

The Danube River as European ecological corridor and its further development as Trans European Green Infrastructure by DANUBEparksCONNECTED

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The Danube – a transnational habitat corridor of European importance

The Danube is a hub of biodiversity and an essential life-line of Europe. The large number of Natura 2000 sites and Protected Area impressively shows Europe's commitment to preserve this natural heritage (ICPDR 2009, ICPDR 2015).

Rivers, their riparian zones and riverine habitats form ecological networks and often build the backbone for bio-corridors. This pertains to the Danube in particular, due to its outstanding role as a link between more bio-regions than any other corridor in Europe. Facing e.g. an increasing future impact of climate change, intact corridors for migration and dispersal of species between the Black Sea Region, the Steppic Region, the Pannonian Region, the Continental and, finally, the Alpine Region, will gain increasing relevance, as such a corridor function could be ensured by a vital Danube river ecosystem.

Fragmentation of the landscape – a main threat for biodiversity in Europe

While Protected Areas preserve some of the most valuable natural sites, habitat fragmentation limits efforts to preserve a cohesive ecosystem (e.g. Crooks & Sanjayan 2006). Human infrastructure, extensions of urban areas, the establishment of new transport routes and energy infrastructure as well as the ongoing intensification of the land-use put growing pressure on the natural treasures

of the Danube. Consequently, the isolation of Protected Areas is one of the main threats to biodiversity in the Upper Danube; the increase of fragmentation reduces ecological connectivity of high-value ecosystems in the Middle and Lower Danube.

To counteract, policies such as the EUSDR Action Plan call for actions to restore and preserve habitat connectivity (European Commission 2010) and to establish a Trans-European Network of Green Infrastructure (European Commission 2013).

DANUBEparksCONNECTED – towards a Danube Habitat Corridor



In January 2017, DANUBE PARKS, the Danube River Network of Protected Areas launched the initiative for the conservation and further development of the Danube Habitat Corridor. With funds of the Interreg Danube Transnational Programme, this project intends to raise awareness for the Danube River as bio-corridor. It aims to promote a better conservation of less-fragmented areas, and implements pilot actions to restore aquatic (WILDIsland) and terrestrial (riparian forest, dry habitats) “stepping stones” within this eco-corridor, as well as the Danube as bird flyway (Danube Free Sky):

• WILDIsland – the Danube Wild Island Habitat Corridor

Islands are flagship habitats in vital river ecosystems. They showcase the dynamic of river morphological processes like the relocation of sediments. The Joint – Danube Survey stressed the outstanding role of islands for characteristic indicator species (Schmidt et. al 2015).

DANUBEparksCONNECTED elaborates a concept for selected islands, gravel banks and sand bars to promote non-intervention management - a key to ensure natural processes in the future and characteristic habitat structures on a long term. Based on strategic cooperation with land owners, land users (e.g. waterway administrations, forest enterprises) and policy makers, “WILDIslands” will be designated. The implementation of pilot actions for their conservation and rehabilitation should increase the habitat quality of Danube islands and will improve their functionality as stepping stones within the Danube Wild Island Habitat Corridor.



Figure 1. The WILDIsland initiative promotes the non-intervention management of selected gravel banks, sand bars and smaller Danube islands. The designation of WILDIslands should result in the establishment of a Danube Wild Island Habitat Corridor, to promote the importance of river dynamics and wilderness on European rivers. Credit: Persina Nature Park/Alexander Ivanov



Figure 2. The Danube riparian forests form a green belt all along the river and provide numerous ecosystem services. Human impacts in the past decades and ongoing intensification of the land use limits these services and can interrupt the coherence of the riparian forest corridor. Credit: Donau-Auen National Park/Franz Kovacs.

- **Danube Riparian Forest Corridor – the green lifeline of the Danube**

Wetland forests are vital habitats serving multiple functions for flora, fauna and humans. Due to human intervention in the past, the loss of Danube floodplains can be assumed with at least 65-70 %. The remaining floodplains suffer from hydrological disconnection, fine sediment aggradation and the substitution of natural floodplain vegetation by poplar plantations (Schwarz et. al 2015).

Today, most of the last remaining large-scale floodplain forest complexes are protected by the Danube Protected Areas, famous for the richness in biodiversity. To counteract isolation of their wildlife population, ecological connectivity measures are needed. Under the coordination of Vojvodinasume Public Forest Enterprise, a Danube-wide “fitness check” of riparian forest ecosystems will be done. Remote census and the EU Copernicus Land Monitoring Services help to identify gaps within the Danube Riparian Forest



Figure 3, 4. The Danube Canyons host some of the most valuable (semi-)dry habitats along the river and act as core areas within the Danube Dry Habitat Corridor. Good practice management of grasslands like grazing is established within DANUBE parks CONNECTED, to further develop this eco-corridor. Credit: Duna Ipoly National Park/Zsolt Kalotás; Nationalpark Donau-Auen/Karoline Zsak.

Habitat Corridor. To overcome these fragmentations, pilot actions with focus on reforestation, the transformation of plantations into native stands, the management of invasive alien tree species and, finally, the promotion of characteristic species (*Populus nigra*, bats as indicators) will be implemented.

- **Danube Dry Habitat Corridor**

Beside aquatic and semi-aquatic habitat types, even dry habitats are an indispensable part of natural river ecosystems. Due to hydro-morphological alterations and changes in the traditional land use, today these (semi-)dry sites are often reduced to small remnants in the floodplain areas. These sites are home to highly endangered plant and animal communities. Eco-corridors for dry habitats are discussed to avoid isolation of these habitat patches.

DANUBE parksCONNECTED aims to contribute to a better conservation of core areas represented by the “Danube Canyons”, home to diverse dry habitats and characteristic species. Additionally, good practice management for semi-dry habitats in the floodplain area (“Heisslands”) is promoted by project activities. Finally, DANUBE parksCONNECTED intends to develop Green Infrastructure between these sites, e.g. by establishing cross-border grazing at the flood protection dykes which could act as ecological linkage for semi-dry grassland species in some sections of the Danube.

- **Danube Free Sky – facing the risk of bird collision on electric power lines**

The Danube River is a flyway for bird migration of European importance. In particular for bird species depending on aquatic habitats (waterfowl, storks, terns, gulls, waders,

several species of birds of prey), the Danube and its riparian zone provide vital breeding, resting and wintering sites and, furthermore, form a “guiding line” across Europe for their short- and long-distance movements.

Danube Protected Areas, Natura 2000 and other valuable natural areas preserve core sites within this eco-corridor, but electric power lines are barriers along the Danube flyway. Due to the large quantity of birds on migration and the big ratio of bird species with relatively high risk of collision, large rivers have to be considered as hot-spots regarding the (potential) conflict of bird conservation and collision at electric power lines (FNN 2014). Each year, millions of birds are killed due to such collisions (TNL Umweltplanung 2017).

The Danube Free Sky campaign brings together nature conservation and the energy sector to exchange best practice experiences and boosts the implementation of technical solution for existing powerlines in the Danube riparian zone (e.g. marking power lines with bird converters).

Danube Habitat Corridor – a long-term multidisciplinary approach

The comprehensive development of Green Infrastructure to preserve the Danube River as a Trans-European Ecological Network (TEN-G) is a long-term approach. The DANUBE parksCONNECTED campaign implements first pilot actions. It aims to establish good practices towards habitat connectivity, and wants to initiate a long-term strategic process to further develop ecological connectivity.



Figure 5, 6. The Danube River is an important flyway for bird migration. For numerous species like waterfowl, waders, storks, pelicans and birds of prey, collision at electric power lines is a highly relevant mortality factor. In cooperation with the energy sector, Danube Free Sky promotes technical solutions for existing power lines along the Danube, which can reduce the risk of collision by 60–90 %. Credit: Nationalpark Donau-Auen/Georg Frank

Advanced tools to improve the functionality of bio-corridors have to be developed. Key stakeholders from navigation, forestry and the energy sector cooperate within DANUBE-parksCONNECTED and promote the cross-sectoral approach in all work packages. International institutions, partner projects and policy drivers are part of the process and stand for long-term capitalisation of the Danube Habitat Corridor.

www.danubeparks.org

<http://www.interreg-danube.eu/danubeparksconnected>

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News and Notes

DIAS – A new network to cope with alien species in the Danube River Basin

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Invasive Alien Species (IAS) are one of the major threats of biodiversity worldwide, they are a big challenge in the global change we have to cope with in the future. The impacts of IAS affect not only the environment but also the economy and society (e.g. health care). The invasion can neither be stopped, nor can invaded species be eradicated completely. But targeted actions will help to reduce the threat to endangered indigenous species and to reduce the speed of invasion. In river landscapes there are many and important vectors and pathways for invading species. In particular, the Danube River and its floodplain are an outstanding part of the South-European aquatic invasion corridor. It links the Black Sea basin with the North Sea basin via the Danube–Main–Rhine Canal and it has been exposed to the introduction and influence of IAS. The International Commission for the Protection of the Danube River (ICPDR) acknowledges that IAS have become a major concern for the Danube River and that their further classification, analysis and management are vital for effective river basin management. The EU Strategy for the Danube Region (EUSDR), which was endorsed in 2011, also acknowledges IAS as a major threat to biodiversity and a liveable Danube Region. Consequently, some of the targets of the EUSDR, as defined in Priority Area 06, are to identify and prioritise IAS and their pathways, to control or eradicate priority species, and to manage pathways to prevent the introduction and establishment of new IAS. Further, in 2014, the European Commission set up the regulation

No 1143/2014 on the prevention and management of the introduction and spread of IAS.

As invasive species do not care about human borders, tackling the issues of IAS should also not be limited to the national scale. In contrast, networking and cooperation on IAS in different scales is crucial for the prevention and management of IAS and can facilitate the implementation of existing IAS instruments. There are already several joint initiatives related to IAS in the Danube Region. Monitoring of aquatic IAS was included in the Joint Danube Survey 3 (ICPDR, 2013). In 2016, ICDPR finished a guidance document on Invasive Alien Species within the Danube River Basin. Furthermore, the network ESENIAS (Eastern and Southern European Network on Invasive Alien Species) already exists as a regional data portal at the Lower and Middle Danube River basin. This network implemented a joint project on potential threats to environmental and economic sustainability in the Danube and Black Sea Region together with the IAD.

Therefore, at the initiative of IAD, ESENIAS, IBER-BAS (Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences) and the Priority Area 06 of the European Union Strategy for the Danube Region (PA 06 EUSDR), a kick-off meeting for a new network took place in October 2014 in Sofia: The **Danube Region Invasive Alien Species Network (DIAS)** with ca. 38 representatives from 10 countries from the Upper, Middle and Lower Danube River basin, as well as from the adjacent Black Sea. DIAS promotes an improved coordination among all actors in the thematic field of