



A cross-border wetland restoration project  
in the Transboundary Biosphere Reserve  
Mura-Drava-Danube:

# THE OLD DRAVA CASE

## The Old-Drava

The Old-Drava oxbow, located near Barcs city, is characterised by narrow sections with dense reed grow, such as by wide open water surfaces. The water supply of the oxbow is insufficient due to the incision of the riverbed, causing water deficiency mainly in low water seasons, during long dry periods. This also causes degradation of the surrounding floodplain forest.

### Project activities

**Forest restoration:** We plant native tree and shrub species on 15 locations: *Acer tataricum*, *Populus tremula*, *Euonymus europaeus* and *Malus sylvestris* (Tatarian maple, Common aspen, Spindle and European crab apple). These plants are only 30 to 40 cm in size, but they are expected to grow quickly and improve the diversity and structure of the forest.

**Construction of a bottom weir:** Water retention will be achieved by the construction of a bottom weir made from stones supported by a steel net, with a sluice built in it, in order to be able to regulate the water level. The bottom weir will have capacity to retain additional 100-120 cm water in the lowest water level season, compared to its previous state before the project started.

**Construction of angler shelters:** As the oxbow is very popular among anglers, there were several shelters and piers built along the oxbow. Fifty of them are replaced with new, nice ones that fit in the landscape, and 3 angling platforms were built for community use.

**Research:** The ecological status report of the area is a very important part of the restoration. This is the most detailed research has ever made about the Old-Drava, which will be followed by monitoring actions, which will show how effective the restoration was.

**Developments for raising public awareness:** Water gauge was installed into the oxbow, educational trail and information point is built on the Croatian side.

#### Partners

Danube-Drava National Park Directorate  
WWF Hungary  
Federation of Angler Associations of Somogy County  
Municipality of Pitomača  
JUUVZP – Public Institution for nature protection in Virovitica  
Podravina county  
Vidra – Regional Development Agency of Virovitica Podravina county

#### Supporters

Hungarian Ministry of Agriculture  
Coca-Cola Foundation  
The restoration of Old-Drava project is financed by the LIFE13 NAT HU388 funding source between 2014 and 2018.  
For further information visit us at:  
[www.olddrava.com](http://www.olddrava.com)



## Contents

The Old-Drava LIFE+ project is the first Hungarian-Croatian LIFE+ funded nature conservation project. Developing and implementing transboundary projects that include restoration on sites that are in two countries or have effects across the state borders are usually very challenging. However, this is also an obvious demand since there are many natural values across the border zones in the Danube river basin which worth to be preserved. This paper summarizes the unique status of wetlands and freshwater habitats, gathers the experiences of the implementation of the preparatory works of the Old-Drava project and shows a wider picture about the project from the aspects of the stakeholders. Some relevant and exciting European examples are also collected where transboundary cooperation was an added value or a principle expectation in the projects. All these experiences and the lessons learned can be added value of upcoming transboundary projects along rivers or other protected areas which only have ecological and social benefits if they are in good status.

### Table of contents

<b>Chapter 1.: Introduction.....</b>	<b>6</b>
<b>Chapter 2.:Technical and legal background of getting permissions for habitat restorations in Croatia and Hungary.....</b>	<b>14</b>
<b>Chapter 3.: Legal requirements and demands of other (governmental) bodies along the oxbow and the river.....</b>	<b>18</b>
<b>Chapter 4.: Stakeholder analysis.....</b>	<b>22</b>
<b>Chapter 5.: Analysis of human impact.....</b>	<b>24</b>
<b>Chapter 6.: Lessons learned and future recommendations for transboundary restoration projects .....</b>	<b>32</b>
<b>Chapter 7.: Transboundary nature conservation along rivers in Europe – examples .....</b>	<b>34</b>
<b>Old Drava lexicon .....</b>	<b>43</b>





# Chapter 1.

## Introduction

### Freshwater habitats

## FRESHWATER IS THE SOURCE OF LIFE, IT MAKES THE EARTH UNIQUE IN THE KNOWN UNIVERSE.

It is also a resource under threat. Only 3 percent of water on the planet is freshwater, and only approximately 1 percent is readily available for human use. Since 1900, more than half of the world's wetlands have disappeared. People will feel the impact of climate change mainly through freshwater; less water will be stored in ice and snow, more extreme climate events will cause droughts and floods, while freshwater species are declining at a faster rate than terrestrial or marine species (WWF International 2017).

An estimated 126,000 described species depend on freshwater habitats, including species of fish, molluscs, reptiles, insects, plants, and mammals. Species richness in relation to the area of habitat is extremely high in many freshwater groups. 45 percent of fish species and 25 percent of mollusc species are freshwater species. An estimated 15,000 fish, 4,300 amphibian, 5,600 dragonfly and damselfly, and 5,000 mollusc species depend on freshwater habitats (IUCN 2017).

The Freshwater Living Planet Index by WWF (WWF 2016) shows that on average the abundance of populations monitored in the freshwater system has declined overall by 81 percent between 1970 and 2012, with an average annual decline of 3.9 percent. These figures are based on the data of 3,324 monitored populations of 881 freshwater species.

The primary threats to freshwater ecosystems are (WWF International, 2017):

- Habitat loss;
- Changes of water flow; Pollution;
- Overexploitation of water and freshwater species;
- Invasive species;
- Climate change.

The primary drivers behind these threats are:

- Poor water and river basin governance;
- Agriculture;
- Dam construction.

Conservation of freshwater biodiversity is perhaps the most important conservation challenge because it is influenced by the upstream drainage network, the surrounding land, the riparian zone, and — in the case of migrating aquatic fauna — downstream reaches (Dudgeon et al. 2006).

### Wetland habitats

Wetlands have unique characteristics: They are generally distinguished from other water bodies or landforms based on their water level and on their vegetation. Specifically, wetlands are characterized by having a water table that stands at or near the land surface for a long period each year, which could support aquatic plants.

The destruction of wetlands is a concern because they are among the most productive habitats on the planet. They often support high abundance of animals — including mammals, birds, fish and inver-



tebrates — and serve as nurseries for many of these species. Wetlands also support the cultivation of rice, which is staple in the diet of half the world's population. And they provide a wide range of ecosystem services that humanity can benefit from, including water filtration, storm protection, flood control and recreation.

### Wetland values in numbers:

The Millennium Ecosystem Assessment gave wetlands a value of 15 trillion USD in 1997.

The annual economic value of the remaining Danube floodplains, including their flood mitigation function, was assessed in 1995 at 650 million EUR.

New York City Municipality found that they could avoid spending 3-8 billion USD on new waste water treatment plants by investing 1.5 billion USD\$ in the purchase of land around the upstate reservoirs. This land purifies the water supply for free.

It has been estimated that freshwater wetlands provide habitat for more than 40 percent of all the world's species and 12 percent of all animal species. The world's wetlands offer a resting site, offering protection and food before the birds continue on to their final destination.

### Above all of these facts:

- conversion of wetlands for commercial development;
- drainage schemes;
- extraction of minerals and peat;
- overfishing;
- tourism;

- pesticide discharges from intensive agriculture;
- toxic pollutants from industrial waste;
- The construction of dams and dikes, often in an attempt at flood protection are the major threats to wetlands everywhere.

### The Old-Drava LIFE+ Project

In order to support wetlands, a LIFE+ project has been launched along the border of Hungary and Croatia, in order to restore a wetland habitat along Drava („Trans-boundary cooperation for revitalization of riverine habitat complex in Drava region within Natura 2000 sites“).



Photo: Bruno Glisch/Pixabay

The project site is the Old-Drava (Barcsi-Ó-Dráva/Stara-Drava) situated along Drava river. Drava is situated in the southern part of Central Europe. With a length of 710 kilometres it is the fifth or sixth longest tributary of the Danube, after the Tisza, Sava, Prut, Siret and perhaps Olt. The source of it is near the market town of Innichen/San Candido in the Puster Valley of South Tyrol, Italy. The river flows eastwards through East Tirol and Carinthia in Austria into the Styria region of Slovenia. Then it turns south-

east, passing through Croatia and, after merging with its main tributary Mura, forms most of the border between Croatia and Hungary, before it joins to the Danube near Osijek.

Compared to other typical large rivers of Europe, the Croatian-Hungarian Drava section shows a considerably natural status with free-flowing sections, gravel shoals and island and eroded high banks; ensuring significant richness of natural habitats and species. Nevertheless, the river regulation caused fundamental changes in the morphology of the river, the large curves has been closed and cut resulted in oxbows with special flora and fauna.

The Ó-Dráva at Barcs is almost 20 kilometre long and the Croatian-Hungarian state border divides it longitudinally. The area is protected at national and international level: Natura 2000, Danube-Drava National Park (HU), National Ecological Network (HU), Mura-Drava-Danube Trans-boundary Biosphere Reserve (UNESCO). In larger sense the project area is about 196 hectares. The oxbow is situated in Somogy County (HU), belonging to Barcs, Babócsa and Péterhida settlements and in Virovitica-Podravina's County (HR). The whole project area is state owned land on both sides of the border. The water body is managed by the "South-Transdanubian

Water Management Directorate" and the "Croatian Waters", and the riverbank is partially managed by Danube-Drava National Park Directorate. The leisure angling is a typical activity on Barcsi-Ó-Dráva, the fishing rights belongs to the "Barcs and surroundings Fishing Association". Despite of that most of the oxbows are results of human intervention they improve biodiversity of the Drava region providing habitat for that species which cannot use the rapid flowing water of Drava. The Old-Drava – which is the direct target area of the project – is the longest oxbow of the Croatian-Hungarian Drava section, originally it was the main channel of the river. At the moment only the downstream mouth is connected to Drava directly, on the upper section the Rinya Stream supply water to Old-Drava. The eutrophication of the oxbow has started due to processes that were presented so far, but the permanent water flow and the opened water surface is crucial for this habitat. The result of the restoration will not be a classical oxbow which has very limited water supply, and also not a classical side-branch which is re-connected to the river. The ecological needs of this complex habitat require solutions that improve the water supply, but do not change totally the hydromorphological conditions and the character of the habitat.



Photo: Tamás Gábor/WWF-Hungary



Contrary to the rapid flowing Drava river the Old-Drava can be characterized by slow water flowing, shallow water with muddy banks and reed around. These conditions are optimal for floating vegetation, like European white water lily and fern species. The slow flowing water with dense vegetation provides ideal habitat and spawning place for the rare spined loach. Along the Old-Drava riparian forests are found typically, with trees like common alder, ash, poplars and white willow. Since these forests were not used intensively the natural structure of gallery forest is clearly visible. The complex of forest and aquatic habitats provides proper breeding and feeding place for several rare bird species, like the black stork and different woodpeckers.

The Old-Drava LIFE+ project aims Natura 2000 habitats directly. The target habitats are mostly out of commercial utilisation, these cannot produce significant income, and consequently, we need additional financial support to improve the ecological status of the area.

## Main objectives of the project

The main objective of the project is to contribute to the conservation and resilience of the riparian forest habitat through improving the water regime and the biodiversity of it. Such restoration will include discharge enhancement of the oxbow, stabilization of the sufficient water level with water retention structures which ensures to reduce the risk of low water periods. The increased water level will support the favourable conditions for the riparian forest, as well as provide favourable ecological circumstances for the targeted aquatic habitat. The appropriate soil humidity will promote the natural rejuvenation of native species of gallery forests and reduce the abundance of invasive plant species. By planting native tree and shrub species we will improve the diversity of forest habitats. The improved water supply generates better conditions for population of rare fish species, too. Additionally, due to riverbed erosion of Drava, the water level in oxbows and ground water tables are also decreasing.

The project will demonstrate a relatively simple and cost effective way of water retention on existing wetlands, where, due to the severe alterations, the original hydromorphological processes (e.g. meandering) cannot be restored completely. Furthermore, the project can justify that these measures will positively affect not only the natural values, but local inhabitants can also have direct benefits from them.

There is a constant human activity within the project area, especially the angling has considerable pressure on nature. The project intends to harmonize human activities and nature conservation tasks. Campaigns will target the local anglers, involving them to remove abandoned angling platforms and other litter from the oxbow.

The project will contribute to improve the transboundary nature conservation in the future. That is why the compilation of recommendations of transboundary projects' administrative criteria and requirements is planned.

The project intends to raise public awareness by various types of communicational tools. If the wide public understands dynamic processes and values of floodplains, a sustainable and environment friendly way of management will be supported by them, not only in the project area, but also on other floodplains.

## The main expected results of the project:

The average water level increased by 0.5-1 metre and the risk of extreme low water periods is to be minimised. The increase of water table will affect positively about 176 hectares of gallery forest along the oxbow. Furthermore, all aquatic habitats will be in better condition, the extremely low water level will not endanger the water related species. Presumably, the population of Natura 2000 fish species bitterling (*Rhodeus sericeus amarus*), the rare spined loach (*Cobitis elongatoides*) and European weather loach (*Misgurnus fossilis*) will grow, the size of the population could be estimated by the ecological study.

Due to the increasing number of fish, populations of certain bird species (e.g. kingfisher, herons and egrets) are also expected to increase; the removal of 30 piers and 17 shelters, the renovation of 30 and construction of 3 new ones. Considering the removal of waste from the oxbow and gallery forest, the project area will provide more attractive surrounding for visitors; a guideline in three languages - that you can hold in your hands - was published, including recommendations for transboundary projects' administrative criteria and requirements and lessons learned of stakeholders' expectations and recommendations; the progress and results of the project was published on the internet: [www.olddrava.com](http://www.olddrava.com). In the future, especially the knowledge of locals about the natural values of floodplain should be improved, it would help them to manage a more nature friendly land use within the Natura 2000 site. On the Hungarian side there are about 100 anglers who regularly visit the project area, they were informed by the two information points how they could continue their hobby without endangering protected species and valuable habitats. The communication for wider public, mainly young generations was managed by using online tools.









## Chapter 2.

Technical and legal background of getting permissions for habitat restorations in Croatia and Hungary

# HEREBY WE GIVE AN OVERVIEW ABOUT THE OFFICIAL LICENING PRODUCERE IN BOTH COUNTRIES.

## 2.1. Croatia

The project has a construction activity in Croatia in order to support water retention. Environmental and water licensing is part of the construction licensing procedure. To obtain a construction permit in this nature conservation area, the Municipality of Pitomača started the process. The project activities A3 (environmental and water licensing CR) and A4 (technical planning of water retention artefacts) are connected.

In May 2016 Virovitica-Podravina County (as a licensing authority) summarized the information on the conditions for making the main design (main project) that was initiated and compiled by a technical designer hired by the Municipality of Pitomača.

The main design requires the approval of:

- Croatian Waters;
- Ministry of Sea, Traffic and Infrastructure;
- Waterway Agency;
- Municipality of Pitomača;
- Virovitica-Podravina County;
- Ministry of Internal affairs (which is responsible for border guarding).

And the following procedures needs to be performed:

- Environmental Impact Assessment Procedure;
- Procedure for Acceptability Assessment of the Ecological Network (Ministry of Environment Protection and Energy - MEPE).

The approval of the Waterway Agency and the Ministry of Sea, Traffic and Infrastructure was received without further comments in 2016.

Municipality of Pitomača sent the official request to initiate the licensing procedure in August 2016.

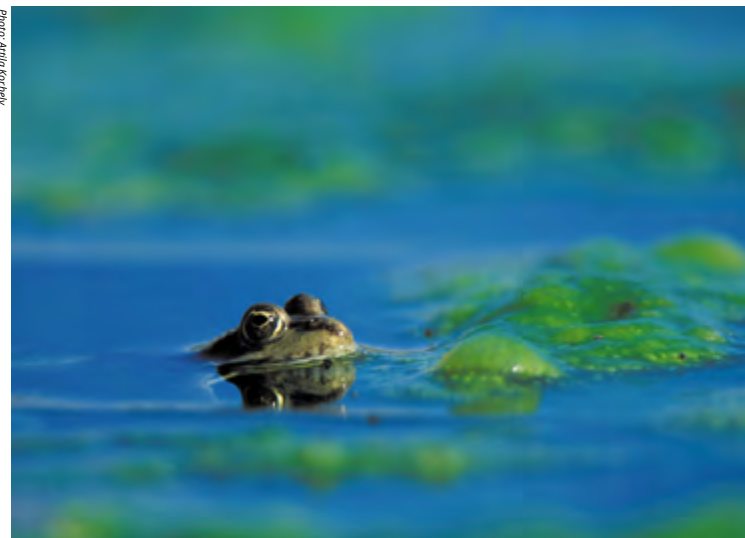
During February 2017 the MEPE stated, that it is not necessary to conduct the environmental impact assessment, but it is necessary to conduct a major impact assessment for the ecological network. It is necessary to draw up a study of the main acceptability assessment for the ecological network. This study was finished in March 2017 by an external expert company. After reviewing the document, in May 2017, the MEPE asked for a supplement to the study, which was finished in June 2017. However, after the review the MEPE asked again for a second supplement to the study, which was finished in August 2017. In November 2017 the MEPE issued the final decision of the main assessment of the acceptability of the project for the ecological network.

The confirmation of the main design by the Municipality of Pitomača and the Ministry of Internal Affairs was received during 2017. Croatian Waters issued a certificate to the main design in 2018.

During 2018, Virovitica-Podravina County invited interested parties and neighbours to get an insight into the subject.



After getting all necessary approvals from other authorities and bodies for the construction permits and the MEPE confirmed the main project, Virovitica-Podravina County (its county office which is responsible for licensing) provided the final construction permit in May 2018.



## 2.2. Hungary

Wetland habitat restoration projects generally need environmental and water permits in Hungary. Sometimes permit from the forestry management authority is also obligatory. During these procedures authorities can involve further authorities in order to use their recommendations or prescriptions (as advisory bodies).

The licensing procedure was initiated by the DDNPD.

Practically, the Hungarian authorities managed the licensing procedure of the restoration as it was only a “national” project, the transboundary aspect of the project was not emphasised. In the case of environmental licensing procedure the licensing authority was the District Office

of Kaposvár within the Governmental Office of Somogy County (Somogy Megyei Kormányhivatal Kaposvári Járási Hivatala).

This authority performed the nature conservation and environmental protection licensing and acted as an advisory body for the water licensing procedure.

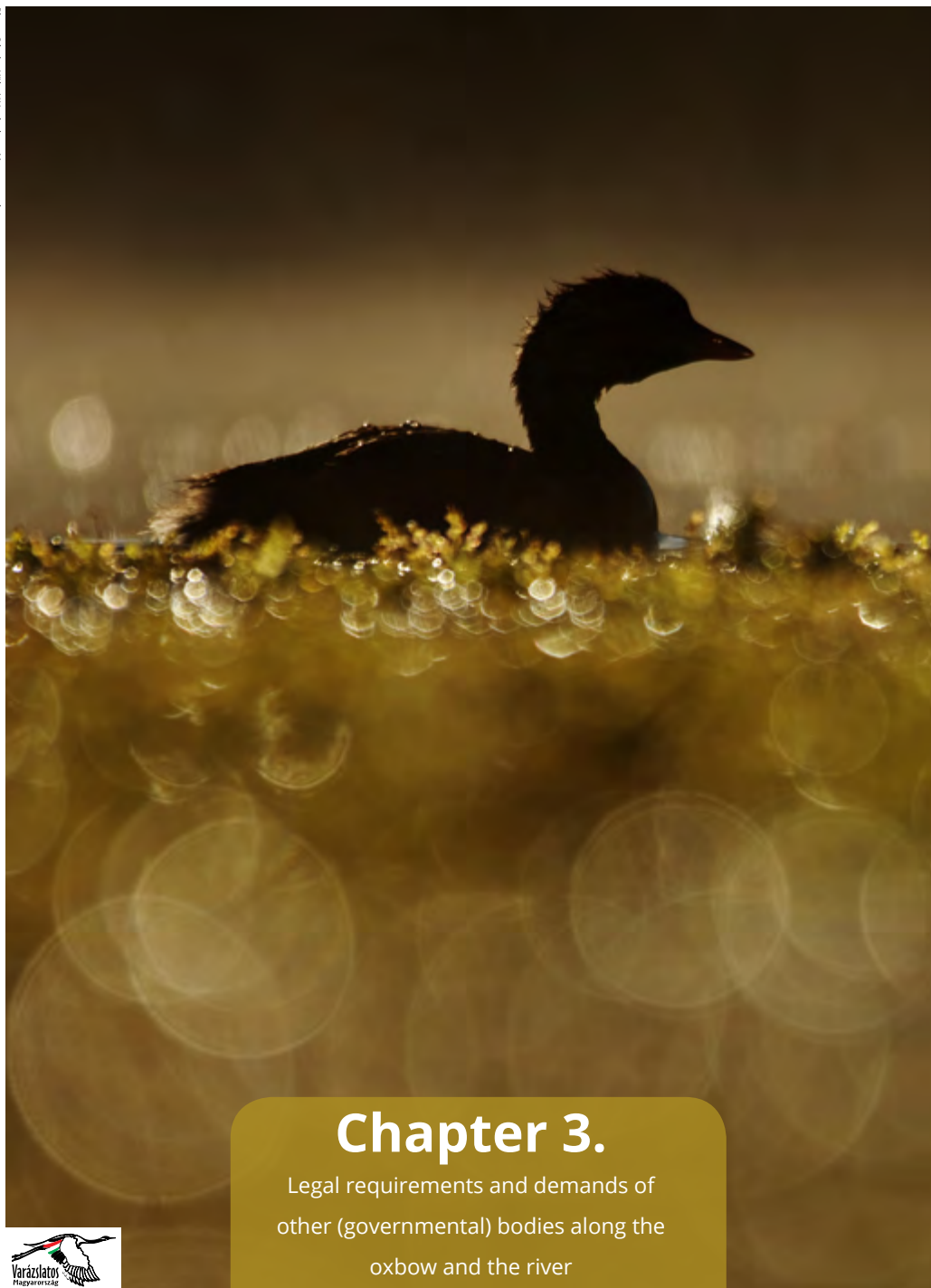
After a personal meeting they suggested to prepare an environmental impact assessment documentation (Előzetes Vizsgálati Dokumentáció referred commonly as EVD). In this documentation the whole project - including the construction work in Croatia - was described and analysed, based on the result of project action A1 “Ecological baseline

study and blueprint”. After reviewing the EVD the authority stated, that the project has no risk to the environment, and the DDNPD shall apply for an environmental permit and a forestry permit. These permits have been issued in January 2018.

In the case of water licensing procedure, the Hungarian translation of the construction documentation was delivered to the Disaster Management Directorate of Baranya County (Baranya Megyei Katasztrófavédelmi Igazgatóság - DMDBC) as water licensing authority. The DMDBC declared, that those part of the investment, which will be built in Hungary do not need a water (e.g. construction) permit. Furthermore, they declared, that the water retention artefact is situated in Croatia, so the Croatian authorities are competent to issue the related permit.

In some cases, the planned investment can fall under the criteria of the Espoo Convention (officially The Convention on Environmental Impact Assessment in a Transboundary Context). This is a United Nations Economic Commission for Europe (UNECE) convention signed in Espoo, Finland, in 1991 that entered into force in 1997. The Convention sets out the obligations of Parties — which are the States that have agreed to be bound by the Convention — to carry out an environmental impact assessment of certain activities at an early stage of planning. It also lays down the general obligation of States to notify and consult to each other on all major projects under consideration that are likely to have a significant adverse environmental impact across boundaries. In April 2014, the convention was ratified by 44 states and the European Union (UNECE 2018).





## Chapter 3.

Legal requirements and demands of other (governmental) bodies along the oxbow and the river



## IN HUNGARY, THE WHOLE PROJECT AREA IS OWNED BY THE HUNGARIAN STATE,

the management rights of the water bodies belong to the South Transdanubian Water Management Directorate (Dél-Dunántúli Vízügyi Igazgatóság) (STWMD), the forest areas partially belong to SEFAG Ltd. and DDNPD, some smaller land pieces are officially managed by the National Land Fund Management Organization (Nemzeti Földalapkezelő Szervezet). At the beginning of the project the DDNPD got a supporting

letter from the stakeholders on A8 form. During the planning phase the STWMD was regularly informed about the status of the blueprint and a fieldtrip was organised for the representatives of the STWMD, too. During the licensing procedures the SEFAG Ltd. and the STWMD also issued the necessary supporting letters, which were attached to the licensing documentation.

To reach the construction area, the machines will have to cross an arable land managed by Dráva-Coop Ltd. (a private company). The DDNPD and the Dráva-Coop Ltd. developed a cooperation agreement, in which the Dráva-Coop Ltd. contributes to the construction: traffic through the arable land is possible and compensatory payments are provided by the DDNPD.









## Chapter 4.

### Stakeholder analysis

Before the implementation of the habitat restoration we tried to reach all relevant stakeholders who are not official partners of the project, in order to see their opinions on this activity.

We analysed the main stakeholder groups and targeted them with a bilingual questionnaire mostly via email, but in some cases also with personal meetings, in order to collect their views and needs according to the habitat restoration(s) along the Drava in Croatia and Hungary.

We received 11 questionnaires from the two countries. The participants represented water management bodies, forest management bodies, municipalities, scientific institutes, angling associations, private farmers, environmental NGOs and authorities. We believe that this is a wide spectrum of stakeholders which needs to be interviewed in other future projects, too. The results show (Fig. 1), that the most important interest of the stakeholders in

habitat restorations is the conservation of biodiversity, followed by the resilience to climate change, ecotourism and hunting. This highlights the importance of the integrated, complex projects, where different type of ecotourism activities and water management purposes should be harmonised with the biodiversity goals as a top priority.

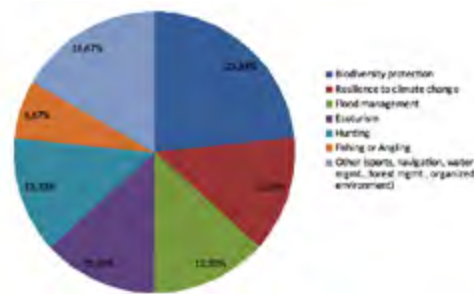


Figure 1: The most significant stakeholder linkages to habitat restorations along the Drava



One of our questions targeted the expectations of the stakeholders regarding the current/other similar habitat restorations. The answers showed that water level is crucial, the water level of the Old-Drava should be increased. Water retention artefacts should help fish, because at higher water levels of Drava they can trespass between the main channel and the oxbow, and can stay in the Old-Drava at low water levels. The water retention should help the condition of the forest habitats and the project should respect the legal and practical forest issues during planning. During the authorisation process the project management staff should cooperate regularly with authorities, water management bodies, and scientific institutions, which process should start as soon as possible (even before the planning phase). Some stakeholders highlighted the importance of self-supporting and self-regulated projects, which do not need major resources from the governmental sector. More stakeholders support complex, integrated projects.

According to our question (Fig. 2) most of the stakeholders argued, that their interests are not in contrast with the nature conservation goals, however, it is clearly visible, that forestry purposes (synchronization with economically sustainable forest management) or water management issues (flood protection and inland water) may cause conflicts.

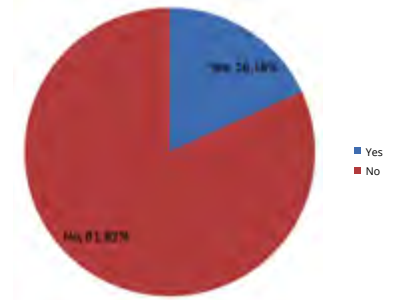


Figure 2: Result of the stakeholder interview question: "Do you think that the conservation goals of the project may have conflicts with your interests and expectations in the project area/similar habitats along the Drava?"

According to the answers to our final question for active users of the target habitats (Fig. 3), most of the stakeholders argued, that they would prefer stable, well preserved/restored ecosystems with high biodiversity and fish abundance, together with harmonised water management purposes and ecotourism development. However, it is worth to mention, that even more contradicting issues showed up, like aquatic plant removal (if these are native) and the need of agricultural irrigation.

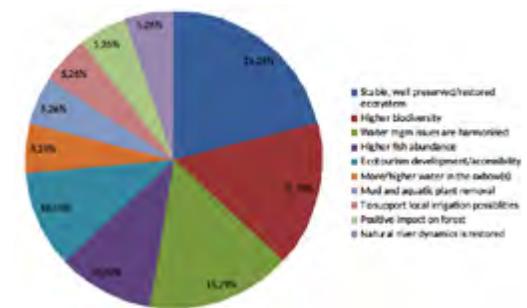


Figure 3: Result of the stakeholder interview question: "If you are an active user of natural habitats in the project area or along similar habitats of the Drava, please describe your main expectations to these habitats?"





## Chapter 5.

Analysis of human impact

Within the framework of the project, a study (Harangozó & Marjainé Dr. Szerényi, 2017) was carried out in order to map the ecosystem services provided by the oxbow. This study reflects to the human activities along the oxbow even in a historical aspect.

### FOCUS GROUP TALKS WERE SUMMARIZED AND EVALUATED AS IT FOLLOWS:

The Hungarian focus group said, that 50-70 years ago local people lived together with the river. They had an enormous amount of economic activities connected to the oxbow and the floodplain, such as fishing, floodplain pasturage, floodplain orchard, floodplain piggery and masting, hunting (mainly ducks), small apiary, iron processing, formerly charring and potash cooking (it resulted in deforestation.) Much earlier local people were also suppliers of fish, crab and grey cattle to the royal house. The oxbow was used as water for animals, to douse but also to drink water ("it was pure enough to be drinkable"). The area was suitable for collecting various herbs (horsetail and elderberry). The surrounding of the oxbow has been regularly flooded before the river regulation, that is why the very fertile soil has evolved. If we look back at the relatively close past, it turns out that angling/fishing has always played a major role in the life of locals, as they could catch many fish species like tench, white bream, carp, grass carp and pike. They went to the riverbank of the oxbow with their family where they spent a lot of time. Fishermen connected the fish to the farewell which has been a tradition for a long time. On the oxbow the boat mooring (boat hiring) and bathing was also typical. It was a folk tradition to collect the mullet and the water chestnut with net, which served as basis of flour, then baked or made bread from it.

We could find living settlement here at that time. The Croatians revealed fishing among the old activities. On the Croatian side there were 20-30 kilos pikes and 60-70 kilos catfish in the water. The locals were cooperating with the fishing co-ops and the fishing served as a base for their living. Thus, it can be said that the population of the area lived together with the water on both sides. Formerly, the green floods during spring were typical on the oxbow, which provided a high water level and refreshed the water of the oxbow.

According to the locals in Hungarian, the reconstructions and river regulations began in the 1960s had a significant impact on Old-Drava. The land of the area became arable which were not so suitable for this kind of cultivation form. They artificially cut a runoff at the Black Stream (Feketeárok), which was unprofessional; therefore the water flows out of the oxbow. After the regulations the water regime changed, but the water of the oxbow was used for irrigation.

The constructions of the Croatian hydro-electric power plants on Drava, upstream from the oxbow, have also serious impact on the status of the river and these all unfavourably affected also the Old-Drava.

Considering the actual situation, the Hungarian inhabitants have rather negative experience. Water has disappeared, and locals have not been able to use the oxbow in their everyday life any more. Due to the changes in the water regime, the habitats along the oxbow have significantly altered. The natural replenishment of the oxbow and the dense vegetation around it is a good sign of the water related habitats' biocapacity for spreading and growing, but the single remaining, almost unique activity of locals, the angling is significantly blocked due to the dense vegetation. Roads are not passable, nobody clears or mows them. They emphasized that the relationship with the Croatians are not so good. This bad relationship and its reasons were asked on the Croatian side focus group meeting



and the Croatian participants were aware of that and confirmed that there was much room for improvement in the compliance of the law. An expeditious sentence is: “the oxbow means nothing, only hope to the locals”. But the locals want to do something: ten years ago a group of anglers joined forces and approximately 50 people made a barrier from sandbags in the lower stretch of the oxbow, resulting that the water level increased by 28 cm within two months. Another action was that they gave kids fishing licenses for free of charge to encourage local young people to familiarize with the area.

The project gives hope to local people, “the old beautiful memories could come back” – they said. Renovation of the part of the piers is not enough to make the recreational activities associated with the oxbow more significant: for angling there should be fish and open water surface, which has already partly disappeared and can be found only on the lower stretches of the oxbow. About developing tourism, both Hungarians’ and Croatians’ opinion is that they could only imagine ecotourism and sustainable tourism, which means few, environmental conscious visitors.

## Based on the answers about the 4 types of ecosystem services the focus group discussions results are the followings:

### Provisioning services

Game products, water for irrigation, fish and honey play some role. The life of the local people has been around the fish for a long time and also partly recently. The fish could bring people back to the oxbow. Honey is less important, but the wildflowers and trees of the area also allow wandering apiary. Game has regional and national significance. Opinions on irrigation have been derived. Local population including the anglers complained that water abstraction is still possible. Conservationists also consider water retention as priority and reduce water abstraction. Although, according to farmers (agricultural companies) the volume of abstracted water is small compared to the average discharge of the oxbow and they would rather increase the size of irrigated crop lands (e.g. sugar beet) around the oxbow.



Photo: Tamás Gruber/WWF Hungary

Among **cultural services** tourism development is important for local people. Experts and locals would expect a low number of guests, but those who are really enthusiastic. They do not want to have mass of tourists who would be burden the carrying capacity of the area. The landscape is considered to be unique, the river bank and the gallery forest along the oxbow are also beautiful despite of its recently neglected status. Angling is one of the most important ecosystem services. It has always played a major role in the life of locals. It is a risk that fewer and fewer people will go down to the oxbow due to the dense vegetation, because they can fish only at the expense of heavy physical labour (by illegally pulling out tangle and mullet). The fish species that were common in the past are also represented now in smaller populations. People have great expectations on scientific research as the area has not been previously surveyed. Monitoring is considered as a necessary and long-term activity and its significance increases as a result of the project. In terms of arts as so-

cial benefit, local painters were mentioned who could paint here and could sell their paintings, and photographers also come to the area. The importance of these activities could increase after the project, when the natural conditions are improved. The old, giant trees are symbols of the region. These could be stopovers of the educational trail and such way more people would be aware of their uniqueness and importance. Birdwatching does not have any relevance currently, but the development of the area may increase its significance as many kinds of birds stop here for a while. Information about the unique status of the Old-Drava has not previously been provided with any means, so the project is also important in this aspect. People are interested widely about the Old-Drava and a short brochure does not satisfy their interest, they want to know more about it (e.g. in a handbook). An educational trail along the Old-Drava was also planned earlier, but the idea was removed from the agenda because of the refugee crisis affecting also this border.



Photo: Pál Nagy (inactive user)



Due to the project, many of the **regulating services** are predicted to be increased, such as biodiversity of the oxbow (habitat for plant and animal species), self-sustaining ability (the oxbow is vulnerable but its ecological status can be stabilized, and it was also mentioned that it would be necessary to find the optimum between natural status and human usage). Water retention is one of the most important long-term goals and the project could produce results in this regard, since if there is water, the oxbow is more viable and the utilization opportunities improve. The oxbow surely has water purification function, which may have importance, because pollutants can be washed in from arable lands of the surrounding areas. The Rinya Steam, which flows into the oxbow, may also cause pollution. Although little or no measurement has been made, as experience shows the oxbow is able to purify the pollutions. The status of the gallery forests could be improved if the water supply is better. The oxbow and the vegetation around it has influence on the microclimate; it makes the air more humid which is favoured by some of the agricultural crops. Old-Drava is an oasis for migrating birds. There is more information about fish species comparing to the amphibians if we consider the spawning sites and spawning capacity of the oxbow. But if there is shallow water bodies that can warm up easily and it would surely help the reproducing capacity of many water related species. Old-Drava is also considered to be very valuable, because oxbows cannot be formed any more along the Drava due to the river regulation and that is why it is a unique habitat.

All the **supporting services** are considered as a basic condition. Although, it has been highlighted that very good quality of soils are around the oxbow, since the floods reached many lands around it before the regulations.



**BASED ON THIS RESEARCH AND EXPERT EVALUATION WE COMPILED A TABLE (TABLE 1) RANKING SIGNIFICANT HUMAN ACTIVITIES NOWADAYS.**

		Significance*1		Harmonisation with nature conservation goals*3
		Before the project	After the project	
Hunting	2	1	1	2
Irrigation	2	1	0	1
Sport angling	2	2	2	2
Fishing	1	1	1	2
Bee-keeping	1	1	1	2
Tourism	1	0	0	2
Scientific research	1	0	1	2
Art activities (photo/painting)	0	0	0,5	2
Birdwatching	0	0	1	2

Table 1: Rank of the significant human activities along the Old-Drava (where \*1: 0=not significant, 1=moderately significant, 2=highly significant; \*2: 0=rare, 1=moderately rare, 2=frequent; \*3: ( 0= not harmonised, 1=moderately harmonised 2= harmonised)

It is clearly visible, that the most important human activities are hunting, irrigation and sport angling. Other activities are not frequent and significant, however, their role could be more important after the restoration and based on local needs (ecotourism, research, phototourism, painters, birdwatching).

Compared to the former decades, even these activities might have a minor effect on local ecosystems. The high level of former extensive use (fishing, floodplain pasturage, floodplain orchard, floodplain piggery and masting, hunting, small apiary, iron processing, herb collection, etc.) – when local people used the area on a daily basis to support their needs – is not foreseen.

As a conclusion it can be stated, that most of the recent human activities are not harming the natural conditions of the oxbow. The local stakeholders and residents are aware of these issues and also do not support mass tourism in the future.





## Chapter 6.

Lessons learned and future recommendations for transboundary restoration projects

During the implementation of project, the project team faced many challenges. Here we list the most important lessons learned during this way in order to help others for a smooth implementation of future habitat restorations:

- It is never too early to involve authorities and stakeholders;
- During the project planning phase it is necessary to perform an accurate stakeholder mapping and it is also useful to make a risk assessment connected to the stakeholders identified. In some cases interviews with the responsible authorities is also recommended which helps to design the permission approach properly;
- A project is more likely to be accepted by locals and stakeholders if they are informed and if necessary involved from a very early stage;
- The environmental and water (construction) licensing procedure needs to be

started as early as possible (in this project it took more than 2 years!). Some authorities recommended that the most useful method of their involvement is to consult with them in the project planning phase, before the technical and financial acceptance of the development project;

- Pay attention: big organisations usually react slower;
- According to some authorities, if the project is transnational, the documentation should be as uniform as possible for both sides (metric system, projection system, language, hard copy/electronic versions etc.);
- According to our experiences it is uncommon that real cross-border constructions happen (i.e. there is an object built with parts on both sides of the exact state border). Those who plan and implement similar projects avoid constructions like this and try to go through licensing procedures only on one side of the border.





## Chapter 7.

Transboundary nature conservation  
along rivers in Europe – examples

### IT IS WORTH TO MENTION, THAT THE WIDER PROJECT AREA HAS A RICH TRADITION OF TRANSBOUNDARY COOPERATION.

#### 7.1. The Transboundary UNESCO Biosphere Reserve Mura-Drava-Danube

The Transboundary UNESCO Biosphere Reserve Mura-Drava-Danube combines thirteen protected areas along these three rivers and jointly manage the shared river ecosystem in a sustainable manner, while boosting economic growth and development in the region.

The Transboundary Mura-Drava-Danube Biosphere Reserve, on the territory of the Republic of Croatia and Hungary, was declared by UNESCO at the 24th session of the International Coordination Council of the Human and Biosphere Program on 11th July 2012 at the UNESCO headquarters in Paris.

The Mura-Drava-Danube river system is a flood river ecosystem with high biological and landscape diversity and rich geological and cultural-traditional heritage. Usually, biosphere reserves are areas that are internationally recognized within the UNESCO programme that promotes the preservation of natural heritage and sustainable development of the local community, all based on scientific knowledge. The programme wants to establish a new way of relationship between people and nature based on the fact that people are not the

enemies of the biosphere, but its component part. There are currently 669 biosphere reserves in 120 countries, including 20 transboundary areas.

The Mura-Drava-Danube Biosphere Reserve concept defines about 300,000 hectares of core and buffer zones (existing protected area network) and around 700,000 hectares of transition zones. The core zone is the ecological backbone of the reserve. It primarily covers the river and floodplains areas, which are mostly situated within flood control dikes. The goals and measures in the core zone are predominantly focused on the preservation of natural habitats, species and processes as well as the restoration of areas degraded already. National and EU funded projects were implemented in the previous years for developing the ecological status of especially Drava and Danube.

#### 7.2 Croatian-Hungarian conservation efforts in cooperation

These conservation efforts affected the Drávapalkonya, Drávakeresztúr, Felsőszentmárton, Tótújfalu, Drávatamási upstream and Drávatamási downstream side-branches. The restorations were implemented between 2011 and 2013.

These restoration projects are:

- Ecological revitalization of Aljmaški rit and Drávakeresztúri branches for renewal of water regime on the Drava's floodplains - HUHR/1101/1.1.1/0004 (see <http://www.hu-hr-ipa.com/en/funed-project/109>)
- Ecological revitalization of Felsőszentmárton side-branch on Drava- DDOP 5.1.5/A-09-2010-0003 (see in Hungarian: <http://www.ddvizig.hu/hu/lezarult-fejlesztések-baranya-megye-1>);



- Water and Life for Drava and Vuka; Revitalization and landscape development of riverine ecosystem in the Drava-Danube area - HUHR/0901/1.1.1/0004 (Drávatamási-upstream, Drávatamási-downstream, Tótújfalui and Drávapalkonyai side-branches – see: <http://www.hu-hr-ipa.com/en/funded-project/3>).

The positive effects of the restorations on the habitats and on river dynamic are already visible in these side-branches: during flood events significant volume of water flows through the side branches.

### 7.3. Joint conservation efforts along transboundary protected habitats in Europe

#### 7.3.a. National Park Thayatal (Austria) and Národní park Podyjí (Czech Republic)

The National Park Thayatal and the Národní park Podyjí are situated along the Thaya river at the northeastern border of Austria. The National Park Thayatal is a company with limited liability, the Národní park Podyjí is an agency of the Czech Ministry of Environment. The National Park Thayatal has a light administrative structure, in the National park Podyjí the former forestry management became part of the national park administration. For some regulations, for example on utilization, the Lower Austrian national park law is much clearer than the Czech one. This can facilitate or complicate measures. This explains why management measures are not always consistent. However, the two administrations have agreed to define common goals, which should be reached within ten years on both sides in accordance with their legislative standards.

Photo: Peter Lazarek



Photo: Gábor Sáfár



#### These general goals are:

- Maintain and develop the characteristics of habitats and promote biodiversity and self-regulation;
- Eliminate or diminish the negative impacts of former and present human interferences, particularly in forests and in the Thaya;
- Offer opportunities to experience nature and relax;
- Improve the quality of life of the local population in the national park area and of visitors to the national parks, and thus, directly or indirectly improve the economic situation in the region;
- Increase knowledge of interrelations/connections between natural cycles through research and verify the impact of measures through scientific observations;

Appear in public more like ONE NATIONAL PARK across two states in the future. A typical joint effort for the practical cooperation was the eradication of the neophyte Himalayan Balsam (*Impatiens glandulifera*), that led to a significant decrease of Himalayan balsam plants in the river valley and return of native plants. The most important success factors were the common approach to the river valley management, access to both river banks by Czech staff, change in the management of river valley meadows, and ongoing joint monitoring in the river valley. The invasive plant was eradicated almost completely and its regrowth is monitored and actions are taken immediately after a new infected location is observed.

Homepage:



### 7.3.b. Bavarian Forest National Park and Šumava National Park

The area of Šumava and Bavarian Forest National Park is characterized as the largest forest region without human intervention in Central Europe. With an area of 922, 84 km<sup>2</sup> it is an important refuge for endangered biotopes, plants and animals and a popular recreational area for humans. Nowhere else in Central Europe such a large area of forests and mires can grow and develop without human interference. With the slogan "let nature be nature" both parks are cooperating to enable the development of wild virgin forests. Since the foundation of Šumava National Park both national parks started an intense cooperation in many fields of work, like:

- Building a common information point in Bučina;
- Introduction of a public transport system in 1996 which is linked beyond the border;
- Natura 2000 habitat mapping in both national parks;
- Running the "Glass Ark" project (a transboundary art project);
- Developing the project "Europe's wild heart";
- Establishing of cross-border hiking trails after the Czech Republic joined the Schengen treaty;
- Providing information in two or three languages in both parks and related institutions.

The EUROPARC Transboundary Parks Certificate<sup>11</sup> was handed out in 2009 for five years. After the revitalization of the cooperation both national parks were certified again in 2015. The ongoing project Silva Gabreta Monitoring serves for the development and implementation of a common, transboundary monitoring programme for the National Parks Bavarian Forest and Šumava. The project focuses on the ecosystems of mountain forests, mires and freshwaters. The main objectives of the project are to plan and implement monitoring activities in close cooperation and to standardize methods for both sides.

Homepage:



Photo: Věra Šolín

### 7.3.c. The Saxon Switzerland National Park and Saxon Switzerland Conservation Area (Germany) and the Bohemian Switzerland National Park and Elbe Sandstone Mountains Conservation Area (Czech Republic)

The Elbe Sandstone Mountains extend across an area of around 700 km<sup>2</sup> on both sides of the Elbe River. They are located on Czech and German territory and contain four conservation areas: two on the German side of the border and two on Czech territory. While on the German side the Saxon Switzerland National Park is surrounded by the Saxon Switzerland Conservation Area, the <http://www.npcs.cz/> Bohemian Switzerland National Park (Národní park České Švýcarsko) is bordered by the <http://labskepiskovce.ochranaprirody.cz/> Elbe Sandstone Mountains Conservation Area (CHKO Labské pískovce).

At the turn of the Millennium the vision of two transboundary national parks became reality. The changed political situation in the early 1990s created new perspectives for transboundary cooperation in nature conservation in Saxon and Bohemian Switzerland. Thus, a stable and lively, professional and friendly cooperation across state borders has been developed with the support of the heads of sanctuaries Werner Hentschel (Labské pískovce Conservation Area) and Dr. Jürgen Stein (Saxon Switzerland National Park) as well as the staff of the conservation administration. The objective of this cooperation is the coordinated, transboundary care and development of the two national parks and conservation areas of Saxon and Bohemian Switzerland. Furthermore, the cooperation aims at a closer bond between residents and guests on both sides of the border. With their diverse, bilingual services the two national park visitor centres in Bad Schandau and Krásná Lípa contribute to a growing understanding and personal

exchange in this border region. The environmental education of both national park administrations brings children and young people of both nations together while they experience nature.

For visitors, the administrative cooperation can be clearly seen in the joint appearance of publications and information brochures. These are also used by both tourism organisations, thus expressing their cross-border solidarity.

In October 2012, the protected area administrations in Saxon-Bohemian Switzerland were awarded the EUROPARC Federation Certificate<sup>2</sup> for cross-border cooperation of Transboundary Parks. The certificate confirms a high level of administrative cooperation of the Saxon and Bohemian Switzerland National Parks and the Labské Pískovce Conservation Area in the care of their unique nature. To receive this certificate it is fundamental to collaborate with key partners in this region, including local governments, clubs and national park partners.

Homepage:



Photo: David Engel / WWF Magyarország





## LITERATURE

WWF International webpage



European Commission  
Environmental LIFE Programme



UNECE



IUCN



Dudgeon, D., Arthington, A.H., Gessner, M.O., Kawabata, Z.I., Knowler, D.J., Lévêque, C., Naiman, R.J., Prieur-Richard, A.H., Soto, D., Stiassny, M.L. and Sullivan, C.A., 2006. Freshwater biodiversity: importance, threats, status and conservation challenges. *Biological reviews*, 81(2), pp.163-182.

Harangozó, G., Marjainé Dr. Szerényi, Zs., 2017. Survey of the Ecosystem Services of Old-Drava and the expected impacts of the habitat restoration on Ecosystem Services – Summary. 6 pp.

WWF. 2016. Living Planet Report 2016. Risk and resilience in a new era. WWF International, Gland, Switzerland

## OLD-DRAVA LEXICON

ENGLISH	HUNGARIAN	CROATIAN
river	folyó	rijeka
riverbed	folyómeder	riječno korito
oxbow	holtmeder	rukavac
(water)stage	vízállás (=vízsint)	vodostaj
groundwater	talajvíz	podzemna voda
control structure/device	szabályozó műtárgy	kontrolna struktura /uređaj
weir	bukógát	ustava
bottom weir	fenékküszöb	brana
drought	aszály (=szárazság)	suša
drainage	csatornázás, lecsapolás	odvodnja
floodplain	ártér	poplavno područje
Floodway channel	hullámtér	aktivna poplavna područja
flood	áradás	poplava
precipitation	csapadék	padaline
rainwater	csapadékvíz	kišnica
climate change	klimaváltozás	klimatske promjene
habitat	élőhely	stanište
freshwater habitat	vízi élőhely	slatkovodno stanište
wetland habitat	vizesélőhely	močvarno stanište
floodplain forest	ártéri erdő	poplavne šume
protected species	védett faj	zaštićene vrste
native species	őshonos faj	autohtone vrste
alien species	idegenhonos faj	strane vrste
forestry	erdészeti	šumarstvo
hunting	vadászat	lovstvo
fishing, angling	halászat, horgászat	ribarstvo
nature conservation	természetvédelem	zaštita prirode
national park	nemzeti park	nacionalni park
biosphere reserve	bioszféra rezervátum	rezervat biosfere
transboundary	határon átnyúló	prekogranični
state border	államhatár	državna granica
water permit	vízjogi engedély	vodna dozvola
environmental permit	környezetvédelmi engedély	okolišna dozvola
authority	hatóság	uprava

The total costs of actions in LIFE+ Old-Drava project (LIFE13 NAT/HU/000388) is € 834,006, the EU contribution is € 623,674. The project is running with the co-financing of the Ministry of Agriculture (Hungary) and the Coca-Cola Foundation.



