



# Danube Transnational Programme

## DaRe to Connect

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### DARE TO CONNECT

## TRANSNATIONAL GUIDING PRINCIPLE FOR CONNECTIVITY IN THE EUROPEAN GREEN BELT IN THE DANUBE REGION



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## AIM AND PURPOSE OF THE GUIDING PRINCIPLE

This Guiding Principle aims to give recommendations on how to further develop the Pan-European network of protected areas. Therefore an approach of integrative data analysis was chosen. It is the goal of this paper to point out to regions along the European Green Belt (EGB) in the Danube Region, where the ecological connectivity and therefore the functioning of the Green Infrastructure network should be enhanced in the future. It is supposed to serve as a foundation for future planning processes and decision making that takes the concept of TEN-G into account.

With this Guiding Principle the aims and goals of the European Green Belt Initiative as a whole and especially of the stakeholders in the Danube Region should be substantiated and supported. These are expressed in the so called “Eisenach Resolution” that was adopted by the participants of the 10<sup>th</sup> Pan-European Green Belt Conference on 16-18 October 2018. Among others the Resolution expresses the support of the European Green Belt Initiative to the EU Strategy on Green Infrastructure <sup>1,2</sup>. The Commission here states that GI should become an integral part of spatial planning.

As the Directorate-General for Environment of the European Commission states in its Biodiversity Strategy for 2030 (COM/2020/380/final) it is crucial for the EU to extend the share of protected areas of the land surface to at least 30%. The focus of the designation of new protected areas, the strategy says, should be laid on areas of very high biodiversity value or potential. The Commission further stresses out the importance of the establishment of ecological corridors to create a Trans-European Nature Network. These ecological corridors are crucial for the prevention of genetic isolation, migration of species and thereby maintain functioning ecosystems. The Commission follows thereof that support and promotion of Green Infrastructure as well as cross-border cooperation.

As it was shown in the R+D Project “European Green Belt as part of European Green Infrastructure”, funded by the German Federal Agency for Nature Conservation, the European Green Belt does serve as a backbone of a transnational ecological network on a European scale. This fact is widely recognised on the EU-level. The European Green Belt is e.g. part of the Commission’s publications “Guidance on a strategic framework for further supporting the deployment of EU-level green and blue infrastructure” <sup>2</sup> and “Strategic Green Infrastructure and Ecosystem Restoration: geospatial methods, data and tools” <sup>3</sup>.

## DATA BASIS & ANALYSIS APPROACH

The methodology of the derivation of the data is described in more detail in the respective project-documents.

In order to create an appropriate data basis for the task of the “DaRe to Connect-Transnational Guiding Principle”, there was the need for a comprehensive, Europe-wide geodata set. Considering this, high-resolution Sentinel-2 satellite data (10m) was purchased, processed and further used for a comprehensive GIS analysis of habitats, gaps and Ecosystem Services provided in selected D2C-Pilot Areas:

- Šumava-Bayerischer Wald – Mühlviertel (CZ-DE-AT)
- Órség National Park- Goričko Nature Park (HU-SI)
- Iron Gates NP-Djerdap National Park (RO-SRB) as well as for the pilot region in
- Virovitica County (HR).

However, due to cost and time constraints it was no option to apply these SENTINEL data sets for the entirety of the EGB.

Instead, the EUNIS habitat classification level 2 with 100m resolution<sup>4</sup> was chosen as a fitting geodata base for an examination and spatial GIS analysis of the European Green Belt in the Danube Region. This habitat classification of the **EU**ropean **N**ature **I**nformation **S**ystem is a hierarchical description of the ecosystem types of Europe by the combination of the Copernicus land services portfolio as well as the marine bathymetry and seabed information. The result is a comprehensive raster file with the spatial resolution of 100m and the thematic resolution of EUNIS level 1 & 2 which works very well on the transnational scale of this objective in D2C.

Subsequently, the EUNIS categories were translated to Broader Habitat Types (BHT), so further analyses could be conducted. Firstly, the connectivity was analyzed by using the software package **GuidosToolbox** (Vogt & Riitters, 2017). Therefore, the Morphological Spatial Pattern Analysis was performed, so mutually exclusive morphometric features could be identified. The output of the MSPA described the geometry and connectivity of these raster image components by segmenting them into 8 categories: Cores, Edges, Perforations, Bridges, Loops, Branches and Islets as well as the background. Secondly, the functional value of the BHTs along the whole Green Belt was assessed by linking the geodata to the Ecosystem Service capacity matrix derived within the project. Using the CORINE land cover classes as reference, the spatial information could be assigned to the ESS and the Total Function Value as well and according maps were created (e.g. for Regulation functions and Habitat functions).

This is the basis for the actual analysis of the possible connections between the protected areas. The combination of the connectivity and functionality analysis was achieved by creating indices from 0 to 1 for each of the two parameters and merging them into a joint **Connectivity-Functionality-Index (CFI)**. This index serves as an indicator for areas with a high potential as corridor between the protected areas of the European Green Belt. It therefore indicates areas of high functional value of Ecosystem Services and importance for connecting existing protected areas. However, aspects like the costs and necessity of corresponding actions, willingness of the land owners, etc. as well as suitable measures to secure or improve the recent ecological situation are not considered here. The resulting maps are rather intended as an important tool for political recommendation and for prioritization to identify areas where which sort of general actions are necessary to improve the function of the European Green Belt as a transnational ecological network and as the backbone of EU Green Infrastructure within the Danube Region. Due to readability, the attached maps highlight areas

with a CFI between 1 and 0,7 (very high to good potential as multifunctional corridor) as areas in greens and CFI values of 0 (no potential) with red.

## Designation of “Areas of Action” (AoA)

To analyse and categorise the spatial data, a qualitative approach was chosen. Given the aim of this Guiding Principle, this approach is accepting a relatively high level of generalisation and leaves the detailed look on the local and regional level, in particular to the Guiding principles within in the Pilot Regions of the DaRe to Connect project and to those pilot regions, where detailed SENTINEL data were made available. Furthermore, the data is made available to a broad public and can be used by other stakeholders as well.

In this Guiding Principle so called main “Areas of Action” (AoA) are designated in the two categories “Safeguard” and “Restore”.

The Areas of Action are considered as **regions with a crucial role for the further development of connectivity along the European Green Belt in the Danube Region. The two categories summarise areas in which different possible measures need to be taken to enhance the network of protected areas along the European Green Belt in the Danube Region by enhancing ecological corridors.**

Following the main objective of the D2C project aiming at a better connection of protected areas along the European Green Belt in the Danube Region areas inside of protected areas where explicitly excluded from the analysis. Even though the results clearly point out the fact that also here by far not all areas show a “Good” or “Very high” potential as multifunctional corridor, an examination of areas was focused solely on non-protected areas. This means that also at certain locations inside the vast majority of protected areas, certain steps and measures, adapted to the respective local situation, need to be taken in future to improve this situation. E.g. the aims and goals as given in the respective management plans of Natura 2000 sites should be implemented where it is still needed.

The **category “Safeguard”** focusses on areas outside of existing large-scale protected areas, where the analyses indicate a high potential as a multifunctional corridor in general. Within such designated areas future nature conservation measures should mainly focus on the preservation of the existing good conditions that may ultimately lead to the designation of new protected areas. Especially the conversion of valuable habitat towards non-sustainable forms of land-use should be avoided and the potential within the area as multifunctional corridor be enhanced and amplified wherever possible.

In contrast the **category “Restore”** points out larger areas with both unprotected areas and a low potential to serve as a multifunctional corridor. Regarding the future implementation of nature conservation measures and the improvement of the functioning of the ecological network along the European Green Belt in the Danube Region the focus here is to be set in general mainly on the re-installation of functional quality of the existing habitat.

In the designation of the areas, a focus was laid on regions with a transnational significance. It is desirable to create especially protected areas on a trans-boundary level. In the context of the European Green Belt, the transnationality of cooperation taking place is one of the factors to make this ecological network and living memorial landscape unique. In total 15 AoAs were designated along the European Green Belt in the Danube Region. Eleven Safeguard AoAs and four Restore AoAs as they are shown in Figure 1.

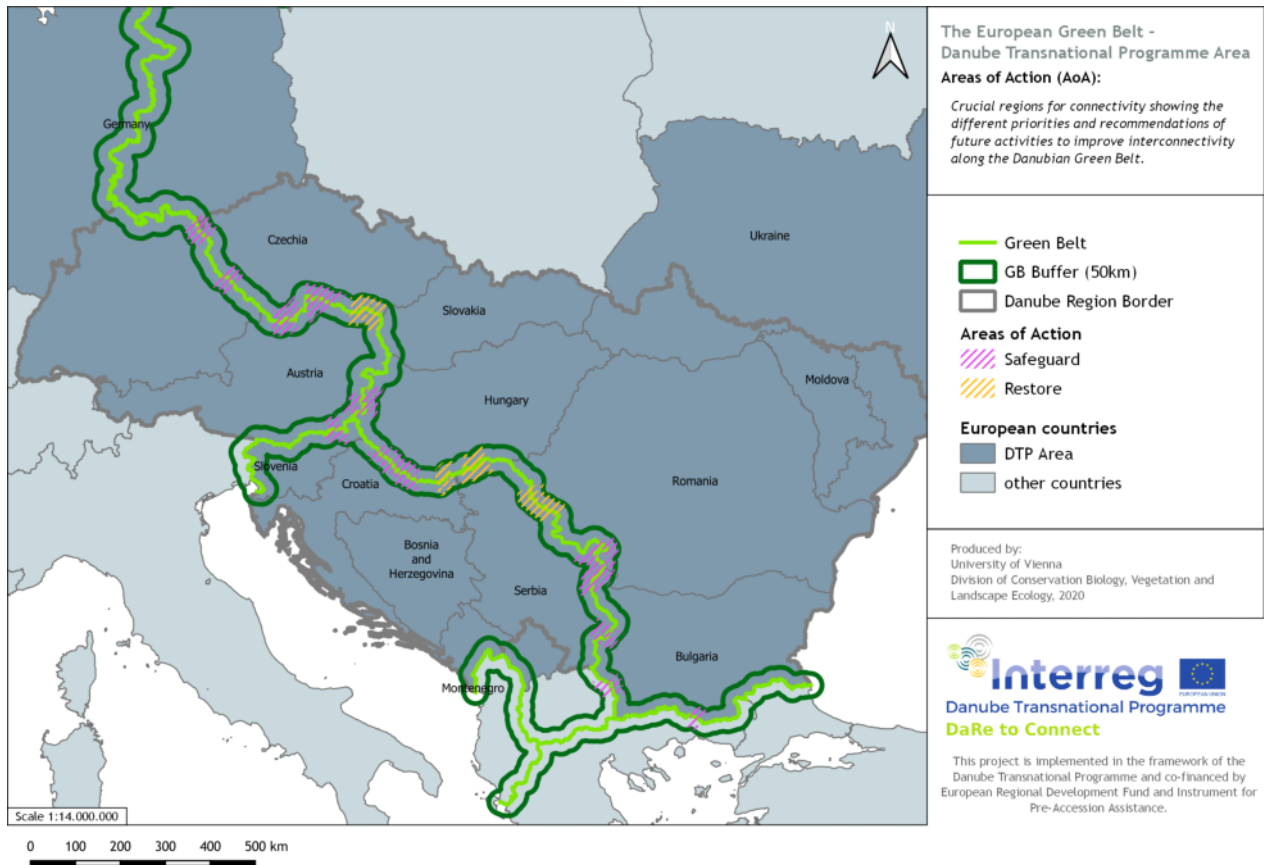


Figure 1: Overview of designated AoAs along the European Green Belt in the Danube Region

Due to the character of the analysis as a multifunctional, transnational or resp. makroregional approach, a statement on the exact measures needed to enhance ecological connectivity in a specific local or subregional section of the EGB cannot be generalized. Furthermore, as the needs of successful nature conservation measures are depending on the concrete species or habitat they are aiming at, different focuses need to be set for detailed future planning on the local and subregional level. This has to be done on a smaller scale than this given document, yet this Transnational Guiding Principle serves as a basis for further planning on transnational, national and partly regional level and gives a good picture on the general situation. The data acquired within the project DaRe to Connect can also serve as a databasis for such small-scale and or thematic-specified analysis as well as. All actions undertaken to improve connectivity of the European Green Belt should incorporate local and regional specifics of nature, landscape and culture.

## EXEMPLIFIED ANALYSIS: EUROPEAN GREEN BELT SECTION AUSTRIA-SLOVAKIA-CZECHIA

This qualitative analysis is exemplified for the Section of the European Green Belt along the borders between Austria, Czech Republic and Slovakia. Figure 2 shows a map extract of the attached result-maps. In this section of the European Green Belt three AoAs were designated, two Safeguard and one Restore at the eastern end of this map. In this paper the Safeguard Area of Action (marked as “AoA 1” in figure 2) in the west and the Restore Area of Action (marked as “AoA 2” in figure 2) are discussed in an exemplary manner. This analysis is not considered concluding, as it should be open for further input from stakeholders.

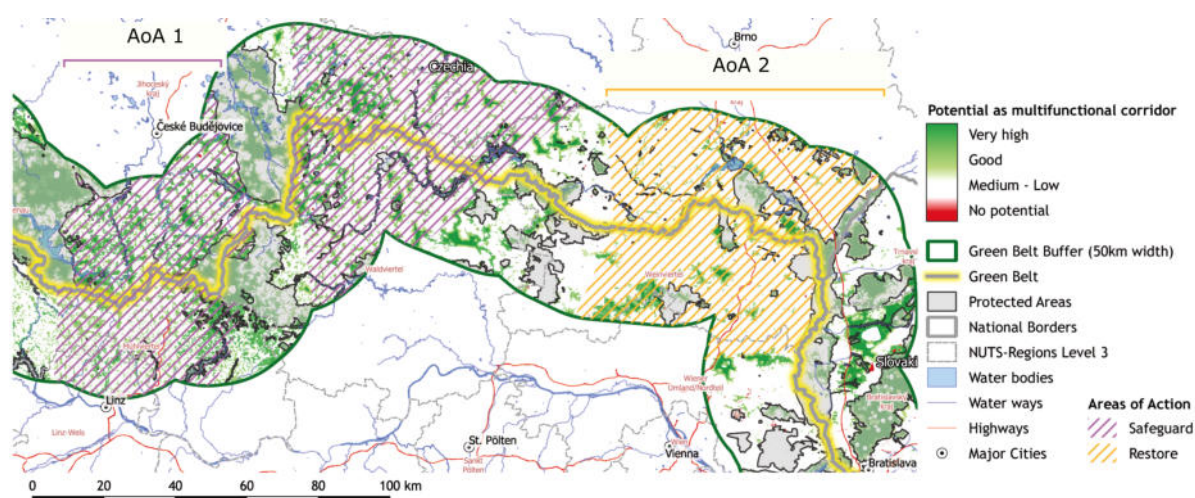


Figure 2: Map extract of the discussed AoAs

(1) The Safeguard Area of Action AoA 1 is located just east of the triangle of Germany, Austria and Czechia and spans roughly between the cities of České Budějovice (CZ) and Linz (AT) in a north-south axis. On the west-east extent, this area covers the gaps between the protected areas Šumava in the west and Novohradské hory and Waldviertel in the east.

AoA 1 shows a distinctly rural character with only minor cities and other grey infrastructure. A difference in the landcover between the two countries shows in the fragmentation. On Austrian side, in wide areas small parcels of agriculturally used land can be found while on the Czech side, land use is more extensive and habitat fragmentation is lower. Accordingly, the areas identified as potential multifunctional corridor are larger and show a higher connectivity within themselves on the Czech side of the EGB. The potential corridors here are mainly made up by forms of grassland (Dry Grassland, Mesic Grassland) and forests (Broadleaved deciduous woodland, Coniferous woodland). To safeguard the ecological coherence and functioning of ecosystems, a mosaic of heterogeneous and diverse habitat should be a guiding principle in the implementation of measures for nature and landscape protection.

It should be ensured that land use in this region is not intensified. Valuable habitat should be maintained and wherever it is possible, an extensification of agricultural used land should take place. By this the functioning of ecosystems and the ecological network can be sustainably ensured and



enhanced. It has to be ensured though, that such efforts can take place under appropriate economic conditions. Agriculture and Forestry stakeholders contributing to the safeguarding of the provision of Ecosystem and Landscape Services should be compensated with appropriate allowances. For this, the common agricultural policy of the EU should provide adequate funds. This designated AoA spans between several large-scale protected areas and additionally a number of smaller protected areas is included within this AoA on both the Austrian and the Czech side of the European Green Belt. AoA 1 covers a relatively large gap in a region of otherwise relatively high density and connectivity of protected areas. Therefore, the potential effect of measures to improve the functionality of the ecological corridors is considered especially high. To preserve such positive outcomes on a long-term, the designation of new protected areas is desirable. This would also facilitate the goal of the EU Biodiversity Strategy to put 30% of the land-surface<sup>3</sup> under protection by the year 2030<sup>5</sup>. The implementation of a funding scheme for a Trans-European Network for Green Infrastructure (TEN-G) would be of high value for such efforts and should be envisaged by the EU.

(2) The Area of Action 2 is designated as a Restore Area. It is situated in the Austrian Weinviertel and the Czech Jihomoravský kraj. Here the land-use is mainly made up by intensively used agricultural land on both sides of the EGB with a higher rate of fragmentation again on the Austrian side. Only minor areas are under some form of protection status and those are considered mainly cultural landscapes. Also only few areas show potential to serve as a multifunctional corridor under the given approach. Here it would be highly desirable to extensify agricultural used land to establish a connection between the clusters of protected areas bordering the AoA in the west (Westliches Weinviertel (AT, SPA), Thayatal bei Hardegg (AT, SCI) National Park Poyjí (CZ)) and east (Soutok-Tvrdonicko (CZ; SPA), March-Thaya-Auen (AT, SPA) and Zahorie (SK, SPA)). For the restoration of valuable habitat in AoA 2 the results of the DaRe to Connect project can and should be used to raise awareness at stakeholders. The results can also function as a base for implementation projects, e.g. in the framework of EU-funded LIFE Nature and Biodiversity projects. For this purpose, the data generated within this Interreg project can serve as database for spatially and thematically distinct analyses.

A major topic in this AoA is the relatively high density of features of grey infrastructure. Apart from an increasing number of settlements compared to AoA 1, especially the density of major roads like highways that function as a barrier for existing and in the future established ecological corridors is to be mentioned. Measures like green bridges should be considered wherever possible to bridge these barriers.

This holds particularly true as in the region of AoA 2 the European Green Belt and the Alpine-Carpathian Corridor overlap. The importance of this crossroads of these ecological corridors of European importance cannot be underestimated. The respective authorities on local, regional and national level of this area should be made even further aware of this situation and the subsequent responsibilities for the European ecological network. The transboundary cooperation should be facilitated on all levels. The institutionalisation of such transnational cooperation on a GO-level should be promoted and funded. In AoA 2 this would integrate Czech, Slovak and Austrian representatives to foster the further coordination of efforts for natural and cultural heritage protection. Under such legal framework also the nomination of the European Green Belt as UNESCO World Natural and Cultural Heritage can and should be fostered.

## FUTURE STEPS AND RECOMMENDATIONS

As ecological connectivity can be considered a foundation for a sustainable functioning of ecosystems as a basis for human well-being, the further connecting of protected areas along the European Green Belt in the Danube Region should be a goal of future activities. This holds true even more under the light of the ongoing man-made climate change and its challenges. To tap the full high potential of the European Green Belt for restoration following points are recommended to be considered within planning processes on regional, national and transnational level as guiding principle:

- The funding schemes of the common agricultural policy of the European Union should enable agriculture and forestry to carry out ecologically valuable services under appropriate economic conditions.
- The governments on national, regional and local level of countries along the European Green Belt should take steps to bring forward a nomination of the EGB as UNESCO World Natural and Cultural Heritage.
- Accordingly to the Trans-European Networks for Energy and -Traffic (TEN-E and TEN-T) funding schemes for a Trans-European Network for Green Infrastructure (TEN-G) needs to be established. By this measure subsidies can be directed towards a sustainable implementation of the European Ecological Network.
- The designation of new protected areas should be implemented along the European Green Belt. As the European Green Belt bears high potential for such designations this would also fit the aim of the EU 2030 Biodiversity Strategy<sup>5</sup> to put 30% of the land-surface under protection.
- The implementation of the protection goals as set in the management plans of existing protected areas should be achieved as soon as possible wherever this is still needed.
- For the further capitalization of the project findings, spatially and thematically distinct analyses should be conducted on basis of the produced data and methods.
- The designated AoAs should be brought to attention and discussed with relevant authorities to set up lists of concrete action to be done within the AoAs.
- All actions undertaken to improve connectivity of the European Green Belt should respect and incorporate local and regional specifics of nature, landscape and culture.

- To safeguard ecological coherence and functioning of ecosystems, a mosaic of heterogeneous and diverse habitat should be a guiding principle in the implementation of measures for nature and landscape protection.
- These distinct analyses can serve as a fundamental justification for e.g. implementation projects.
- The results of the DaRe to Connect project should be brought to stakeholders on every level. This includes EU officials, national and regional officials as well as local actors like farmers, hunters and forestry.
- In the sense of the European Green Belt Initiative and the DaRe to Connect project the bi- and/or trilateral transnational cooperation on the topic of nature conservation and the conservation of the cultural heritage along the former Iron Curtain should be institutionalised on a GO-level.

## SOURCES

- <sup>1</sup> Communication from the Commission “Green Infrastructure (GI) – Enhancing Europe’s Natural Capital”, COM/2013/0249 final
- <sup>2</sup> Commission Staff Working Document “Guidance on a strategic framework for further supporting the deployment of EU-level green and blue infrastructure” SWD (2019) 193 final
- <sup>3</sup> Estreguil, C., Dige, G., Kleeschulte, S., Carrao, H., Raynal, J. and Teller, A., Strategic Green Infrastructure and Ecosystem Restoration: geospatial methods, data and tools, EUR 29449 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-79-97294-2, doi:10.2760/06072, JRC113815.
- <sup>4</sup> European Environmental Agency (EEA) (2017): Crosswalk between EUNIS habitats classification and Corine land cover.  
Retrieved from <https://www.eea.europa.eu/data-and-maps/data/eunis-habitat-classification/documentation/eunis-clc.pdf>
- <sup>5</sup> Factsheet EU Biodiversity Strategy, May 2020  
Retrieved from [https://ec.europa.eu/commission/presscorner/detail/en/fs\\_20\\_906](https://ec.europa.eu/commission/presscorner/detail/en/fs_20_906)

## Attachment

Map-compound of CFI-Analysis and Areas of Action