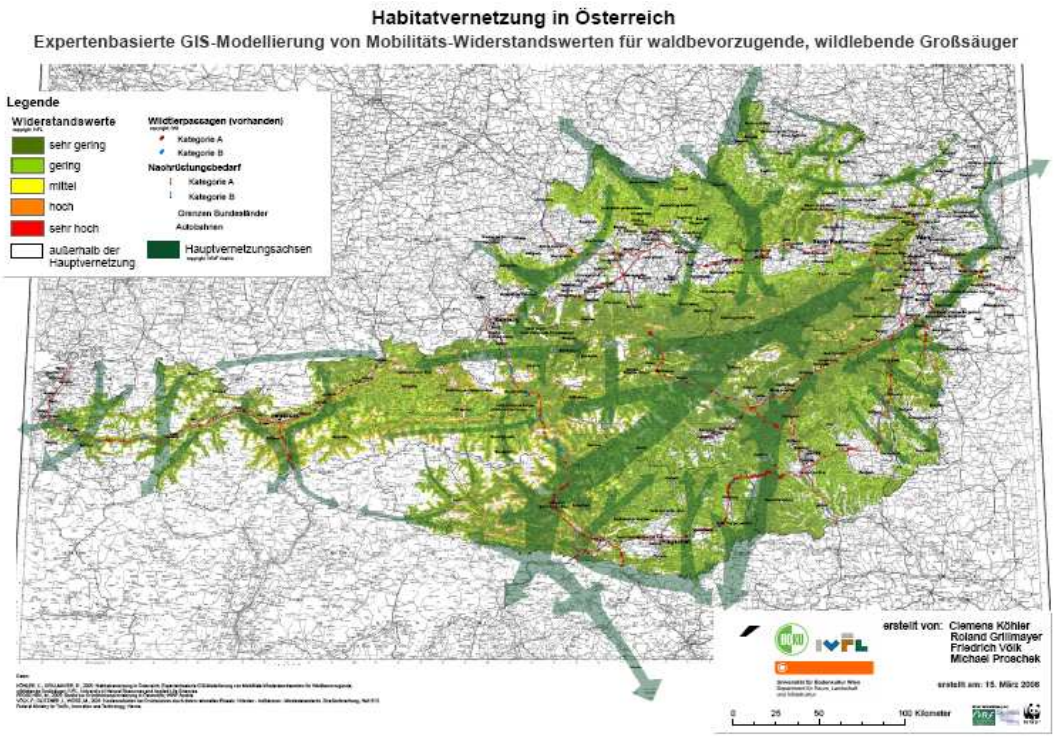
Small scale corridor model by satellite image interpretation

Methods of modelling areas with high or low migration potential in Austria by using geoinformatics and remote sensing have been developed by Grillmayer et al. (2002) and Köhler (2005).

Together with wildlife ecologists, Köhler developed a model based on landscape data, which illustrates areas of high or low landscape resistance for migrating large forest-dwelling mammals. This demonstrates potential supraregional corridors in Austria and adjacent countries. The connectedness potential is determined from area size, configuration of habitat types (forest, grassland, fields) and barriers (e.g. built-up areas).

Additional barriers can exist within the migration areas, such as fences, walls or terrain-related barriers – but also landscape elements with a positive effect, which cannot be detected by satellite images. For that reason, the model can serve as a basis for dialog only at a small scale at this level (1:200.000 - 1:50.000). The model allows corridor alignment on a supraregional and international level. The corridor model was tested by means of tracking selected wildlife species such as the red deer.

Fig. 11 Ecological connectivity in Austria as result of GIS modeling



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Large scale corridor identification for the model area "Leithagebirge to Danube floodplains"

The area between the two important stepping stones Leithagebirge and Danube floodplains is an intensively used agricultural area, and is a section which has been prioritized as one of the model sites in the Alpine-Carpathian Corridor project. A detailed corridor model was made in this area by Grillmayer et al. (2002).

Based on aerial photos, relevant land coverage was identified – besides areolar objects, also linear elements with barrier effects (e.g. fences) or with positive effects on migration (e.g. hedges). Afterwards, elements which could not be detected by aerial photo interpretation were identified by field survey.

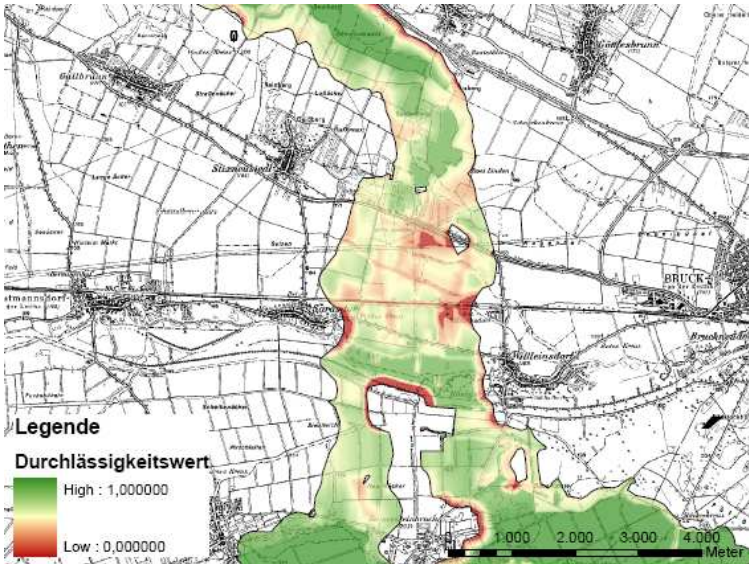
The results were combined, and together with experts' input, resulted in a detailed resistance model, showing areas with high and low migration potential.

Hence, possible migration areas, as well as areas requiring specific restructuring measures in the field, were identified.

This detailed corridor model, which can be built and applied within the scale of 1:50.000 to 1:10.000, offers the opportunity to

- ✓ calculate the most probable migration route,
- ✓ identify optimal sites for wildlife passages,
- ✓ identify areas where landscape restructuring measures are required,
- ✓ foster sound decision-making processes.
- ✓ In the project this detailed modelling shall be conducted in model sections and bottle-neck areas in the Alpine-Carpathian Corridor.

Fig. 12 Large Scale Corridor model as used in model area



Mapping of deer passes by field mapping and interviews with local hunters

Another approach is to identify wildlife passes by field mapping and local expert consultation. It has been conducted in Burgenland and parts of Slovakia (Cecil and Hackländer 2007, Völk & Kalivodova 2000). Local knowledge can be perfectly integrated into remote sensing procedures

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for means of ground truthing and is in general a good approach for identifying local implementation needs. Important investigation measures that have been applied are the tracking of wildlife, the monitoring of wildlife accidents on streets and the mapping of landscape patterns in the field.

Fig. 13 Mapping of deer passes in Burgenland (Cecil and Hackländer 2007)

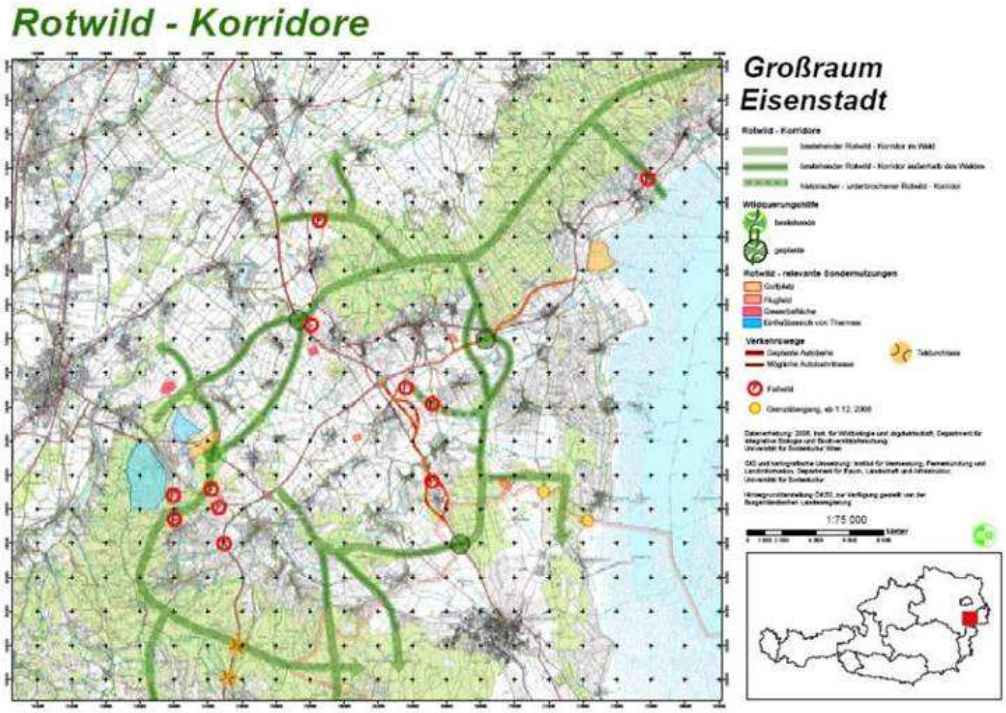
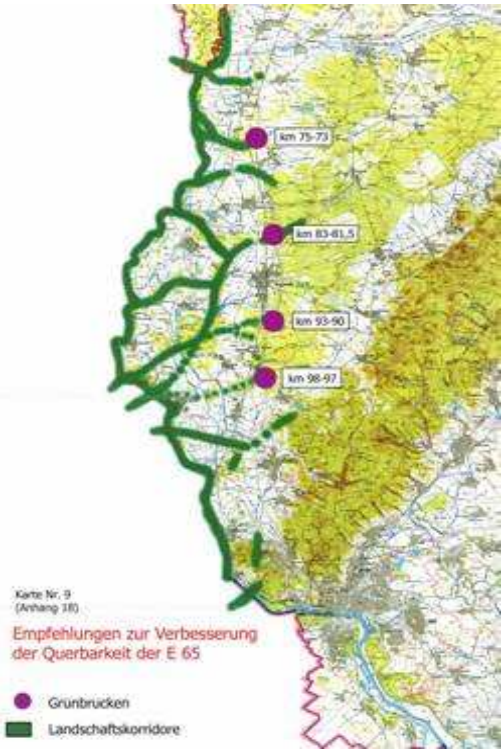


Fig. 14 Mapping ecological corridors in the Zahorie (Völk & Kalivodová 2000)



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4.2. Reconnection of fragmented landscapes: Wildlife passages (WLP)

The reconnection of fragmentized areas is an expensive but necessary measure. Sound knowledge about aims, needs and design is a required precaution before implementation projects can be started. Unfortunately, lessons had to be learned in the past. Measures partly did not work out properly or were opposed by other developments (cf. Eidgenössische Finanzkontrolle 2007). For that reason, three key factors have been thoroughly investigated during the feasibility study: the location of greenbridges, the maintenance of the functionality of wildlife passages and the precise design. Experience and knowledge in this field has increased in the meantime, so that accurate implementation projects in the range of the Alpine-Carpathian Corridor can be started.

Monitoring results (e.g. Tegethof, U. 2007) revealed that wildlife passages integrated into a newly built motorway secured wildlife migration by a ratio of at least 10% in comparison to undisturbed conditions.

Main outcome: In general it is much more efficient to maintain functional wildlife passages than to build new ones. This has to be a main task in securing the Alpine-Carpathian Corridor.

The need for wildlife-passages in the range of the corridor is evident and affect the motorways A4 (Austria) and D2 (Slovakia).

It is crucial to consider the need for ecological connectivity on the given scientific basis and target species landscape bridges, with accompanying measures and landscape design.

Further causes of wildlife loss have been proved on minor streets (B9 in Lower Austria) and railways (Nr. 110 in the Zahorie Lowland and Ostbahn in Austria). However, there is still no evidence of these traffic lines having a total barrier effect.

The need for WLPs along the Alpine-Carpathian Corridor

The first milestone regarding wildlife corridors in Austria was a study carried out by Völk et al. (2001). Using field surveys and surveys among local people (primarily hunters and conservation officials), important Austrian gene flow corridors could be identified, and recommendations for refitting greenbridges along motorways and expressways have been made.

It has become apparent that the need for action in the area of the Alpine-Carpathian Corridor is urgent. Three recommendations for sites of greenbridges with top priority have been made within the narrower range of the corridor, as well as in three further locations in the wide range of the corridor (see Table 8 and Fig. 15). Top priority, in this case, is a required wildlife passage, which is of superior international importance and shall be realized within the next 10 years (cf. Völk et al., 2001).

A WWF-Study (Proschek, 2005) has evalued the twenty most urgent greenbridge locations in Austria (according to Völk et al., 2001), referring to the relevance of ecological wildlife. Five of the six recommended locations listed in Table 8 are among these urgent cases of Austria, which reinforces the high relevance of the Alpine-Carpathian Corridor.

The required greenbridge at Pöttsching was completed in summer 2006. According to reports from local hunters and the municipality of Pöttsching, the greenbridge was accepted by wildlife immediately after its completion.

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Table 8 Recommended greenbridges within the Alpine-Carpathian Corridor in Austria (cf. Völk et al., 2001). Locations in the narrow range of the corridor are highlighted.

Location	Motorway/Expressway	Kilometer
Göttlesbrunn/Arbesthal	A4 motorway	26 - 26,5
Müllendorf/Steinbrunn	A3 motorway	30,5 - 31
Pöttsching (completed in 2006)	S4 expressway	3,7 – 4,2
Wiener Neustadt	A2 motorway	49,1 - 49,2
Langenwang	S6 expressway	34,7 - 34,9
Schäffern	A2 motorway	86,5

The study evaluated the state of the landscape, as well as the ecological state of the wildlife of the Alpine-Carpathian Corridor, referring to large forest-preferring mammals as brown bear, lynx, wolf, moose and red deer. Proschek (2006) revealed that the landscape quality is currently in a bad condition due to numerous barriers and fragmentations of landscape along the corridor. This, and the fact that source-and target-populations of most of the indicator species are quite apart at present, also displays a bad wildlife ecological state, but that does not minimize the high international relevance of the Alpine-Carpathian Corridor.

In the year 2000, University of Natural Resources and Applied Life Sciences, together with the Institute of Landscape Ecology of the Slovakian Academy of Sciences, carried out surveys regarding the permeability of landscape for wildlife within the area of the Morava floodplains and the Slovakian motorway D2 in the Alpine-Carpathian Corridor. They detected six east-west corridors by field survey and aerial photo interpretation. In their study, Völk & Kalivodova (2000) proposed four greenbridge locations at the D2: one east of Láb, one between Plavecký Štvrtok and Malacky, one between Malacky and Vel'ke Leváre and one between Závod and Moravský Sv. Ján.

Areas have also been identified in the branches of the Alpine-Carpathian Corridor, where landscape-restructuring is required for migrating animals.

This initiative has been carried out and completed by the planning office DOPRAVOPROJEKT and Sprava CHKO Zahorie within a feasibility study (Longa & Sedlák, 2007) with the aim to detect the optimal location for at least one greenbridge over the D2 and the railway Nr. 110 parallel to the motorway. Migration routes were identified by tracking routes and analysing habitat structure around the highway areas.

Zoologists and landscape ecologists detected three possible locations of greenbridges over the motorway as well as over the railway (see Table 9). But it turned out to be not necessary to build a greenbridge over the railway due to its low frequency.

Table 9 Recommended greenbridges within the Alpine-Carpathian Corridor in Slovakia (cf. Longa & Sedlák, 2007)

Location	D2 Motorway | Kilometer	Railway Nr. 110 | Kilometer
Láb	97,0 - 97,6	14,7-16,7
Závod	77,3 - 79,05	34,4 – 36,7
Moravsky Sv. Ján	71,8 - 74,3	39,3 – 41,9

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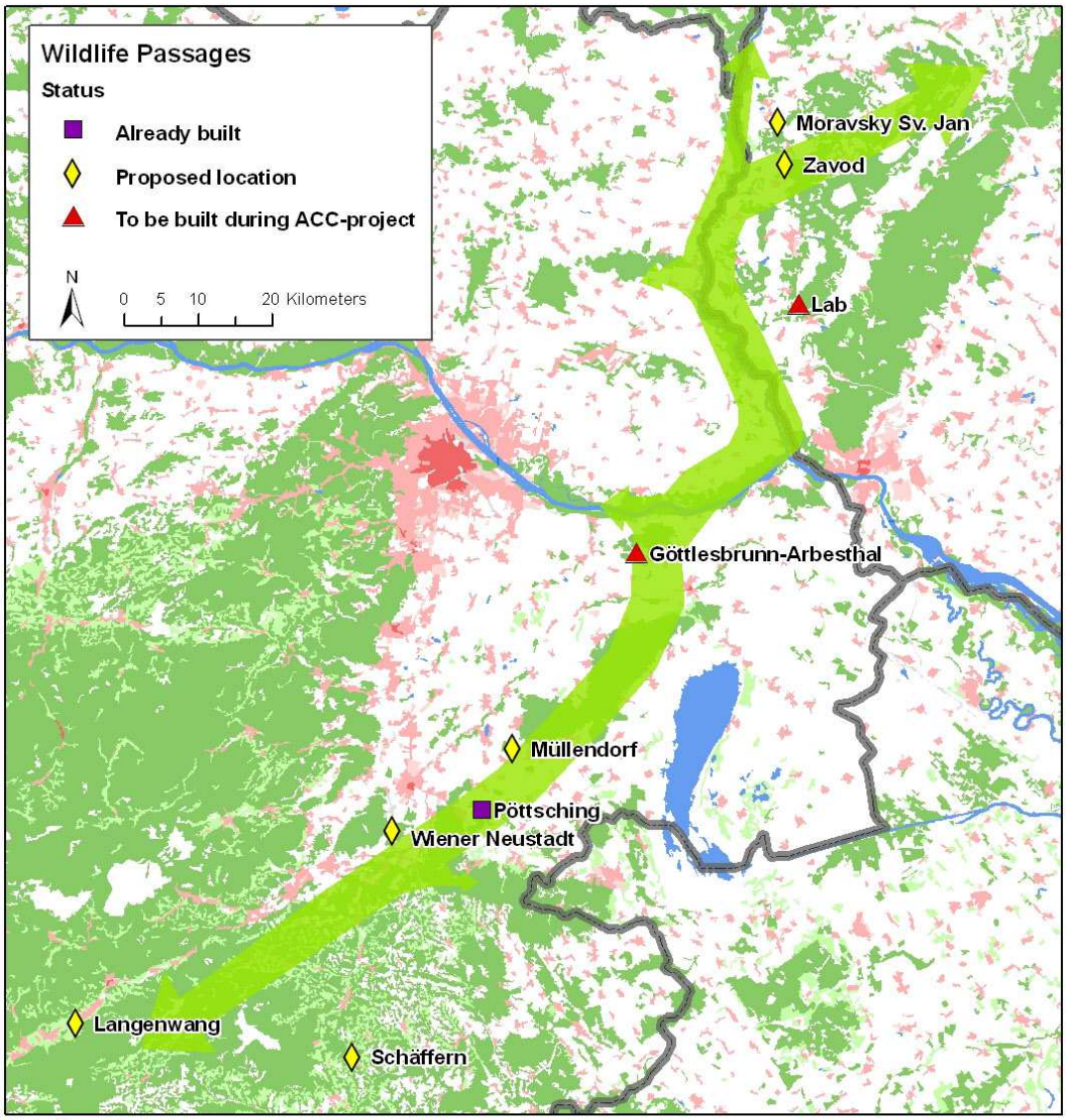
The location near Moravsky Sv. Ján turned out to be the most suitable for the connective effect of landscape structure, and the location near Láb turned out to be the most suitable for spacious migrating wildlife. The results should be considered as preliminary –further field mappings will be conducted this winter.

Fig. 15 Important Locations for additional Wildlife passages



Data Source:
Copyright ESRI.
Völk F. & Kalivodova E., 2000: Wildtier-Korridor Alpen-Karpaten Slowakischer Teilbereich.
Longa J. & Sedlák A. et al., 2007: Ekodukt Záhorie - štúdia uskutočniteľnosti.
Proschek M., 2005: Study over Prioritization of Wildlife Passages in Austria, WWF Austria.

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Minimum requirements for wildlife passages and functionality

The first greenbridges built in Austria and all over Europe triggered a discussion about minimum requirements of wildlife passages. This especially came true because of the installation of three greenbridges with a very low functionality at the A4 motorway in Austria. Pfeifer et al. (2006) delivered a good overview about the functionality of existing wildlife passages (WTPs). From 112 assessed WLPs, 83% have been used by row deer, but only 40% have been used by the more sensitive red deer due to direct (e.g. hunting constructions, such as high seats) and indirect disturbances (e.g. storage of materials or agricultural equipment).

Therefore, besides the location, the design of the greenbridge is also of great importance. Völk et al. (2001) stated that wildlife passages within corridors of international importance have to be at least 80-100 metres broad in terms of effective span from the point of wildlife. Further important criteria are:

- ✓ coverage (to prevent disturbance) and guiding structures
- ✓ direct view from source to aim sites
- ✓ at least 500 m distance to settlements

According to international experience gathered in the framework of the COST 341 initiative (Juell et al., 2003), wildlife passages for sensitive species are defined as landscape bridges with a minimum width of 80m. Experience collected through greenbridge projects (as, for example, recently at the A6 motorway in Austria) also give a good indication of how vegetation patterns may be optimized. Important factors are: native plant species and preferable feeding sources, change in soil depth from the brink to the middle to generate a gradient in the vegetation pattern and secure low vegetation in the centre, screening to avoid disturbance and fencing to prevent accidents.

The cost efficiency of ecological connectivity measures were also the target of a study by the federal financial control of Switzerland, comparing several European approaches (Eidgenössische Finanzkontrolle, 2007). The way of setting guidelines and rules in Austria in a participatory approach has been stated as a good way of gaining acceptance with various stakeholders.

Relevant legal binding standardizations were developed, for instance, by the Federal Ministry of Transport, Innovation and Technology in Austria in Cooperation with the FSV and the involvement of relevant experts and stakeholders (RVS 04.03.12, FSV 2007).

Safeguarding the functionality of wildlife passages

To preserve existing wildlife migration routes (e.g.under bridges), the preservation of existing ones is much more effective and financially efficient than building new ones. In Austria, the ASFINAG is in charge to monitor the efficiency and functionality of all wildlife passages in the major traffic system. The last assessment of the functionality (Pfeifer et al., 2006) by criteria of land use and land cover revealed that 53% of the existing wildlife passages are degraded in terms of functionality. The main reason for degradation is unsuitable use of land parcels in the range of the passage for storage and hunting infrastructure near the passages. Pfeifer et al. (2006) also provide a list of improvements that can be done on existing WLPs.

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4.3. Improving landscape functionality

In the past, ecological corridors focused mainly on the establishment of a network of similar habitats connecting important stepping stones and core areas of distribution (e.g. hedges for forest related species). This approach was the target of scientific criticism because of the small range of indicator species and possible negative effects of corridors for other species groups (e.g. Volg, F. 2004). This is especially true for the range of the Alpine-Carpathian Corridor, where sites with very few landscape structures are of great importance to well-adapted species such as the great bustard (*Otis tarda*). With red deer as one indicator species for ecological connectivity, this is not necessarily a problem, because red deer are well equipped for traversing unsuitable habitats (cf. HARRIS and WOOLLARD 1990).

The aim of the ACC project is to secure landscape functionality, not necessarily due to forest habitats, but to focus on undisturbed extensive land use patterns feasible for species to cross and migrate. This approach is of particular importance to the wider range of wildlife passages (to increase the likeliness of species finding the passages). In addition, measures for the improvement of the landscape functionality are important, where wider ranges of unsuitable land use are located between major stepping stones (e.g. Arbesthaler Hügelland, Valley bottom between Rosalien- and Leithagebirge).

> **Main outcome: The aim of the project is to secure dynamic connections between suitable near-natural habitats, due to preservation and reestablishment of land use and landscape patterns that enable wildlife to cross and migrate along the corridor. Corridors must not to be seen as a closed line of forest habitats and hedges!**
>
> **Emphasis needs to be placed on the neighbourhood of wildlife passages and ranges with large distances between stepping stones.**
>
> **In combination with field mapping and stakeholder involvement, GIS mapping provides a good basis to locate sites of restoration. Maps of priority restoration sites can be easily used for the preparation of implementation projects, and even for compensation measures in the framework of Environmental Impact assessment.**
>
> **To improve specific improvements of the landscape functionality, various funds and implementation possibilities can be approached. The priority is to establish regional information and the promotion of measures according to local site management.**
>
> **Other negative land use practices (such as fencing) can only be addressed by means of wildlife ecological spatial planning and legal binding regulations and agreements.**

Expert-based GIS modelling, in combination with field mapping, can deliver a sound basis for the location of management activities in the field. During the feasibility study, measures to improve the functionality of the corridor range were identified based on the corridor model developed by Grillmayer et al (2002). Possible improvements in the landscape structure and land use (e.g. pastures, hedges, small woods, set aside agricultural land but also the improvement of sight axes) have been illustrated in maps and discussed with experts in the field.

Reiss-Enz, V. & Völk, F. 2007 define minimum criteria for bio-corridors in Austria and state that 500-1000m between settlements are favourable and changes in direction should not exceed 45 degrees.

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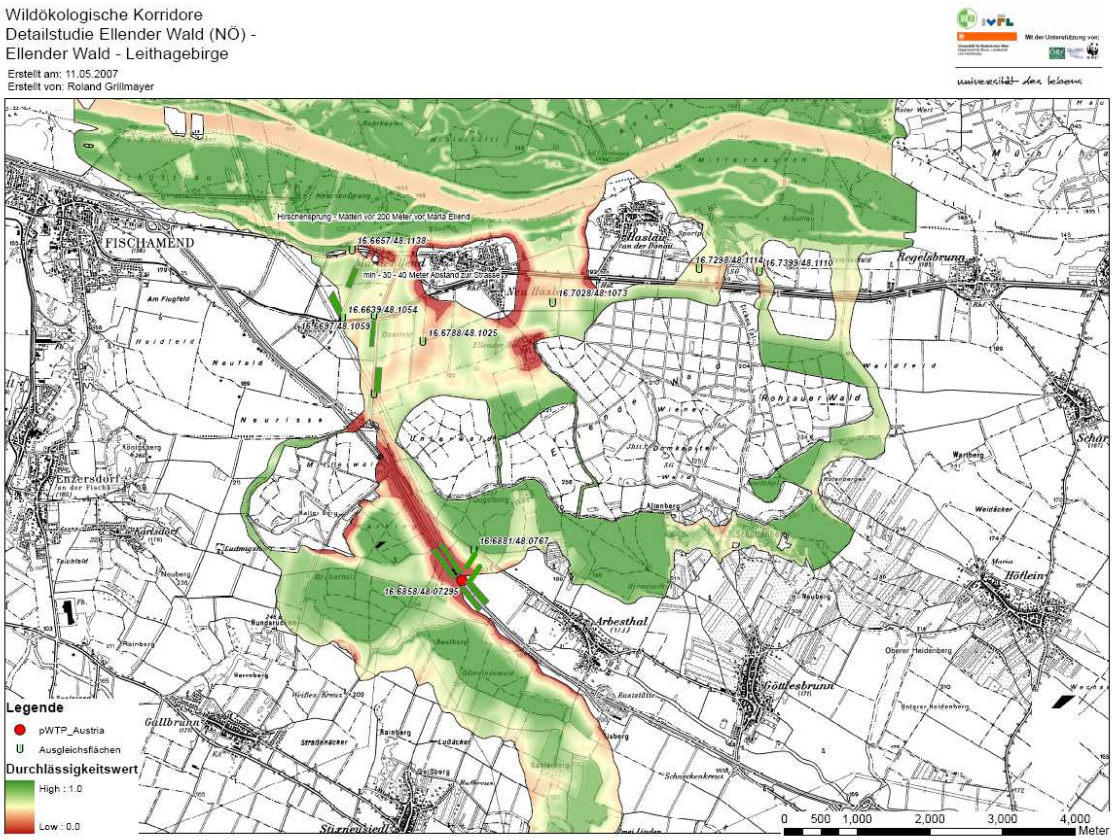
Fig. 16 Location of possible improvements of landscape functionality tested in 2007.
(Red shaded areas with need for action).



Various possibilities exist to obtain necessary funding for the implementation of measures. A very good overview has been compiled by Distelverein and the Hunting Association of Lower Austria (http://wild.distelverein.at/de/service/index.html). This, of course, has to be extended and supplemented by local information and promotion of measures. A recent project of Distelverein for the preservation of meadows and set aside land in the project area (Morava floodplains) showed the positive effect of local site managers. The combination of information, local consultation and clear contact possibilities allowed the securing of 150 ha of meadow habitats in the floodplain area.

For the EU funding period 2007-2013, the last possibility to account for funds in the framework of the Agricultural funds is the year 2009 (because of the 5 year duration of contracts). Two main branches can be addressed: conservation measures (such as set aside land and meadows) within the ÖPUL programme and the so-called biodiversity measures (such as fallow edges of acres).

Another possibility that was tested in the framework of the feasibility study is to cooperate with projects that have to set compensation measures. Improvements of landscape functionality have proved to be a good opportunity.

In Slovakia, DAPHNE assessed possibilities and measures to improve land use and land cover for the protection of biodiversity. While activities for improvement are well established, the practical implementation depends on the regional status of the land reform. The programme for agricultural funds

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offers a series of measures that can be used in terms of improving ecological connectivity.

However, there are aspects of land use that are not easily influenced by agricultural and forestry instruments. Fences (e.g. for the military base in the Zahorie and for fenced game grounds in Austria) are of great relevance to the barrier effects within the landscape. To improve the connectivity in these terms, wildlife ecological zoning has to be conducted. Again, local site management plays an important role in terms of information, promotion and implementation.

4.4. Adoption of land use: Wildlife ecological spatial planning

Wildlife ecological spatial planning (WESP) is a tool that was developed and applied to solve problems in terms of wildlife, environmental protection, land use and especially, conflict areas with forestry and tourism. In the feasibility study, WESP was identified as one possible tool for integrating different demands on land-use in a participatory way. When there are different requirements on space and resources by different population groups (local population, hunters, recreation, nature conservation e.g.) and wildlife, wildlife ecological zoning helps avoid conflicts.

According to Reimoser (2002), the most important success factor is to involve all stakeholders and land users in the planning process. Basic spatial concepts are based on wildlife areas, which are defined in terms of habitats and species ecology, and models to seperate management areas into core, buffer and exclusion sites. WESP is a tool that can be implemented on a legal basis in the framework of hunting laws. Because of different legislation and the responsibility of different administration bodies, a sound coordination is a necessary precaution.

From the perspective of ecological corridors, such as the Alpine-Carpathian Corridor, regarding landscape, land use, level of disturbance and width, a delineation has to be made between critical sensitive zones, which relate to core areas and bottlenecks of the corridor, and zones, which are in the edge region of the corridor. These zones represent different categories referring to utilization by men and disturbance-sensitiveness of wildlife. For example, the surroundings of greenbridges should be kept free from hunting infrastructure (cf. wildlife passages near the A6) in accordance to the need for wildlife regulation by means of hunting.

Another basic study for land use planning was conducted for protected areas to develop tourism guidance strategies and to avoid disturbance of sensitive species, while still allow recreational use (e.g. Redl et al. 1994, Prachensky 1997).

Reimoser (2001) worked out a concept of wildlife ecological zoning for an important part of the Alpine-Carpathian Corridor, the Danube floodplains. In this study, red deer was used as indicator species because of its space requirement reaching beyond the border of the National park and its high sensitivity to disturbances. The results are currently being incorporated in the management plan of the Donau-Auen National park.

Based on a detailed study (Grillmayer et al., 2002) in the area between the Danube floodplains and the Leithagebirge (see also chapter 4.1.), a first proposal for a delineation of different disturbance areas has been made within the feasibility study. The classification relies on a threshold value

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determined by intersecting the resistance model with track surveys, which differentiates areas with higher evidence of indicator species (red deer and wild boar) and higher migration potential from those with lower ones. The results were also discussed with local stakeholders, who agreed to a spatial concept. To do so for the bottleneck sections of the Alpine-Carpathian Corridor, where the risk of conflicts is high, additional investigations in terms of recreational use and tourism, hunting and land use has to be done and implemented in a participatory way.

4.5. Spatial planning

Instruments of spatial planning for safeguarding the Alpine-Carpathian Corridor have been assessed during the feasibility study due with the help of literature (especially from other regions) and expert interviews in a series of meetings and in the stakeholder workshop. In general, the responsibility for spatial planning is shared between different administration bodies (EU, federal state, provinces and municipalities). That is why different instruments have to be considered in terms of range and level of implementation. In addition, legal binding measures of zoning have to be distinguished from strategic planning tools.

Main outcome: Ecological corridors can be secured by existing instruments when wildlife ecology delivers sound data and profound legal binding argumentation. According to the level of impact of human land use and the current land-cover feasible for wildlife migration, different means can be used.

It is important to distinguish between instruments of legal binding, zoning, strategic planning and landscape planning, and to address the relevant instruments.

A clear deficit of past practice is the lack of information exchange between ecologist and spatial planning – which resulted in the disregard of wildlife needs which were well-known, at least to ecologists.

In terms of environmental impact assessments, the consideration of corridors has proven difficult because of the wide range of corridors which could not be considered in local studies.

A clear limit to instruments of spatial planning is set when corridors are affected by land use practices such as hunting, horticulture or recreational use. For these aspects, more informal tools of communication and wildlife ecological zoning have to be elaborated.

The Alpine-Carpathian Corridor can only be successfully reestablished as a wildlife corridor in the long run if the relevant landscape and properties can be kept free from buildings or other disturbing utilisations.

Therefore, the ACC must be integrated into planning instruments. Firstly, as a general information to spread the knowledge and alertness for the subject, and secondly, to protect required areas from unfavourable uses. The information task can be supported by integrating the ACC's pathway in rather general programs, long term surveys and concepts which are not legally binding, but are considered a basis for the discussion of general long term development directions. Important examples are the

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JORDES+ concept, the CENTROPE mission statement and the KOBRA project. All of them also refer to the need for a sustainable development that uses land/space carefully. Within the JORDES+ concept, the Alpine-Carpathian Corridor project is already mentioned as a possible implementation project. Spatial development concepts exist for Lower Austria, Vienna and Burgenland, and aspects of ecological connectivity are being considered.

However, to really protect areas, the integration in legal binding instruments, like regional development plans, which are the basis for development, and zoning plans on the municipality level are necessary. The task to develop planning instruments which help to save wildlife corridors is very important. There are just a few existing examples of such specific spatial planning tools (e.g. Styria, Switzerland). In Slovakia, the Territorial System for ecological stability already incorporates biocorridors as important elements for a sustainable development and the protection of biodiversity. Unfortunately, these corridors have not been established according to specific landscape patterns and habitat requirements of wildlife.

The integration of wildlife corridors in regional development plans is important because they give legally binding input to local zoning plans. The relevant planning tools in regional development plans are, generally speaking, “landscapes of priority interest” (have to be considered in local zoning), “regional green zones” or “regional settlement borders” (have to be regarded in local zoning).

However, the problem remains that also in these “keep-free zones”, some activities which may have negative influences on the wildlife corridor are still possible. These elements can be kept free in the local zoning, due to the designation as “open space”. First consultations with regional and local authorities advise that regional instruments are implemented in the bottleneck sections and that local instruments are used for really high priority areas, such as the surrounding of greenbridges.

So the need for a good scientific argumentation is obvious. Only a comprehensive analysis and explanation why a specific area is important for the functionality for the wildlife corridor can guarantee that a construction ban is accepted.

The ecological survey has to be a process referring to different levels: the general routes for ecological corridors have to be defined on a small scale, which can be used in an indicative way (e.g. Jongman et al., 2006). This is sufficient to prove the importance of existing large stepping stones (e.g. Leithagebirge mountains). Because they are also protected due to other legal instruments, development tendencies are weak and no further examination is needed here. Detailed studies are important if areas next to settlements or next to infrastructure (e.g. highways) are affected. Here the effort of detailed GIS models is justified and needed to give the “green zones”, with their substantial consequences for land owners, the necessary background.

An important argument for strong restrictions is the need for preventing accidents with game. Game passes can be a severe danger for traffic.

With the support of scientific background, important areas in need of protection can be identified. “Hot spots” can be defined: the barrier effect or the danger of disappearance of an existing passage is high, and the need to save this passage for the ACC is urgent. These passages must be protected with spatial planning tools, firstly on the regional planning level, secondly on the local planning level.

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To increase the acceptance of wildlife corridors and legal binding instruments, communication measures are important. This way, corridors can be saved in the long run. Spatial planning instruments are accepted and also other measures, which cannot be prevented by spatial planning tools, will take the ACC into account.

Table 10 Levels of implementation and consideration

Level	Instrument	Administration bodies
supra-regional	cross-border development concepts, PEEN network	international treaties
regional	development-concepts: overall goals and mission statements (e.g. conservation concepts)	countries, provinces
regional	development plans: green zones settlement-borders bio-corridors	provinces
regional	land-use management/agreements: Wildlife ecological spatial planning	agreements within relevant sectoral regulations
local	spatial zoning: designation as “open space” contracts	municipalities

First discussions with representatives from the Federal Government of Lower Austria have been very successful. The ACC (and probably further wildlife passages) will be integrated in new regional plans which will be completed in 2008. These plans contain legally binding information which must be taken into account in local zoning plans. There will be a specific “Green zone” category “wild ecological corridor”. The needed scientific background to declare these zones is evident and can be prepared.

During the feasibility study, it became apparent that revisions of two instruments are currently in preparation, and regarding to ecological connectivity is only possible by spring 2008. This is due to the fact that a preliminary study has been launched by the Federal government of Lower Austria (Hackländer et al. in preparation) to prepare scientific background.

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Tabelle 11 Relevant Instruments and features of spatial planning in the different regions

Austria	**Spatial planning at the national and provincial level**	**Territorial planning**	**Austrian Spatial Development Concept 2001**
		Strategic socio-economic development planning	Provincial development concepts (NÖ Landesentwicklungskonzept, Landesentwicklungsprogramm Burgenland)
		Landscape protection and planning	expert surveys and scientific research
	Spatial planning at the regional level	Territorial planning	Regional development plan (Regionales Entwicklungskonzept)
		Strategic socio-economic development planning	Development concepts for microregions (Kleinregionales Entwicklungsprogramm)
		Landscape protection and planning	expert surveys and scientific research, Nature conservation concept (e.g. Naturschutzkonzept Niederösterreich)
	Local level	Territorial planning	Territorial plan of a municipality in the form of land use plan (zoning plan)
		Strategic socio-economic development planning	Municipal development concept (Örtliches Entwicklungskonzept)
		Landscape protection and planning	Landscape concept (part of the municipal development concept)
Slovakia	Spatial planning at the national level	Territorial planning	Spatial Development Perspective of the Republic of Slovakia
		Strategic socio-economic development planning	Operational Regional-development Plan, incl. environmental quality development
		Landscape protection and planning	Territorial System of Ecological Stability of the SR (TSEC) (defining bio-corridors, bio-centers, interaction areas) and other landscape protection planning documents at the national level
	Spatial planning at the regional level	Territorial planning	Territorial plan of the region with obligatory Landscape plan (TSEC at the regional level incl.)
		Strategic socio-economic development planning	Regional socio-economic development plan incl. environmental quality development
		Landscape protection and planning	Landscape protection planning documents at the regional level
	Local level	Territorial planning	Territorial plan of a municipality in the form of land-use plan Territorial plan of a zone (both obligatory incl. landscape plan and TSEC at the local level)
		Strategic socio-economic development planning	Municipal socio-economic development plan, incl. environmental quality development
		Landscape protection and planning	Landscape protection planning documents at the regional level

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4.6. Communication

Communication plays an important role in developing and conducting projects such as the Alpine-Carpathian Corridor project, which affects a large transboundary area and various sectors (authorities, spatial planning, hunters, recreation, etc.) from regional to international level. Besides, the need for preserving ecological connectivity is not yet well known in the general and professional public.

So it was and is a target to communicate the intention to preserve a wildlife corridor between the Alps and the Carpathians as well as the last remaining areas between Vienna, Bratislava and Sopron, which are free from built-up areas and great human disturbances.

Communication aspects were discussed with various professionals (e.g. PR, environmental education staff, broadcasting associations) and instruments and media coverage was investigated and partly tested (Also compare with Leitschuh-Fecht, H. 2007).

Main outcome: Communication in all its forms will be a basic component of the Alpine-Carpathian Corridor project. On the one hand, to inform the general public of the need for preserving ecological connectivity, especially in the area between Vienna and Bratislava. On the other hand, to motivate people to take interest in the process of the project.

In the past, information exchange between relevant sectors and experts was driven only by personal contacts and commitment. This resulted in inefficient output and unnecessary damages for all sides.

Beyond information, participation is necessary to gain a broad acceptance for measures related to land use and land cover, especially in the bottleneck areas. Wildlife ecological zoning is one possible approach.

Two key messages for the Alpine-Carpathian Corridor project are the demands of wildlife and of the population, yet it is necessary to focus on one subject on special occasions.

Information

An appropriate means to provide information nowadays is over the internet. The corridor data and relevant materials have been published within an interactive map service (http://ivfl.boku.ac.at/Projekte/Woek). This tool has mainly been used by ecologists and has not spread into other sectors. Within the so-called CentropeMap, there is a Webgis service that can be used as a more widely known platform to present future results. For restricted use, a planning tool called NÖ-GIS can be used, for instance in Lower Austria.

Since the starting date in 2006, WWF and its partners started to actively communicate issues of wildlife, safeguarding biodiversity and ecological connectivity with a focus on the Alpine-Carpathian Corridor (e.g. PR-Tour with Wildlife ecologist along the Corridor, Leaflet about the Alpine-Carpathian Corridor and media relations). In general, the subject of ecological connectivity has proved a subject of great interest. Especially in combination with the living space for men, the fragmentation of the landscape and the increasing ratio of built-up land is of general concern.

Communication was also discussed with broadcasting professionals of the ORF / Universum editorial staff. It became apparent that it is important to highlight wildlife and special species to spread the Alpine-Carpathian project in nature documentation.

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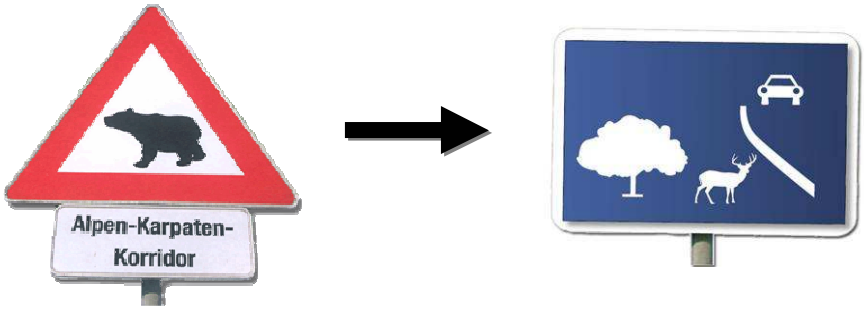
Fig. 17 Change of attitude from “Wildlife Centred” to “Integrated Approach” during project development.



Participation

Participation is a key factor for gaining acceptance for safeguarding ecological connectivity. Actions, in terms of changing land cover and restricting land use, are only possible in good relations with relevant stakeholders. Besides information, participation within the planning and implementation phase is necessary.

Based on the modelled corridor areas of Köhler C. (2005), the association Distelverein informed all Austrian municipalities concerned with a letter about the Alpine-Carpathian Corridor and the need for action in the year 2005, asking them to spread the information to local spatial planning professionals and interested parties.

During the feasibility study, contents and implementation of the planned Alpine-Carpathian Corridor project were discussed in experts’ meetings, with various stakeholder groups and with local communities. The feedback concerning the integrated approach to the subject of ecological connectivity was welcomed by many target groups.

At the end of September 2007, a Stakeholder workshop brought together Slovakian and Austrian experts of various sectors to discuss the preliminary project draft in terms of scientific bases, landscape restructuring, spatial planning and communication.

Fig. 18 Stakeholder-Workshop on 28th of September 2007 in Orth/Donau.

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In addition, an information exchange between one especially affected municipality was organized with support from the spatial planning authorities of Lower Austria and stadtland. Suggested measures, activities and possible restrictions were discussed on the basis of wildlife ecological results. It became apparent that acceptance can be gained if activities are explained in detail and if there is a broad support for the project from many partners.

Environment Education

Raising awareness begins in school, so it is also target of the Alpine-Carpathian Corridor project – among other environmental education measures – to present the topic of ecological corridors to children and youngsters. Several environmental education programmes were conducted by various groups about specific subjects of nature conservation and environmental protection.

The Ecological Footprint project by WWF AT can be seen as a model for teaching ecological connectivity. Educational material and school lessons with a special programme were held by trained staff.

At present, a school programme called “Einzigartig anders” (www.kids-for-the-alps.net) is conducted by WWF International, which provides school material on the subject of biodiversity and habitat connectivity. On the Slovakian side, the school programme “World of Carpathians“ is in process.

A project conducted by the Natural History Museum Vienna focused especially on the subject of landscape fragmentation.

Furthermore, the touring exhibition “Wandern ist Bärensache“ is conducted by WWF. The exhibition informs visitors about the brown bear, bear management and the importance of saving migration routes throughout Europe.

The premise that “ecological connectivity” is a tricky issue to communicate could be disproved by Peter Sürth and his project “The way of the wolf”. Sürth hiked along the Alpine-Carpathian Corridor from the High Tatra to Mariazell and elicited a broad media response.

To test existing school materials and education topics, WWF held a lesson on the subject of ecological connectivity in the fifth grade of the high school Polgarstraße on 14 June 2007.

It became clear that materials for this special topic are rare. But there is a good foundation for developing an educational programme.

In several protected areas along the corridor, nature guides and rangers play an important role in promoting nature, informing visitors and raising awareness for conservation issues. This potential could be further developed in a cross-border training course.

Recreation & Tourism

Recreational use of the corridor areas is a topic where not only conflicts, but also opportunities may arise in terms of raising awareness and informing people. Within the project development, the cycle and hiking trail network in the area of the corridor, starting from the Rosaliengebirge to the Small Carpathian mountains, was analyzed. It became apparent that the cycleway network is developed fully. This provides the opportunity of implementing a long distance cycleway along the Alpine-Carpathian Corridor which does not disturb nature and inform people about ecological corridors by corresponding information boards.

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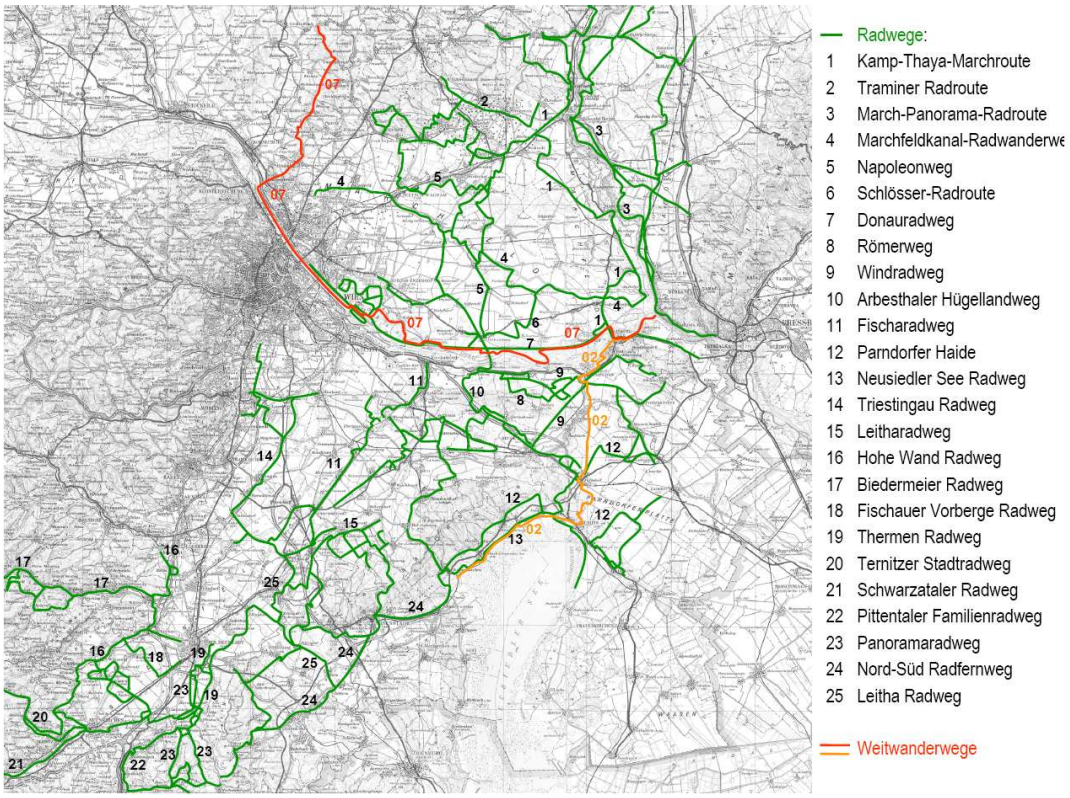
Fig. 19 Cycle-paths around the Alpine-Carpathian Corridor



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4.7. Action plan

To approach the variety of interdisciplinary, transboundary and interlinked tasks for ecological connectivity along the Alpine-Carpathian Corridor in a sustainable and effective way, a compiled tool is necessary. Several intersectoral and transnational tasks were elaborated in the past by means of an action plan (e.g. Flood protection Rhine 1998, Sturgeon conservation 2006, Neobiota, Essl et al. 2004). All assessed action plans have the benefit that clear objectives are combined with committed partners and stakeholders to implement necessary measures.

During the feasibility study, a scheme for an action plan for the preservation of the Alpine-Carpathian Corridor was developed. The plan aims at combining measures, activities, means, funding possibilities and implementation bodies.

> **Main outcome: An action plan for the preservation of the Alpine-Carpathian Corridor can foster the implementation of activities and measure on the whole range of the corridor, with the support of different partners and implementation body and can work as a main tool of project management. In addition, the action plan can compile all necessary information about the need for action, the rationale, necessary activities and practical funding possibilities in a holistic way.**

For the model region between Danube floodplains and the Leithagebirge, the action plan has been tested.

The proposed measures and activities refer to certain measures on the ground (e.g. wildlife passages) but also refer to fields of communication, participation and scientific research. During the ACC project, the results of scientific research and stakeholder consultation will be used to compile an overall action plan for the long-term preservation of the corridor, which has to be accepted by all partners and implementation bodies necessary. With the action plan as a common tool, it is possible to maintain an up-to-date plan which illustrates fulfilled and pending tasks. Therefore, the action plan is a flexible tool, especially to divide implementation measures into various projects on a different scale of implementation – e.g. regional spatial planning project, implementation in the framework of LE, greenbridge construction – that are gathered under a common framework.

Moreover, the action plan (to be finalized in the first project phase of the ACC project) can also be used as the management tool for the ACC project itself.

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Table 12 Scheme of the action plan tested within the feasibility study

Rows	**List of all activities necessary** **grouped by fields of action (scientific research, implementation, communication, ...)** **structured by Cardinal Numbers**

Module	Activity	Priority (A,B,C)*	Range of meassure	Output	Level of Impact	Assigned to:	Project	Costs (H,M,L)
1.	**SCIENTIFIC BACKGROUND**							
1.1	**Wildlife Ecology**							
1.1.1	Study about aims & public interest for corridor	A	Trans-boundary	Rationale for measures	AT	BOKU IWJ	Feasibility-Study	L
1.1.2	...	..						

Columns	
Activity	Short Description of the specific activity
Priority	Importance of the activity for the preservation of the corridor. Estimated in three categories A: activities essential for the preservation of the corridor B: activities important for the preservation of the corridor C: activities that can support the preservation of the corridor
Range of the activity	Describes the range of the measure Divided within the overview into: transboundary, regional, local range
Output	Definition of the specific results of the activity
Level of Impact	Defines the range, where the output will be effective
Assigned to:	Partners responsible for activity
Project	Possible framework for implementation of the activity
Cost	Rough estimation of costs H: high (e.g. greenbridge) M: medium (e.g. GIS Modelling of ACC area) L: low (e.g. Improvement of landscape functionality on specific site)

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4.8. Identifying bottlenecks – Hotspots for activities

Due to the variety of regions within the Alps and Carpathian mountains, the challenges can be very different. Hence, it was necessary to divide the corridor into sections (see Fig. 20). This division allows us to differentiate between critical areas with a high need for action and areas with a lower need for action. The core team set up criteria for prioritization and designation of model sections, which are based on the corridor model of Köhler (2005), the current fragmentation due to traffic infrastructure, current traffic plans in the corridor area, development pressure and expert opinion of wildlife ecologists (see Table 13).

According to the evaluation it became apparent that sections 3 (Wiener Neustädter Pforte), 5 (Leithagebirge mountains and Danube floodplains), 7 (Morava floodplain and Marchfeld) and 8 (Zahorie Lowland) have been identified as critical areas concerning migration potential (see Table 14).

According to this, the focus at these model sites should be on the elaboration of scientific basis, the implementation into spatial plans and restructuring measures in the field.

Table 13 Criteria for the identification of bottlenecks within the Alpine-Carpathian Corridor

Criteria	Description	Rating
I. Corridor model (Köhler, 2005)	Ratio of corridor profile with high fragmentation effect	1 (low) – 4 (high)
II. Current fragmentation due to traffic infrastructure (according to Völk et al. (2001) and Proschek (2005)	Need for additional wildlife passages (for key species	1 (no fragmentation) 2 (fragmentation with WLPs) 3 (need for improvement) 4 (currently total barrier)
III. Planned infrastructure barriers (ASFINAG, ÖBB, ...)	Need for accompanying measures	0 (no) – 1 (yes)
IV. Development pressure per Section. (ÖROK, development concepts, Protected areas)	Outlook at development of built up land and protection status.	1 (low) – 4 (high)
V. Expert input	Estimation about need for action in section	1 (low) – 4 (high)

Table 14 Valuation-matrix for the sections along the Alpine-Carpathian Corridor.

Criteria | Sections	1	2	3	4	5	6	7	8
I. Corridor model	1	1	4	1	4	1	4	-
II. Current fragmentation due to traffic infrastructure	2	1	4	1	4	1	1	4
III. Planned infrastructure barriers	0	0	?	0	?	0	1	?
IV. Development pressure	1	1	2	1	2	1	4	4
V. Expert input	1	1	4	1	4	1	4	4

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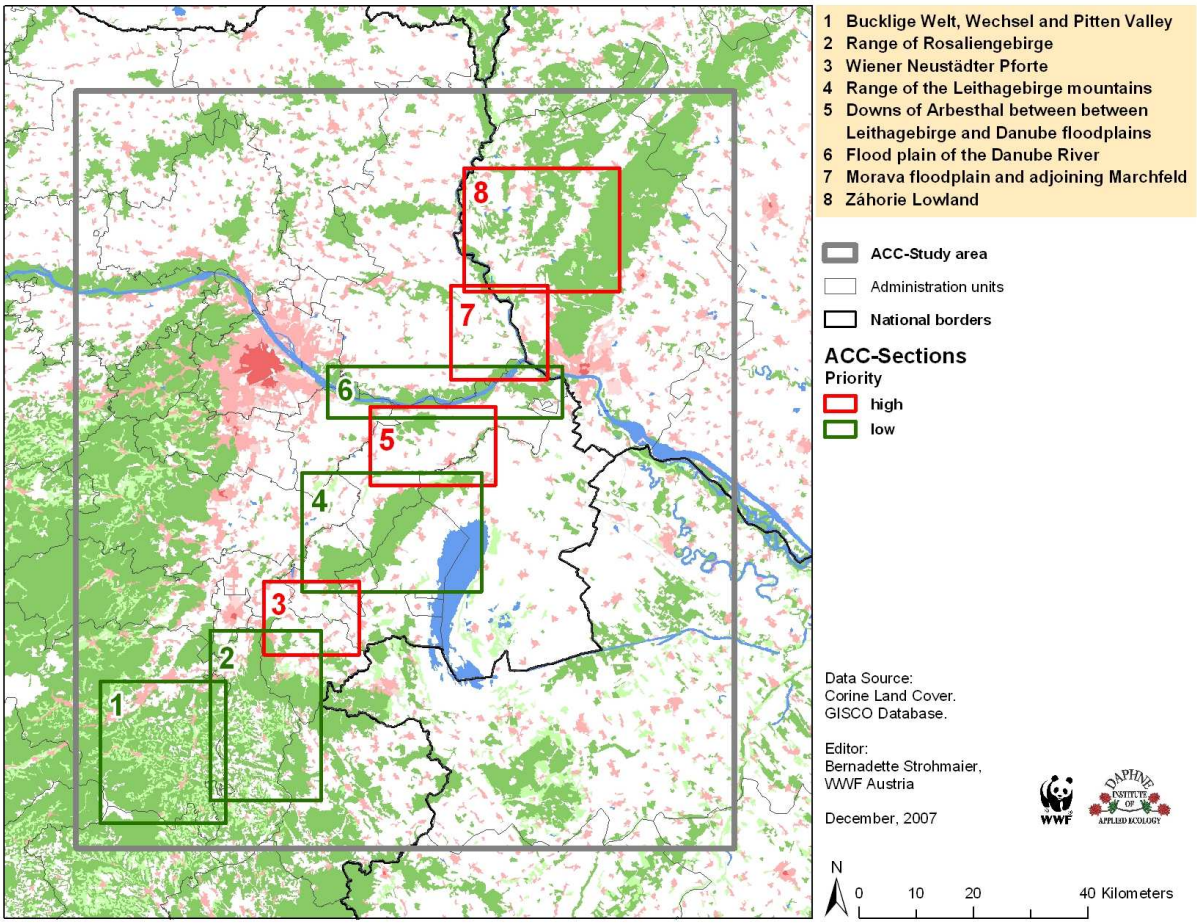
Fig. 20 Defined sections along the Alpine-Carpathian Corridor and prioritized model sections



4.9. Assessed data required for GIS & wildlife ecological zoning

To conduct research, communication and implementation measures, a certain amount of materials and data have to be available in compatible formats for all involved regions. Within the feasibility study, a set of data was defined and availability checked.

Basic

- ✓ Base maps/topographic maps in different scales (1:50.000 / 1:200.000 / 1:500.000)
- ✓ Satellite images (all of which are available: Landsat / IRS-1C / Aster / High resolution images like Ikonos / Quickbird)
- ✓ Aerial photos - especially from the bottleneck sections
- ✓ Administration bodies
- ✓ Land cover / land use dataset (higher resolution than Corine2000 preferable)

Additional

- ✓ Data about the settlements and if possible data about the development of settlements, especially in the bottlenecks.
- ✓ Data about infrastructure (railways, highways, ...)
- ✓ Data about producing areas and data about other forms of land use.

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- ✓ Data about potential linear barriers like rivers and information about the riverbank, fences (fenced areas, roads and forest sites)
- ✓ Actual spatial planning and zoning materials.

Optional

- ✓ Socio-economic data: Tourism (e.g. accommodation / duration of stay in a region)

4.10. Precautions for the conduction of a successful Alpine-Carpathian Corridor project

Several aspects in various sectors are a possible risk of missing the mark of a transboundary implementation project. Due to the multidimensional nature of the project approach, possible risks have to be clarified at the earliest possible stage and solutions have to be proposed.

The following list displays the current state of knowledge of the transboundary core team that has to be developed further in the implementation project phase.

- ✓ Reconnecting fragmentized landscapes can also have negative effects on species. For example, it is possible that parasites (such as *Fascioloides magna*) can spread into new areas.
  From an expert's point of view, monitoring and possible counteractions have to be developed during the project to address and mitigate negative effects.
- ✓ Improving the landscape functionality for specific indicator species may cause negative effects for species adapted to different habitat conditions (*Otis tarda* e.g.). For that reason, changes in land use have to be carefully planned and improvements in landscape functionality have to take into account the requirements of species of open (low structured) landscapes.
- ✓ Fenced game grounds and the fenced military base in Zahorie can pose a threat that cannot be dealt with by measures of spatial planning or wildlife passages. For that reason, professional field managers have to elaborate solutions with relevant stakeholders.
- ✓ The migration of large carnivores, such as the brown bear, can cause trouble in terms of land use practices if they are not addressed in specific management concepts. A management plan for brown bears exists in Austria, which can cope with the eventuality of migrating brown bears. Similar concepts have yet to be developed for the wolf and the lynx.
- ✓ Municipalities may not only benefit from the preservation of green zones, but may also be affected by restrictions in their spatial development. Therefore, measures in accordance with local development plans and solutions have to be found in a flexible way.
- ✓ In general, all sectors and the whole range of the corridor have to participate in the preservation of the Alpine-Carpathian Corridor. A common mission statement is necessary, for example by a common memorandum.
- ✓ The cross-sectoral project will have to cooperate with various stakeholders and administration bodies. For that reason all relevant administration bodies should participate in the implementation project (ministries, federal governments)

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5. Concept for the Alpine-Carpathian Corridor Project

5.1. Mission statement

The enlargement of the EU necessitates the growing together of transboundary regions along former border areas. The so-called Centrope region, which has developed between Vienna, Bratislava and Sopron, is one of Europe's most dynamic regions. This causes a high ratio of built-up land, fragmentation and intensive land use, but also an increasing demand for recreational areas. The remaining protected areas and wildlife are under great pressure. Various spatial development concepts for this region stress the importance of natural values and that development must be achieved in a sustainable way (in terms of economy, ecology and social dimension).

The aim of the Alpine-Carpathian Corridor project is to safeguard the ecological connectivity between the Alps and the Carpathians, which intersects the Centrope region. Migration and genetical exchange of wildlife population will be enabled between these two large eco-regions and the valuable protected areas in this region.

The project has to enable a sustainable development plan which takes into account the requirements of both man and wildlife. The knowledge about the importance of undisturbed areas, green zones and a close use of land resource shall be fostered.

The transnational cooperation of various sectors within a tangible implementation project shall be actively communicated and used to trigger follow up projects in the adjacent regions of the Carpathians and the Alps.

5.2. Background

Spatial development and wildlife corridors

The traditional migration route, the Alpine-Carpathian Corridor, connects Europe's greatest mountain ranges and is one of the most significant genetic flow corridors in Central Europe (cf. Völk & Kalivodova, 2000). But the permeability of the landscape has changed enormously in the last century because of agricultural, traffic and settlement development. The result is a fragmented landscape which especially affects species which inhabit large areas and have a distinctive migration behaviour. Large species (e.g. red deer) and animals at the end of the food chain (lynx, brown bear, wolf) have these superior requirements of undisturbed space (cf. Völk et al., 2001).

Reestablishing a continuous green band between the Alps and the Carpathians and reconnecting important stepping stones such as the Danube floodplains, Morava floodplains and the small Carpathian mountains, will have positive effects for wildlife and man, due to a sustainable development of living space.

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Building on existing concepts

The region between Vienna, Bratislava and Györ is developing very dynamically. The **Joint Regional Development Strategy (JORDES+)** aims at furthering a sustainable development due to a sound nature management and regional development. The Alpine-Carpathian Corridor project has been identified as one possible key element for developing the green heart of this region.

In the framework of the **Centrope** overall concept, the mission statement for the environmental development of a green heart of Central Europe has been developed. Key elements are: sustainable growth, economically use of resources and space and nature-friendly traffic.

The project **KOBRA+** dealt with the living space in the surroundings of Bratislava. One important element of the mission statement is the preservation of green zones for recreational use and tourism.

Implementation of international obligations

Establishing and securing ecological corridors is one of the bases for preserving our biodiversity. Several international agreements and obligations which commit the contracting parties to implementation activities refer to this need for action. The Convention on Biodiversity member states and the European Union have committed themselves to the preservation of biological diversity. A coherent Natura 2000 network is one way to achieve this goal.

The so-called Pan-European Ecological Network is an initiative by the Council of Europe and aims at the preservation of a network of corridors – including the Alpine-Carpathian Corridor.

The Memorandum of Understanding for the cooperation between the Alpine Convention and the Carpathian Convention says that efforts for enhancing networks of protected areas in the Alps (ALPARC) and in the Carpathians (CNPA) will be continued, as well as the ecological link-up between the two mountain ranges.

5.3. Goal and project content

The overall goal of the Alpine-Carpathian Corridor Project is to trigger cross-sectoral activities for safeguarding ecological connectivity, to further a sustainable development and to raise the awareness for a balanced use of natural resources.

Objective

The aim of the Alpine-Carpathian Corridor project is to safeguard the ecological connectivity between the Alps and the Carpathians, which intersects the Centrope region. Migration and genetical exchange of wildlife population between these two large ecoregions and its valuable protected areas shall be enabled.

The project has to trigger a sustainable development which considers the requirements of both man and wildlife. The knowledge about the importance of undisturbed areas, green zones and a close use of land resource shall be fostered.

The transnational cooperation of various sectors within a tangible implementation project shall be actively communicated and used to trigger follow-ups in the adjacent regions of the Carpathians and the Alps.

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Planned activities

The reestablishing and safeguarding of ecological connectivity has to be based on a sound scientific basis. For that reason, base data must be generated using satellite image interpretation, field mapping, wildlife tracking and investigation of implementation instruments.

One main activity of the Alpine Carpathian corridor project is to build two wildlife passages (greenbridges) in Austria and Slovakia to mitigate existing barrier effects of motorways.

To improve proper land use and land cover it is important to address agriculture, spatial planning authorities, hunting, tourism and other sectors in a participatory way.

Summary of activities (details in Table 16):

- ✓ Facilitation and preparation of scientific base data
- ✓ Trigger investment in two wildlife passages
- ✓ Promotion of a sustainable land use within sensitive corridor sections
- ✓ Safeguarding corridors in spatial plans
- ✓ Environmental education, information and participation

Expected results

- ✓ Due to activities and measures within the project a coherent and continuous green band of near natural habitats shall interlink the Alpine and Carpathian ecoregions. This contributes to supporting biodiversity and to foster a sustainable development.
- ✓ Mitigation of negative effects of landscape fragmentation due to wildlife passages over two infrastructure barriers (A4 in Austria and D2 in Slovakia)
- ✓ Preparation of harmonized base data for ecological connectivity in the wider range of the Alpine-Carpathian Corridor (parts of Austria, Slovakia and Hungary), which can be used efficiently in further development project plans.
- ✓ Trigger and foster transboundary cooperation in terms of nature protection issues and environmental education
- ✓ Transboundary coordination and harmonization of measures to safeguard ecological connectivity by means of spatial planning
- ✓ Raised awareness for the importance of green zones and unfragmentized landscape as well as the value of open landscape areas.

Objectives and activities planned within the cross-border Alpine-Carpathian Corridor project fit into relevant EU funding programmes, which shall provide the funding of the project. The operational programme of the transnational programme within the Central-European region of the ETC programme established the aim responsible use of the environment (Priority 3).

Within the cross-border cooperation programme for Austria and Slovakia, the second priority aims at improving accessibility and sustainable development due to spatial development (2.2) and cooperation and joint management of protected areas (2.3).

Project area and impact area:

The project area has to be defined by close natural regions deliminating the Alpine-Carpathian Corridor. To the west the Rosaliengebirge, to the North the Morawa-Dyje floodplains, to the east the Malé Karpatŷ and to the South-East the Hungarian Danube floodplains and the Neusiedlersee. Impacts shall be triggered within the Alps and Carpathians as well.

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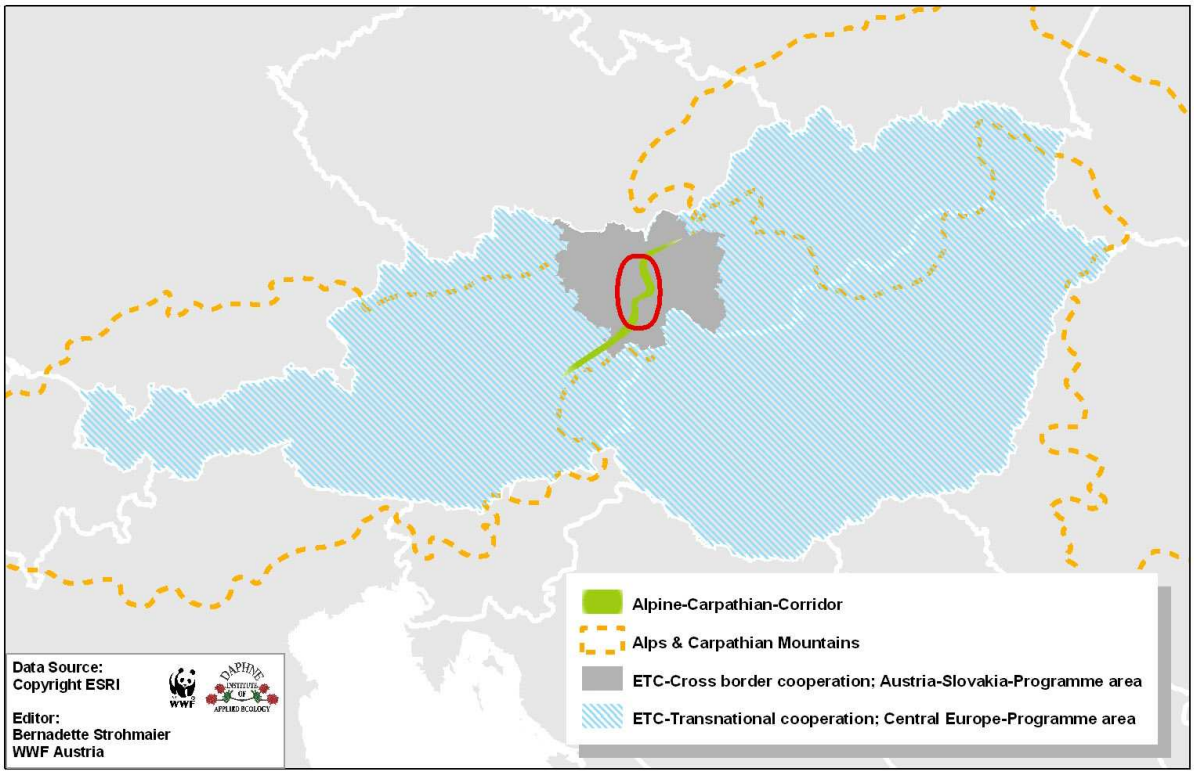
Fig. 21 Project area and relevant spatial units



Duration: 36 - 48 months (2008 – 2011)

Project partners:

To conduct a transnational and inter-sectoral Alpine-Carpathian Corridor project, a network of committed partners and supporters are a necessary precaution. During the feasibility study, a network of cooperation was established. In terms of the implementation of activities, further partners have been approached to participate in the project.

According to the EU funding programme European Territorial cooperation, several aspects have to be considered. In the new funding period 2007-2013, a lead beneficiary shall be appointed, who is to be responsible for a sound financial management, arrangements with other project partners and the responsibility for the overall project implementation (ERDF regulation). In general, and especially for the lead partner, it is important to charge durable and financially capable organisations. Several options have been assessed by the project development team. The administration of Lower Austria (in a cooperation of nature conservation and spatial planning department) has been found a good choice, with strong assistance from relevant ministries and organizations in charge of the project management.

Further important partners are research institutes, NGOs, Departments of the federal states, motorway companies and protected area management bodies. Important support and cooperation is guaranteed due to the assistance of national and international bodies, such as the Federal Ministry of Traffic, Innovation and Technology, Federal Ministry of Environment, the Alpine and Carpathian convention, IUCN and the Council of Europe (PEEN network).

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Table 15 Overview of key partners in a cross-border Alpine-Carpathian Corridor project

Tasks	Role and function	Possible partners
Project related		
National Co-Financing	Financial contribution to trigger EU funds	ASFINAG, NDSAS, Regional governments, Environmental ministry
Project steering level	Decision making processes and steering of work packages	ASFINAG, NDSAS, Regional governments, Environmental ministry and representatives from partners
Leadpartner	Overall responsibility in terms of contracts, financial management, distribution of funds.	Regional government of Lower Austria
Projectmanagement	Conducts operational tasks on behalf of the lead partner	To be contracted (e.g. Donau-Auen National park, DAPHNE, CHKO Zahorie, ÖBf AG)
Support	Cooperation in terms of project implementation	Ministries for traffic, environment, regional development, International organizations, Organisations of land-users
Content related		
Scientific background	Sound scientific base data and data management	BOKU, DAPHNE, WWF, FIWI, SPECTRA, CHKO Zahorie, CWS
Spatial planning	Application and implementation of scientific base data	Spatial planning authorities, PGO
Implementation of measures	Building of infrastructure, adaption of land use	Distelverein, CHKO Zahorie, Regional management bodies
Communication	Specific and overall communication tasks (information, education, participation)	Protected area management bodies, WWF, Daphne, Distelverein

Table 16 Overview about the planned activities within the Alpine-Carpathian Corridor project

Workpackage/Activity	Assigned to	Output	Results
1. SCIENTIFIC BACKGROUND			
Study about requirements, risks and practice for ecological connectivity	BOKU IWJ/CWS	Guidelines, management requirements for WLPs	Study
Establish monitoring project	BOKU IWJ/CWS	Methodology, base assessment	Report with proof of success
GIS modelling of ACC area	BOKU IVFL	Sound connectivity data (scale 1:100.000)	GIS Database
GIS mapping of bottleneck sections	BOKU IWJ/CHKO Zahorie	Sound connectivity data (scale 1:20.000)	GIS Database
Study on land use and land cover	BOKU IWJ/CWS	Management proposals	Study + measure locations

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Design of Wildlife Ecological spatial planning	FIWI	Approved and feasible land use planning	Spatial implementation plan
Geodata Management	BOKU IVFL	Ready useable geographical information (e.g. for spatial planning)	General provision of connectivity data + metadata
Implementation Handbook for Spatial planning and Environmental Assessments	to be defined /SPEKTRA	CB Guidelines for implementation of connectivity data	Handbook
2. ACTION PLAN			
Collection of a comprehensive Implementation plan	WWF/Daphne	Ready useable plan of activities including funding options	Publication
3. IMPLEMENTATION			
Greenbridge near Laab	NDSAS	Infrastructure to remove barrier effects	Infrastructure
Greenbridge near Göttlesbrunn	ASFINAG	Infrastructure to remove barrier effects	Infrastructure
Implementation of wildlife corridors into spatial planning	Spatial planning Departments	Regional preservation of greenzones	Adapted Planning instruments
Tourism & recreation	To be defined	Crossborder bicycle path "Alpine-Carpathian Corridor"	Infrastructure, path signs, map
Improvement of landscape functionality	DISTELVEREIN	Adapted land use	Adapted land use practices
4. COMMUNICATION			
Communication concept	WWF/Daphne	Target-driven communication	Communication strategy
Information about the ACC	Nationalpark	Awareness raising	Homepage, leaflet,
Media relations	Nationalpark	Information & awareness raising	print, tv, broadcast
School program for Ecological connectivity	WWF/Daphne	Awareness raising in schools	Education materials & school visits
Training course Nature guides	NP / CHKO Zahorie	Training of multiplicators	Excursion programme
Events to inform and involve Stakeholder and to develop measures	Distelverein	Awareness raising, information exchange, participation	Common implementation strategy
Preparation of a MoU Alps-Carpathian Countries, Federal governments, municipalities	WWF/Daphne/ISCC	Political committment	MoU
Conference with signing of the MoU	ISCC	Awareness raising	Conference
5. PROJECT MANAGEMENT			
Lead partner & Project management	Lower Austria / partly to be put out to tender	Project administration, billing, steering	Reports to steering committee & advisory board

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Table 17 Timetable for project work packages

TIMETABLE	2008		2009		2010		2011	
1. SCIENTIFIC BACKGROUND	1 HJ	2 HJ	1 HJ	2 HJ	1 HJ	2 HJ	1 HJ	2 HJ
Study about requirements, risks and practice for ecological connectivity								
Establish monitoring project								
GIS modelling of ACC area								
GIS mapping of bottleneck sections								
Study on land use and land cover								
Design of Wildlife Ecological spatial planning								
Geodata management								
Implementation Handbook for Spatial planning and EIA								
2. ACTION PLAN								
Collection of a comprehensive Implementation plan								
3. IMPLEMENTATION								
Greenbridge near Laab								
Greenbridge near Göttlesbrunn								
Implementation of wildlife corridors into spatial planning								
Tourism & recreation								
Improvement of landscape functionality								
4. COMMUNICATION								
Communcation concept								
Information about the ACC								
Media relations								
School program for Ecological connectivity								
Training course Nature guides								
Events to inform and involve Stakeholders								
Preparation of a MoU Alps-Carpathian Countries, Federal governments, municipalities								
Conference with signing of the MoU								
5. Project Management								
Project management								

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Indicative project calculation

Within the framework of the feasibility study done by WWF and Daphne, and referring to the feasibility study done by Longa et al. (2007), the total costs to preserve the Alpine-Carpathian Corridor in an inter-sectoral project were estimated. Including the costs to build two greenbridges (A4 in Austria and D2 in Slovakia), the costs amount to **approx. 8 Mio. € (267 Mio SKK)**. Due to the fact that the Austrian motorway company is willing to finance the main expenditures of the Austrian greenbridge, the cost for a trans-boundary ETC project would amount to **about 5,2 Mio. € (174 Mio. SKK)**.

To finance the project, the trans-boundary project development team proposes a cross-border ETC project.

First cost-estimations by the Projectdevelopment Team - June 2007

	AT	SK	AT-SK
Modul 1 Scientific basis			
Wildlife ecology	55.000	35.000	**90.000**
Geoinformatics and Datamanagement	122.000	38.000	**160.000**
Wildlife ecological zoning	120.000	40.000	**160.000**
Spatial planning	35.000	35.000	**70.000**
total	**332.000**	**148.000**	**480.000**
Modul 2 Action plan			
Action plan	50.000	50.000	**100.000**
total	***50.000***	***50.000***	**100.000**
Modul 3 Implementation of measures			
Greenbridges	0*	2.900.000	**2.900.000**
Implementation in Bottleneck sections	240.000	80.000	**320.000**
Recreation & Tourism	123.750	41.250	**165.000**
Implementation (spatial planning/field)	52.500	52.500	**105.000**
total	***416.250***	***3.073.750***	***3.490.000***
Modul 4 Communication			
Information	122.500	122.500	**245.000**
Environmental education	125.000	125.000	**250.000**
Participation	75.000	25.000	**100.000**
International politics	30.000	30.000	**60.000**
total	***352.500***	***302.500***	**655.000**
Modul 5 Administration / Lead			
Project Lead / Project management	400.000	100.000	**500.000**
total	***400.000***	***100.000***	**500.000**
Sum Total	**1.550.750**	**3.674.250**	**5.225.000**

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Financing of the project

In a series of consultations, the proposed project activities were investigated in terms of a feasible financing structure. Due to the fact that the Austrian motorway company is committed to build the necessary greenbridge in Austria, the majority of the project has been funded.

ERDF funds can be applied for to co-fund necessary preliminary work, accompanying communication and project management and the greenbridge in Slovakia.

The content of the project fits into the objectives of the Funds for European territorial Cooperation (ETC). The operational programme of the transnational programme within the Central-European region of the ETC programme has established the aim to use our environment responsibly (Priority 3).

Within the cross-border cooperation programme for Austria and Slovakia, the second priority aims at improving accessibility and sustainable development due to sustainable spatial development (2.2), cooperation and joint management of protected areas (2.3).

To trigger EU funds, national co-funding (15-25% of total project budget) has to be afforded.

First proposal for the financing of the project - June 2007

		AT	SK	**AT-SK**
National Cofinancing				
Bundeländer (AT)		387.688		**387.688**
NDSAS & SK Ministries			551.138	**551.138**
total		**387.688**	**551.138**	**938.825**
EU-Cofinancing				
Target 3 - ETC-Funds AT (proposed)		1.163.063		**1.163.063**
Target 3 - ETC-Funds SK (proposed)			3.123.113	**3.123.113**
total		**1.163.063**	**3.123.113**	**4.286.175**
total % EU-cofunded		75	85	
Sum Total		**1.550.750**	**3.674.250**	**5.225.000**

* Variante 2: Greenbridge in Austria will be funded in a seperate project by ASFINAG

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5.4. Description of the project content

Module 1 - Scientific basis

Within module 1, the basement for implementation measures in the field, scientific background for spatial planning instruments and monitoring procedures for measuring the success will be prepared. The communication and geographical data infrastructure required for execution of the project will be provided. Furthermore, all relevant wildlife ecological questions regarding the project are taken care of. Module 1 provides the main basis for evaluation of the condition of the Alpine-Carpathian Corridor.

Work package – Wildlife ecology

The requirements of wildlife in the range of the Alpine-Carpathian Corridor will be analyzed according to the ecological demand of sensitive indicator species. According to these minimum requirements, a monitoring procedure for ecological connectivity measures will be developed. Management facilities aiming to avoid possible impacts of ecological connectivity, such as parasites dispersal, will be elaborated.

Work package – Geoinformatics

For modelling and designating the Alpine-Carpathian Corridor, a topical and harmonized data set of the whole corridor area will be generated within the project.

The accurate situation of the corridor is currently well-known only for the model site between the Danube floodplains and the Leithagebirge mountains (Grillmayer et al., 2002). The scale of investigation and designation within maps of 1:10.000 to 1: 50.000 is suitable for accurate planning of measures and implementation into instruments of spatial planning. The expert-based GIS model shall be expanded to the whole range of the corridor and shall be proved by field mapping in four model sections (definition by WWF 2007).

The results will be processed into maps and the description of measures, suitable for use in the implementation and communication module. For public notice, especially for planning offices and technical experts, the relevant maps and metadata will be provided through existing information portals (e.g. CentropeMAP).

Work package – Wildlife ecological zoning

According to the Instrument of Wildlife, ecological zoning such as it already exists for the National Park Donau-Auen (Reimoser et al., 2001), a model for the Alpine-Carpathian Corridor, which defines zones of the wildlife corridor utilizable for different land uses (e.g. agriculture, tourism) will be developed, either to combine them or to separate them. The requirements of wildlife within this zoning will be analyzed according to the ecological demand of sensitive indicator species, and concepts for adapted land use in agriculture and tourism will be elaborated. According to these minimum requirements, a monitoring procedure for ecological connectivity measures will be developed.

Work package – Spatial planning

Together with wildlife ecologists and the spatial planning authorities, the need of action and possibility for implementation into spatial planning instruments will be compiled in a transboundary best practice handbook. The aim is to define instruments and procedures for the preservation of green zones dedicated to ecological connectivity in regional and local spatial plans. The results of sub-modules 1, 2 and 3 will be prepared for use in local and regional spatial planning in an iterative and participatory way (compare sub-module 4.3).

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Module 2 – Action plan

A compiled tool is necessary to approach the variety of interdisciplinary, transboundary and interlinked tasks for ecological connectivity along the Alpine-Carpathian Corridor in a sustainable and effective way. The action plan will display all measures necessary in the landscape (e.g. wildlife passages), but also contain activities in the field of communication, participation and scientific research necessary. The aim of the action plan is to display necessary activities, as well as implementation and funding possibilities. The action plan will be prepared in cooperation with relevant stakeholders.

Module 3 – Implementation of measures

The Ecological connectivity along the Alpine-Carpathian Corridor is interrupted today due to the increase of build up land, infrastructure barriers and intensive land use. To secure the Alpine-Carpathian Corridor, the very most important measures shall be implemented within the Alpine-Carpathian Corridor project. This shall be done by mitigating the fragmentation effect of infrastructure barriers by building wildlife passages, by improving the function of the landscape for ecological connectivity (restructuring) and by securing priority areas for ecological connectivity within spatial plans. The implementation of measures will be focused on the bottleneck sections. For the implementation of measures, field managers will be afforded to cooperate with municipalities, land users and planning offices.

Work package – Construction of greenbridges

The aim of this sub-module is to rebuild ecological connection along two major infrastructure barriers, the A4 motorway in Lower Austria and the D2 motorway in Slovakia. The accurate locations of necessary wildlife passages were elaborated in two preliminary studies (Proschek 2005, Longa & Sedlák 2007). The most suitable location in Slovakia will be near Láb, and Göttlesbrunn in Austria.

Work package – Improvement of landscape functionality

The aim of this sub-module is to improve the status of ecological connectivity by landscape restructuring in the model sections of the corridor. The measures are prepared within the action plan. In addition, the probability of wildlife finding wildlife passages will be improved. In each of the pilot sites, field staff will be present to obtain support from local communities and stakeholders and to support the measures.

Work package – Recreation and tourism

To increase the awareness for ecological corridors and to build a relationship of all municipalities responsible for the corridor, existing bicycle and hiking paths shall be interlinked and promoted as a recreation area between the Alps and the Carpathian mountains. This should make ecological corridors visible and accessible. The prevention of negative impacts for wildlife is a precaution for this activity (compare Module 1.3).

Work package – Integration into spatial planning

The wildlife ecological zoning of module 1 will be integrated into local and regional spatial planning. This shall be implemented across boundaries. Tools for administration practice will be developed in an exchange process of ecologists and spatial planning authorities. Any projects within this area should consider ecological connectivity in a participation process. Relevant information will be provided (see module 4).

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Module 4 – Communication

The need for preserving ecological connectivity and the Alpine-Carpathian Corridor itself are currently not known to the general public, planning authorities and land users. Due to a lack of information, this circumstance has, in the past, led to an increase in fragmentation. At the same time, new measures and possible restrictions to preserving ecological connectivity have to be communicated to gain the necessary public acceptance.

In module 4, communication facilities for information, environmental education and participation in decision making will be provided. The communication measures shall improve the acceptance of ecological connectivity measures and improve incorporation of the minimum requirements of the Alpine-Carpathian Corridor. As the regional key persons for ecological knowledge, nature guides in the existing nature reserves will be instructed to communicate the importance of connectivity.

Work package - Information

Necessary information about ecological connectivity and wildlife ecological corridors shall be provided by means of a shared web page, by information materials, by an “easy understandable” study about the need for action and by audio-visual and print media work.

Work package - Environment education

Education materials for schools and a programme offering experts’ lessons to schools shall be developed and implemented to increase the knowledge about the importance of wildlife ecology and ecological connectivity in young target groups. A trans-boundary training course for nature reserve guides shall increase the exchange of knowledge and local practical concerns about ecological connectivity.

Work package - Participation

In the model sites of the project, municipalities and land users shall be integrated into local implementation of ecological corridors in order to obtain a broad acceptance and knowledge about the preservation of ecological corridors, but also to receive valuable information from the local stakeholders to preserve the corridor. This shall be achieved by information and participation meetings in the regions.

Work package - International Politics

The preservation of the Alpine-Carpathian Corridor is of international interest to implement international legislation and agreements (Convention on Biological Diversity, Natura 2000, Memorandum of Understanding between the Alpine and Carpathian convention). At the same time, the corridors can only be secured if all stakeholders from local to international level work together, because just one single barrier within the corridor can inhibit its functionality. To secure the intention of the project and ecological connectivity, a trans-boundary symposium will bring together responsible authorities of the governments, federal states and municipalities to sign a common agreement to secure the lifeline between the Alps and the Carpathians.

Module 5 – Project management

The lead partner of the Alpine-Carpathian Corridor project will be responsible for contracts between all partners and supporters and will provide coordination, information exchange and evaluation in strong cooperation with applicants and experts. According to the lead partner principle, a lead partner will be responsible for one country, so an Austrian will share tasks with a Slovakian counterpart.

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APPENDIX: Project Documentation

Meetings of the project development core team

Date	Participants	Subject
02/03/2007	Sibylla Zech, Ulrich Blanda, Harald Rötzer, Elisabeth Wrbka, Gerhard Egger, Bernadette Strohmaier, Johannes Wolf, Roland Grillmayer, Milan Janak, Dušan Valachovič	Discussion of project idea, tasks, partners, ETC programme, project modules
09/05/2007	Sibylla Zech, Ulrich Blanda, Gerhard Egger, Bernadette Strohmaier, Johannes Wolf, Alfred Frey-Roos, Milan Janak, Dušan Valachovič	SK feasibility study, Project content of modules drafts
13/06/2007	Sibylla Zech, Ulrich Blanda, Gerhard Egger, Bernadette Strohmaier, Astrid Thoby, Alfred Frey-Roos, Milan Janak, Georg Frank	Details on ETC programme, Results from seperate meetings, Preparation of workshop
08/08/2007	Maroš Finka, Milan Janak, Dušan Valachovič, Michaela Skuban, Ulrich Blanda, Franz Suppan, Alfred Frey-Roos, Gerhard Egger	Project outline, Spatial planning, Wildlife ecology & Action plan
18/09/2007	Sibylla Zech, Ulrich Blanda, Milan Janak, Dušan Valachovič, Astrid Thoby, Franz Suppan, Georg Frank, Gerhard Egger, Bernadette Strohmaier	Preparation of workshop

Project presentations and Expert consultations

Date	Participants	Subject
21/11/2006	Regional government of Burgenland - DI Thomas Perlaky (Stabsstelle Raumordnung und Wohnbauförderung) - DI Rupert Schatovich (Referat Raumordnung) - DI Johann Godowitsch (Abteilung 8 - Straßen, Maschinen- und Hochbau) - DI Helmuth Koch (Planung und Bauvorhaben) - Prof. Mag. Hermann Frühstück (Umweltanwalt, Burgenland) - Dr. Andreas Ranner (Abteilung Anlagenrecht, Umweltschutz und Verkehr) - Mag. Michael Proschek	Presentation of the ACC-project Discussion of cooperation
04/12/2006	Provincial Government of Lower Austria - DI Zibuschka (Head- Regional development and Environment; Government of Lower Austria) - DI Reischauer (Lower austrian farmers association – Environment) - Dr. Kloser (Chamber of commerce – Environment) - Mag. Tschulik (Department for nature conservation;	Presentation of the ACC-project Discussion of cooperation

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	AdNÖLReg) - DI Beiglböck (Department for major projects; AdNÖLReg) - DI Langmantel (Department for construction and engeneering; AdNÖLReg) - DI Schenkir (Department for spatial planning – Baden) - Mag. Roither (Industrialists' Association) - DI Nagl-Estermann (Industrialists' Association) - DI Wolf (Distelverein) - DI Kaufmann (ASFINAG) - DI Reiss-Enz (Ministry of Transport and Infrastructure) - Dr. Hackländer (University of Natural Resources and Applied Life Sciences, Vienna) - DI Grillmayer (University of Natural Resources and Applied Life Sciences, Vienna) - Mag. Michael Proschek	
09/01/2007	NDSAS & Traffic Ministry SK	Presentation of the ACC-project Discussion of cooperation
16/02/2007	PGO (Planungsgemeinschaft Ost) - DI Ilse Wollansky (PGO) - DI Hannes Schulz (PGO) - DI Walter Pozarek (PGO) - DI Rupert Schatovich (Raumordnung, Land Burgenland, spatial planning) - DI Ernst Tringl (Regionalplanung, Land Niederösterreich, Regional Planning) - DI Doris Fried (Euregio Weinviertel) - DI Viktoria Reiss-Enz (BMVIT, Ministry of Transport) - DI Werner Kaufmann (ASFINAG) - DI Fritz Völk (ÖBf) - Mag. Gerhard Egger (WWF) - Mag. Bernadette Strohmaier (WWF)	Presentation of the ACC-project and feasibility study to the office and members of PGO (Planungsgemeinschaft Ost) Discussion of cooperation
15/02/2007	UNEP ISCC - Dr. Harald Egerer (UNEP – ISCC) - Mag. Doris Wiederwald (ÖAR) - Hermann Sonntag (WWF) - Gerhard Egger (WWF) - Bernadette Strohmaier (WWF)	Project presentation & Discussion of cooperation within feasibility study
27/03/2007	Expert group of the UNEP ISCC on biodiversity	Project presentation
17/04/2007	- DI Roland Grillmayer (BOKU) - DI Andreas Duscher (FIWI) - Dr. Richard Zink (FIWI) - Gerhard Egger (WWF) - Bernadette Strohmaier (WWF)	Expert meeting on Wildlife ecological spatial planning

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17/04/2007	II. Round table at Provincial Government of Lower Austria - Prof. Zibuschka (Head- Regional development and Environment; Government of Lower Austria) - DI Reischauer (Lower austrian farmers association – Environment) - Dr. Kloser (Chamber of commerce – Environment) - Mag. Tschulik (Department for nature conservation; AdNÖLReg) - DI Beiglböck (Department for major projects; AdNÖLReg) - DI Langmantel (Department for construction and engeneering; AdNÖLReg) - DI Schenkir (Department for spatial planning – Baden) - Mag. Roither (Industrialists' Association) - DI Nagl-Estermann (Industrialists' Association) - DI Wolf (Distelverein) - DI Kaufmann (ASFINAG) - DI Elke Spindler (Ministry of Transport and Infrastructure) - Dr. Hackländer (University of Natural Resources and Applied Life Sciences, Vienna) - DI Grillmayer (University of Natural Resources and Applied Life Sciences, Vienna) - Mag. Gerhard Egger	The meeting discussed and reported the development of the Alpine-Carpathian Corridor project and clarification about funding possibilities and structure of the project.
04/05/2007	Austrian state forest enterprise (ÖBf AG) - DI Gottfried Pausch (ÖBf AG & Head of National park company Donau-Auen AG) - Mag. Gerhard Egger (WWF) - Mag. Bernadette Strohmaier (WWF)	Informing National park Donau-Auen about the project and discussing the general role of ÖBf AG in the project.
07/05/2007	Donau-Auen National park - Mag. Carl Manzano (Director of National park Donau-Auen) - Dr. Christian Baumgartner (Nature conservation, National park Donau-Auen) - Mag. Georg Frank (National park Donau-Auen) - Gerhard Egger (WWF) - Bernadette Strohmaier (WWF)	Presentation of the Alpine Carpathian Corridor project and Discussion of Cooperation
08/05/2007	Advisory board of the National Park Donau-Auen	Informing Advisory board of the National Park Donau-Auen about the project.
08/05/2007	Hunting association Burgenland - DI Friedrich Prandl (Hunting association Burgenland) - Mag. Gerhard Egger (WWF) - Mag. Bernadette Strohmaier (WWF)	Informing the Head of Hunting association Burgenland about the project.
10/05/2007	- Mag. Margit Gross (Head of Naturschutzbund of Lower Austria – NABU NÖ) - Mag. Gerhard Egger (WWF) - Mag. Bernadette Strohmaier (WWF)	Interchanging information of the ACC-project and the Green Belt project. Discussing possibilities of

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		cooperation within the ACC-project.
07/06/2007	Spatial Planning Department of Lower Austria (Baden) - Ulrich Blanda - Roland Grillmayer - Gerhard Egger - Karl Skorpil - Andreas Hacker - Harald Steyrer - Elisabeth Schenkir - Franz Schweighofer - Felix Jagenteufel - Michael Maxian - Martin Hois - Gernot Kuran	Workshop on Spatial planning issues
19/06/2007	Ministry of Transport, Ministry of regional Development, NDSAS and regional Government of Bratislava Region	Project presentation and discussion of participation in SK
08/08/2007	Spatial Planning Department of Burgenland - HR DI Rupert Schatovich (Spatial Planning, Regional Government of Burgenland) - Prof. Mag. Hermann Frühstück (Advocate for Environmental Issues, Regional Government of Burgenland) - Ulrich Blanda (stadtland) - Roland Grillmayer (IVFL-BOKU) - Franz Suppan (IVFL-BOKU) - Fredy Frey-Roos (IWJ-BOKU) - Gerhard Egger (WWF) - Bernadette Strohmaier (WWF)	Workshop on spatial planning issues
19/10/07	Council of Europe: expert group on PEEN and PEBLDS	Project presentation
12/11/2007	ETC Authorities of Burgenland - Mag. Daniela Schuster (Büro Eisenstadt – ETZ/Internationales Projektmanagement) - Ulrich Blanda (stadtland) - Gerhard Egger (WWF) - Bernadette Strohmaier (WWF)	Details on ETC funding programme
03/12/2007	ETC Authorities of Lower Austria - Mag. Francois Eduard Pailleron - Gerhard Egger (WWF) - Georg Frank (National park Donau-Auen) - Sibylla Zech (stadtland)	Details on ETC funding programme
18/12/2007	ETC Authorities of Bratislava Region - Milan Janak - Monika Adamekova	Details on ETC funding programme in Slovakia

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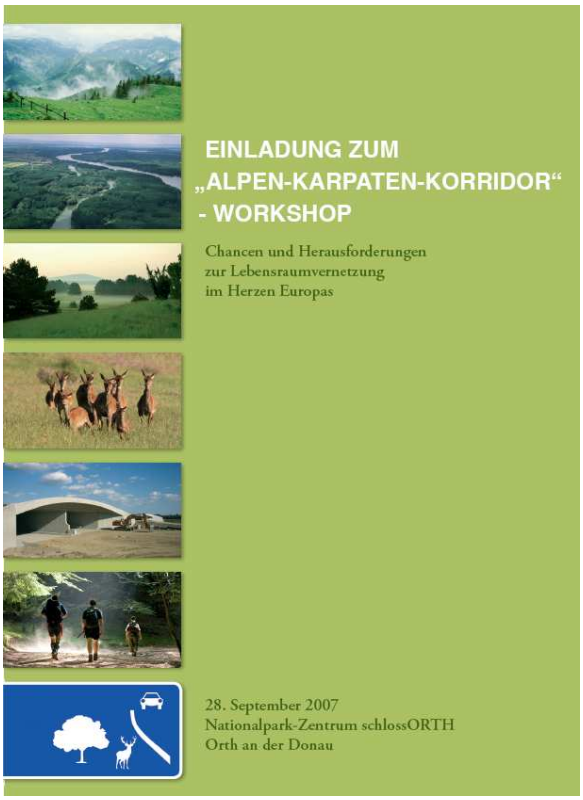
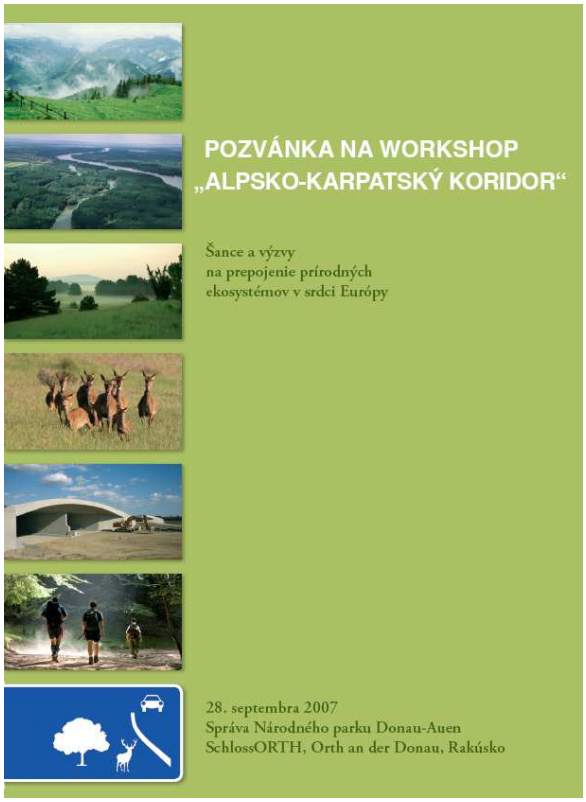
Summary of the Expert and Stakeholder Workshop in Orth, 28. Sept. 2007

The workshop was held in German and Slovak with simultaneous translation. The outcome is available in both languages at: www.wwf.at





Workshop Program

9.00	**Welcome** (Simultaneous Translation) *Dir. Carl Manzano (National Park Donau-Auen)*
	Overview over programme *Sibylla Zech (stadtland)*
9.20	**INFO-BLOCK** (Simultaneous Translation) *(Gerhard Egger & Milan Janak moderate the Information-block)*
	1) Overview: Targets and Contents of Feasibility Study and Modules; “Status quo?“; Introduction of the following presenters.
	Gerhard Egger (WWF) & Milan Janak (Daphne)
	2) Short presentations of modules (7 to max 10 minutes) *in each case: the idea, 1-2* pictoresque, *implementation-oriented examples*
9.30	Scientific base
	Klaus Hackländer (BOKU – IWJ)
9.40	Spatial Planning, Recreation
	Ulrich Blanda (stadtland)
9.50	Widlife passages & Landscape restructuring

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	Dusan Valachovic (Správa CHKO Zahorie)
10.10	Communication
	Georg Frank (National Park Donau-Auen)
10.20	**Good-Practice Gallery with coffee, drinks & pastries:** (Conversational Translation) Guidance through Gallery (*Translation*): h1.) "Feasibility Study Ecoduct Záhorie - Evaluation of Actual Connectivity of Landscape along the D2 Motorway" (*Dusan Valchovic, Správa CHKO Záhoriee)* 2.) Green Bridge example at Pöttsching (*Kurt Hellmich - Regional Government of Burgenland)* 3.) Environmental Communication in Schools and Villages of the Lower Morava Region" (*Milan Janak, DAPHNE)* 4.) Green Belt (Alois Lang - IUCN) *5.) "*Safeguarding Ecological connectivity in the framework of the Alpine and Carpathian Convention" *(Guido Plassmann & Harald Egerer)*
11.00	**4 parallel topic** stations (2x change): (Conversational Translation) Participants change according to their interests; *in each case*: 2 experts (A, SK) _1 Scientific background *Klaus Hackländer*, Slavomir Findo _2 Spatial planning, recreation *Ulrich Blanda, Maros Finka* _3 Landscape restructuring and Wildlife passages *Paul Weiß, Dusan Valchovic* _4 Communication *Georg Frank, Milan Janak*
12.00	**Plenum – Very short report of the Topic stations:** (Simultaneous Translation) Both moderators come to the front and make a report of about 5'. **Additions from the Plenum**: about 15'.
12.30 (45)	**Outlook** (Simultaneous Translation)
13.00	**Buffet at the Foyer** Starting instead of Ending (for instance: every participations can mark his/her favorite point in a Alpine-Carpathian-Corridor-map and write in a list.
14.00	**Afternoon Excursion Danube floodplains**

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Workshop Participants

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