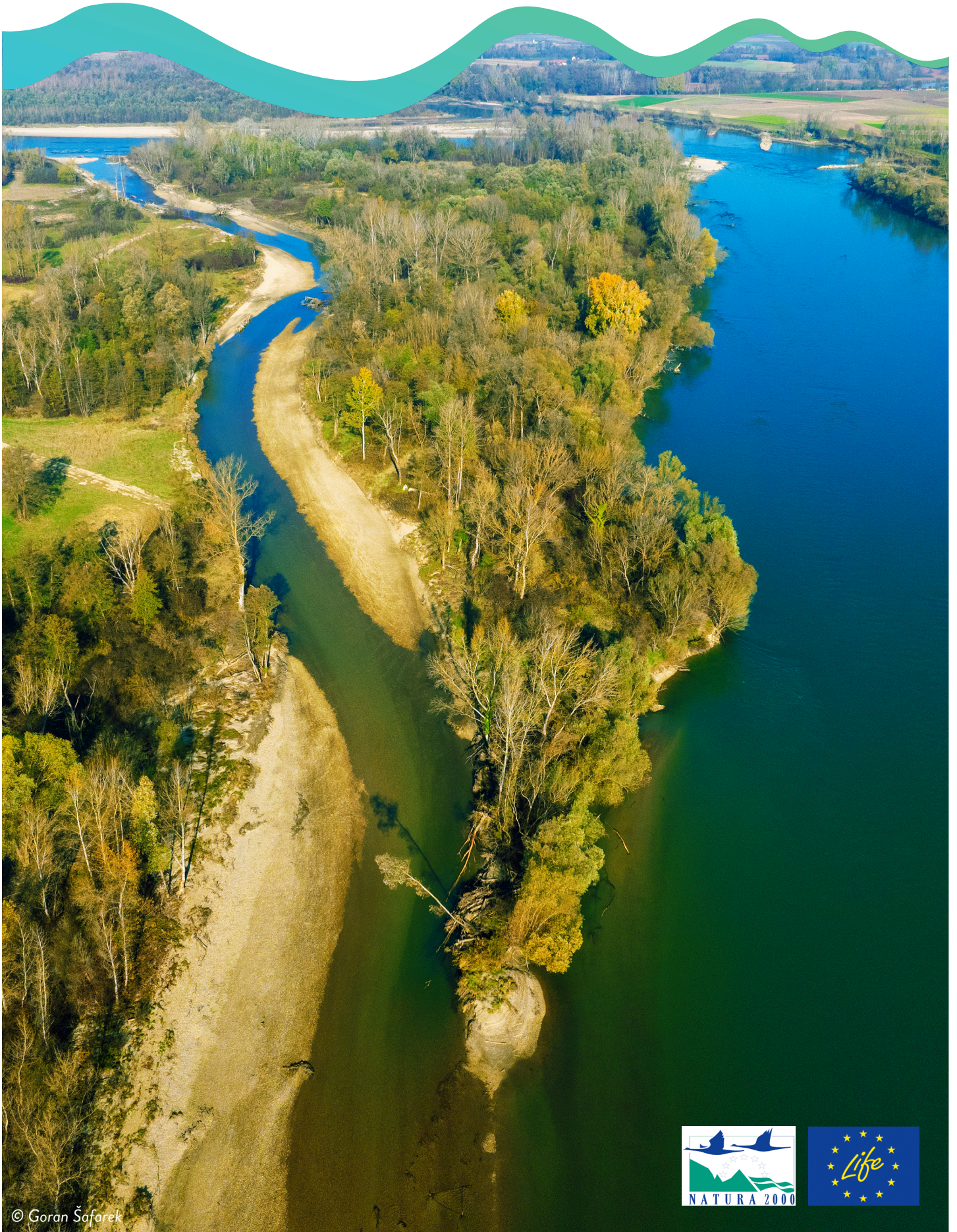




DRAVA
LIFE

The International DRAVA LIFE Final Symposium Report
21st – 24th October 2024, Varaždin, Croatia

December 2024 – LIFE14NAT/HR/000115 - DRAVA LIFE



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EU Nature Restoration Law and new chances for Europe’s rivers and floodplain forests, Frank Vassen, European Commission, DG Environment



The UNESCO Five-country Biosphere Reserve Mura-Drava-Danube (TBR MDD) known as “Amazon of Europe”



World’s first
Five-country Biosphere Reserve

3
rivers

5
countries

900,000
people living in the area

930,000 ha along **700** km
Europe’s largest protected riverine area

12
major protected areas

Danube’s most important fish spawning areas

150 breeding pairs of white-tailed eagles (Continental Europe’s highest breeding density)

+250,000 water birds resting and feeding place

Danube’s largest and most intact floodplain forests

AGENDA

Day I: Monday, 21st October, 2024
Guided walking tour of Varaždin and welcome dinner.
Day II: Tuesday, 22nd October, 2024
KEYNOTE I & II, Session I: River and wetland restoration in TBR MDD, Session 2: Kick-off Sediment Dialogue in TBR MDD, Film presentation “DRAVA LIFE – New Life for Drava”, Book presentation “DRAVA - Yesterday, Today, Tomorrow”
Day III: Wednesday, 23rd October, 2024
Session 3: Ambassadors of dynamic rivers , Session 4: International perspectives on European rivers, Session 5: Vision and future of river restoration in the TBR MDD, Evening programme in the wine hills
Day IV: Thursday, 24th October, 2024
Excursion

FROM VISION TO IMPLEMENTATION OF RIVER RESTORATION IN THE UNESCO FIVE-COUNTRY BIOSPHERE RESERVE MURA-DRAVA-DANUBE (TBR MDD)



The international DRAVA LIFE final Symposium 21st – 24th October 2024, Varaždin, Croatia City Museum Varaždin; Herzer Palace

The international DRAVA LIFE Symposium aimed to foster the exchange of know-how on river restoration projects within the UNESCO Five-country Biosphere Reserve Mura-Drava-Danube (TBR MDD) between Austria, Slovenia, Croatia, Hungary and Serbia. Project partners, river restoration experts and stakeholders from all five countries discussed the status quo and the need for a healthy river ecosystem within the TBR MDD – now and in the future. They also discussed how river restoration in the TBR MDD will contribute to the ambitious goals of the new EU Nature Restoration Law. A special focus was on a transboundary and basin-wide approach to sediment management, as the DRAVA LIFE Symposium also served as the kick-off for the Sediment Stakeholder Dialogue within the EU LIFE RESTORE for MDD project.

The TBR MDD serves as an international platform for cooperation in the implementation of harmonized and integrated river management, nature conservation and sustainable use in the region.



NOTE

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.



OPENING AND WELCOME



Mišel Jelić, *Curator of the natural history department in the City Museum Varaždin*, underlined the deep relationship between the region and the Drava River that has not only shaped the natural environment but has also been an integral part of the cultural and historical identity of Varaždin County. However, it has also faced significant pressures, from human activities to the impact of climate change, all of which have threatened its integrity. While the DRAVA LIFE project has already provided a strong response to these challenges, he stressed that the future of the Drava depends on our continued collaboration, and through our joint efforts, we can ensure that this vital river will continue to thrive for generations to come.



Slađana Miočić, *Head of the Department of Economic Affairs, City of Varaždin*, welcomed the participants in the name of the mayor and congratulated to the implementation of the project. She emphasized that hosting this Symposium in Varaždin, at the heart of the Drava River, was an honor. It served as a reminder of the importance of local action in global conservation efforts. The City of Varaždin was grateful to all DRAVA LIFE partners who have made significant strides in restoring this vital river, which has been important to the city and its inhabitants for generations and will continue to be in the future.



Anđelko Stričak, *the prefect of Varaždin County*, highlighted that the DRAVA LIFE project has resulted in concrete and significant activities aimed at restoring the river. He mentioned the example of the restoration of a side channel in Varaždin County that will contribute to the protection of numerous endangered habitats and species, while also enhancing flood protection for populated areas. As part of this project, the Public Institution for Nature Protection of Varaždin County has established six information points, or rest stops, featuring details about the natural values of the Drava. They have also conducted actions to reintroduce the strictly protected species German tamarisk (*Myricaria germanica*) to Drava's gravel banks, an effort they plan to continue.



Igor Kreitmeyer, *Director of the Nature Protection Directorate in the Ministry of Environmental Protection and Green Transition*, underlined that Croatia is dedicated to the EU Biodiversity strategy and the new EU Nature Restoration Law that will bring benefit to rivers and wetlands. He praised the DRAVA LIFE project for opening a new era of restoration actions in Croatia and described it as a shining example of how we can restore nature while ensuring sustainable development. With the EU Nature Restoration Law, new opportunities are opening up for the restoration of rivers and floodplain forests across Europe and he is proud that the DRAVA LIFE project sets a precedent for these future initiatives.



Milan Rezo, *Director of the Water Management Department for Mura and Upper Drava*, emphasized the good cooperation between water management, nature protection and NGOs. Through this project, Croatian Waters has demonstrated its commitment to innovative and sustainable water management practices. The restoration of the Drava River has shown that it is possible to balance the needs of nature with those of local communities. Recent floods have further underlined the critical importance of sustainable river management, and Croatian Waters will continue to integrate these successful practices to protect both the environment and the local population.




Nataša Kalauz, CEO of WWF-Adria, referred to the Living Planet Report and stressed the importance of restoration projects such as DRAVA LIFE to reverse the negative trend. WWF has been dedicated to the protection of the Mura-Drava-Danube region for over 20 years. The designation of the UNESCO Five-country Biosphere Reserve in 2021 was a monumental achievement, and the DRAVA LIFE project has been pivotal in restoring river ecosystems in Croatia. As we face the ongoing challenge of reversing ecological degradation, river restoration remains critical – not only for biodiversity but also for improved flood protection, water quality, and recreational opportunities for local communities. WWF will continue to support and advocate for these efforts.



The Symposium started with the press conference. 1: Igor Kreitmeyer / 2: Sladana Miočić / 3: Nataša Kalauz



KEYNOTE I EU Nature Restoration Law and new chances for Europe's Rivers and floodplain forests – an EU perspective

Frank Vassen, European Commission, DG Environment 

Frank Vassen has been involved in nature conservation at EU level for the last 25 years. He highlighted the key role of the Natura 2000 network for maintaining or restoring the favorable conservation status of species and habitats and for climate mitigation and adaptation. He sees DRAVA LIFE as a good example and important milestone for strengthening the cooperation between water management and nature protection and thereby supporting the resilience against floods. Capacity building in the frame of the DRAVA LIFE project resulted in the even bigger LIFE RESTORE for MDD project. With regard the recently adopted EU Nature Restoration Regulation, he is hoping for the development of national restoration plans within the next two years, as a planning basis for prioritizing restoration measures and investment needs.



KEYNOTE II UNESCO Five-country Biosphere Reserve Mura-Drava-Danube – Saving the “Amazon of Europe”



Arno Mohl, WWF-AT 

Arno Mohl is a landscape ecologist and conservationist who founded and leads the "Mura-Drava Danube" programme at WWF-Austria. For more than 30 years he has been committed to the protection and against the destruction of MDD. He is dedicated and enthusiastic for preserving free-flowing rivers and the beauty of nature.



In 2024, Europe again faced devastating floods that caused significant loss of life and economic damage—the September floods in Austria alone resulted in €1.3 billion in damage. With climate change, such events are likely to get worse. At the same time, 2024 marked a new record in biodiversity loss, with 73% of wildlife populations having disappeared over recent decades, and freshwater species facing even more severe declines.

Flooding and species extinction share the same root cause: the overexploitation of our planet. These two issues are two sides of the same coin. Today, humanity consumes resources as though we have 1.7 Earths, a reality highlighted by Earth Overshoot Day, which in 2024 fell on the 1st of August – an earlier date each year.

The solution lies in reducing consumption and using resources more sustainably. Biosphere reserves play a key role in this. These areas are intended to be models of harmonious coexistence between humans and nature – a concept that must be put into action.

Austria, Slovenia, Croatia, Hungary and Serbia have agreed to conserve the Mura-Drava-Danube region within a Five-country Biosphere Reserve, committing to its protection rather than exploitation.

What makes a river a "living river"? It is when rivers meander freely through the landscape. A natural, free-flowing river creates beauty, supports biodiversity and brings about natural flood protection for local communities. While this may seem idealistic, it is rooted in the reality of 'shifting baseline syndrome', where over time we accept degraded environmental conditions as normal. The real question is not whether we should restore regulated rivers to their natural state for the benefit of nature and people, but how far we can bring them back to their original condition.

The quality of the Mura-Drava-Danube River ecosystem has been severely degraded: Due to historical river regulation, sediment extraction and the construction of hydropower dams along the Mura, Drava and Danube river systems, we have lost 78% of the original floodplains, 51% of natural riverbanks, 85% of gravel and sand bars, and 81% of key species such as the sand martin (*Riparia riparia*).

To restore rivers and floodplains, it is essential to remove human-made river training structures that impede natural processes, allowing rivers to shape their own landscapes. This includes relocating flood dikes that are too close to the river and creating space for natural interactions that increase biodiversity and reduce flood risks.

Overcoming sectoral approaches and fostering collaboration among stakeholders is crucial. The challenges we face are complex, and we must work together to avoid future conflicts over land use and resources. We are all in the same boat.

Looking 30 years ahead, the hope is that the DRAVA LIFE project will be seen as a turning point in Croatia and the Five-country Biosphere Reserve Mura-Drava-Danube - a catalyst that helped pave the way for a more sustainable and cooperative approach to preserving and managing our rivers, ecosystems, and resources wisely.



SESSION 1: RIVER AND WETLAND RESTORATION IN TBR MDD

DRAVA LIFE – 9 years towards Integrated River Management – a Résumé Croatia	Igor Tošić , Croatian Waters Jasmin Sadiković , Green Osijek
WISEDRAVA LIFE – Conservation of Riverine and Floodplain Habitats along the Drava River Hungary-Croatia	Zoltán Barina , WWF-HU
Wetland Restoration in Gornje Podunavlje Special Nature Reserve and other projects along the Danube floodplains Serbia	Ivana Vasić , Public Enterprise Vojvodinašume
Natura Mura – River and Floodplain Restoration Slovenia	Aleksander Koren , IRSNC
River Restoration projects in Sichelendorf and Gosdorf at Mura River (Interreg) Austria	Tanja Schriebl , Province of Styria
LIFE RESTORE for MDD – Five years for Nature Conservation – a joint initiative to preserve and restore the largest contiguous riparian forests in the UNESCO Five-country Biosphere Reserve Mura-Drava-Danube	Lisa Wolf , WWF-AT
PANEL DISCUSSION Lessons learned from river restoration in TBR MDD; how to support each other and cooperate in the future	Speakers from presentations in the session and keynote II

DRAVA LIFE – 9 years towards Integrated River Management – a Résumé



Igor Tošić, Croatian Waters

Igor Tošić is a water management specialist and project manager at Croatian Waters / Hrvatske vode, Legal Entity for Water Management. He is a PhD candidate in the field of groundwater management and protection, with a strong interest in hydrological modelling aimed at improving flood protection, sediment balance and transport in open watercourses.

His connection with the DRAVA LIFE project has been constant and intense since the very beginning of his employment at Croatian Waters in March 2018. Now, at the end of this decade-long journey, he looks back fondly on this project and cherishes the experience.



Jasmin Sadiković, Green Osijek

Jasmin Sadiković is ecologist and project coordinator at Green Osijek. He was involved in the DRAVA LIFE project preparation and 9 years of its coordination. He has been active in nature protection for more than 27 years within the TBR MDD with a number of projects focusing on river restoration, biodiversity protection, awareness raising, campaigning and development of eco-tourism. He is passionate about Kopački Rit and paddling on the Drava and other rivers.



The presentation highlighted the project's background, objectives, achievements, and lessons learned in river restoration along the Drava River, a crucial part of the UNESCO Five-country Biosphere Reserve Mura-Drava-Danube (TBR MDD). The Drava River's ecological value and its significant threats are introduced, such as habitat degradation and water level changes, emphasizing the need for restoration and sustainable management practices.

The project's comprehensive goals include enhancing biodiversity, supporting flood management, promoting natural water dynamics, and involving multiple stakeholders across sectors. Specific actions under DRAVA LIFE, such as the creation of side branches, the restoration of floodplain forests, and the construction of an Educational Water Center, have been designed to achieve these aims. Major project actions were detailed, including regulatory adjustments, public awareness campaigns, and collaborations with local and international partners, leading to a total investment budget of approximately €4.6 million.

The presentation concluded with key lessons and recommendations for future river restoration initiatives, underscoring the importance of early planning, flexibility, financial sustainability, and strong collaboration among experts and stakeholders. These insights aim to guide ongoing and future projects to contribute effectively to ecological resilience, sustainable water management, and community engagement.

WISEDRAVA LIFE – Conservation of Riverine and Floodplain Habitats along the Drava River



Zoltán Barina, WWF-HU

Zoltán Barina is a biologist and Living Rivers Expert in the Freshwater Group of WWF-Hungary. His interests lie in river and wetland restoration with their ecological background, consequences and impacts, exploring the hidden treasures of the Mura-Drava-Danube region and enhancing their dynamic preservation.



Project WISEDRAVA LIFE was implemented between 2018 and 2024 as a novel initiative of Hungarian and Croatian partners of different sectors. The project surveys revealed the causes of riverbed incision in the Drava and contributed to the preparation of restoration works in three main sites. Ecological conditions of forest and meadow habitats were achieved in the Lankóc forest by means of water retaining bottom weirs and by installing bat boxes and artificial black stork nests. At Heresznye, an old and disconnected side-branch of the river was reconnected and three groynes were modified to enhance the free-flowing nature of the river.

Local people were addressed through a thematic magazine, children's summer camps, participatory theatre plays and workshops and in thematic events, forums and consultations. The general public was informed about the challenges and activities along the Drava River on social media and at public events, where infographics, animations, videos, interviews and articles were disseminated. Researchers and students were involved in conferences, scientific cooperations and field visits to the project sites.

The project contributed greatly to a better understanding of the river and floodplain habitats, as well as to local and transnational awareness, cooperation and conservation.

Wetland Restoration in Gornje Podunavlje Special Nature Reserve and other projects along the Danube floodplains



Ivana Vasić, Public Enterprise Vojvodinašume 

Ivana Vasić is a forest engineer at the Public Enterprise Vojvodinašume that manages several protected areas, including Gornje Podunavlje. After finishing her MSc studies for protected area management in Klagenfurt, Ivana started to lead the nature conservation sector in the company. She has been a project manager in several projects that are implemented in Gornje Podunavlje as part of the TBR MDD.



Being managed by the Public Enterprise “Vojvodinašume”, Gornje Podunavlje Special Nature Reserve (SNR) and Kovilj-Petrovaradin marsh Special Nature Reserve are protected areas where numerous projects have been implemented for the last 15 years. Both areas are rich in biodiversity. Gornje Podunavlje SNR is home of 51 species of mammals, 248 bird species, 9 species of reptiles, 21 species of amphibians and 55 fish species. Kovilj-Petrovaradin marsh SNR is famous, mainly for the 172 bird and 42 fish species. Both areas are of international importance, being Ramsar sites, IPA and IBA sites. Gornje Podunavlje SNR is also part of the Five- country Biosphere Reserve Mura-Drava-Danube.

A proactive approach in managing both areas started some 15 years ago.

One of the biggest projects in Gornje Podunavlje focusing on wetlands has been implemented in cooperation with WWF and the Coca-Cola Company. The focus of the project was on revitalization of water and wetland habitats in Šarkanj pond (2013-2015), Široki rit (2008-2011) and Semenjača pond (2009-2012). With the support of the Provincial Secretariat for Urbanism and Environmental Protection and the Institute for Nature Conservation of Vojvodina Province, Vojvodinašume implemented projects on the revitalization of Labudnjača pond (2008-2012) and lately on Bestrement (2010-2014). This project also included activities on establishing two feeding places for birds of prey. These activities supported the efforts on the conservation of the population of white-tailed eagle in Gornje Podunavlje, which is the largest population in Serbia.

Currently Vojvodinašume is implementing three projects in Gornje Podunavlje. Two of them are financed by the EU LIFE Biodiversity Program. The focus of the LIFE Wild Islands project is the preservation of the Danube islands in the region of city of Apatin, while the LIFE RESTORE for MDD project is focusing on improving the hydrological water regime of Monoštor part of Gornje Podunavlje SNR.

A smaller grant was obtained from an anonymous donator for the preservation and habitat improvement of the Great Crested Newt. A project entitled “Danube-wide conservation of the Great Crested Newt (*Triturus dobrogicus*)” will be implemented in the next two years on one locality in Gornje Podunavlje with the aim to restore one pond and create habitats for these species.

Regarding activities in Kovilj-Petrovaradin marsh Special Nature Reserve, the focus in the last decade was on the revitalization of water and wetland habitats and creation of new water surfaces. The removal of illegal objects and trash started in the localities of Šlajz and Tikvara; future efforts will focus on the revitalization of the natural Danube side channels and wetlands.

Vojvodinašume will also stay dedicated in the future to the proactive approach of managing floodplain protected areas.

Natura Mura – River and Floodplain Restoration



Aleksander Koren, IRSNC 

Aleksander Koren is a biologist and nature conservation counselor at the Institute of Republic of Slovenia for Nature Conservation. For 15 years he has been working in the field of nature conservation within the Institute of Republic of Slovenia for Nature Conservation, where most of his work was devoted to conservation and restoration of the Mura River in Slovenia.



The Mura River in Slovenia has a great natural and cultural value; it is the habitat of numerous endangered species and is part of the Natura 2000 areas. It has been designated as the Mura River Biosphere Reserve and became part of the UNESCO Five-country Biosphere Reserve Mura-Drava-Danube. However, the negative effects of past river management practices threaten the riverine ecosystem by causing the loss of important ecosystem services such as flood protection, biodiversity, drinking water supply etc. Riverine habitats such as gravel bars, side arms, oxbows and floodplain forests are disappearing. The Natura Mura project was a comprehensive restoration project involving activities in the field of water management, forestry, and agriculture and nature interpretation. The main objective was to improve the ecological conditions of three habitat types and 12 Natura 2000 species along the Mura River in Slovenia. In the frame of the project the river dynamics were restored at a 3.5 km long stretch of the Mura River and six side arms were reconnected to the river. Two dried-out and overgrown oxbow lakes were restored and 20 new smaller ponds were additionally created. Moreover, a complex of wet meadows was restored at the area of 10 ha and the floodplain forest was restored on the area of 32 ha with converting plantations of non-native species. With an active approach and cross-sectoral planning of the implementation of restoration measures, the Mura River’s hydro-morphology was restored, which enabled the natural processes of river dynamics that were interrupted in the past. The implementation of the project represented an important step in achieving the goals of sustainable development of the UNESCO Five-country Biosphere Reserve Mura-Drava-Danube, as well as future restoration projects.

River Restoration projects in Sichelendorf and Gosdorf on the Mura River (Interreg)



Tanja Schriebl, Province of Styria 

Tanja Schriebl studied civil engineering and water management at the University of Natural resources and Life Sciences in Vienna. She works in the Office of the Styrian Provincial Government, Department for Water Management where her tasks include international water management, discharge analyses and hazard zone planning, as well as being a party to all water law proceedings. She is a member of the Permanent Austrian-Slovenian Commission for the Mura River since 2020 and a member of the Steering Committee of the Five-country Biosphere Reserve Mura-Drava-Danube since it was founded four years ago.

She was also a project manager for the province of Styria as a project partner in the two EU projects goMURra and lifeline MDD.



Until its regulation the Mura River had several main and side branches. The regulation led to a separation of the side branches, resulting in their siltation. The erosion of the river bottom at the border Mura of around 3-5 cm per year is a major problem as it has wide-ranging consequences.



Causes of this deepening are the Hohenburg regulation (1874-1894) and a lack of bedload input from hydropower stations and transverse flood protection structures.

Due to the river deepening 45,000 m³ of bed load is missing per year. Consequences are the loss of habitats caused by the lack of a gravel layer, lowering of the groundwater level and resulting changes to the alluvial forest and an increased flood risk due to reduced retention. In the hardwood forest an oak dieback, a lack of regeneration and danger for the middle spotted woodpecker (*Dendrocoptes medius*) population can be determined.

The Mura Commission deals with all water management issues, measures and works in the border section of the Mura and all tributaries, EU projects, surveys of the river bed, all significant impacts caused by water discharges or pollution, aspects of defense against natural hazards, aspects of the utilization of hydropower, melioration and water supply, aspects of crossing and bridges and the “Murforum”.

A large number of EU projects have been successfully implemented between Austria and Slovenia.

Finalized projects include: Interreg IIa Planning the Lower Mur Valley habitat, Basic water management concept 2000, Interreg IIIa PHARE CBC Measures Lower Murtal, DRA-MUR-CI Interreg SLO-A, SI-MUR-AT Safeguarding and protecting groundwater quality, CROSSRISK Improvement of the flood forecast and consideration of a snow module, goMURra border Mura 2030 Management Plan, Bilateral Flood Disaster Protection plan and Lifeline MDD Improving connectivity and biodiversity in the Mura-Drava-Danube basin area. These projects built the basis for the currently ongoing LIFE RESTORE for MDD ‘Preserving and restoring floodplain forest habitats along the Mura-Drava-Danube’.

The river widening in Gosdorf in the frame of the Interreg IIIa project won the IRF RiverPrize in 2014. It is the most important and largest measure to date on the border-Mura with the following construction measures: acquisition of land, removal of bank stabilization, widening of the Mura riverbed, a new side arm (1 km long) and an extension of the Saßbach.

Restoration goals have been sediment management, securing the water supply, restoring/improving lateral connectivity, securing land in the river corridor and awareness raising.

Results of the widening in Gosdorf include 150,000 m³ bed load for the river, 300,000 m³ bank gravel for the river to take by itself, increased sediment supply for a certain period of time, an extended Saßbach and a new home for endangered animal species. Unfortunately, the measures led to too little side erosion as the highest flow velocities are in the center of the river, a lack of sediment input upstream and neophytes.

The public has been informed and involved in the frame of numerous events (hikes in the alluvial forest, children's adventure days, Mura talks), an exhibition on ‘Life on the Mura’, a Mura cycle path and an observation tower in Gosdorf.

Natura Mura – River and Floodplain Restoration



Lisa Wolf, WWF-AT 

Lisa Wolf is the project manager of the LIFE RESTORE for MDD Project at WWF-AT. She studied Environmental Engineering and Bioresource Management and Geographical System Sciences in Vienna, Klagenfurt and Sarajevo. Her fields of expertise are nature conservation, transboundary cooperation and peace and conflict studies. She is a University Lecturer at the TU Vienna and at the University of Applied Sciences Carinthia.

Lisa Wolf is passionate about nature conservation and worked on transboundary projects all her professional life.



The ‘LIFE RESTORE for MDD’ project is a joint initiative of Austria, Slovenia, Croatia, Hungary and Serbia to preserve and restore the largest contiguous riparian forests in the UNESCO Five-country Biosphere Reserve Mura-Drava-Danube, also known as the ‘Amazon of Europe’.



The project, which is co-funded by the European Union’s LIFE programme with 67%, started on 1 October 2023 and will run for five years. With a total budget of €20,024,000 the project is being implemented by 17 partners from all five countries.

Restoration measures are planned at 29 locations along the three rivers, covering an area of 2,100 km². In 17 Natura 2000 areas, the project partners are reconnecting river branches, widening riverbeds and converting poplar plantations into more natural floodplain forests. The restoration measures are supported by comprehensive public relations work, environmental education and continuous monitoring.

The presentation provided an overview of what has happened so far and what lies ahead of the project consortium. Listeners learned about the ambitious goals and the implementations of one of Europe’s largest LIFE Nature and Biodiversity projects, its challenges, as well as its successes.



PANEL DISCUSSION

Lessons learned from river restoration in the TBR MDD;
how to support each other and cooperate in the future



Panel discussion in Session 1

Speakers from presentations in the session and keynote II

During the discussion it was pointed out that river restoration is a question of space and resources. It was recommended not only to talk about widening the river bed, but also to consider the aspect of increasing the length of the river.

More ambitious plans are needed, but this is a question of acceptance (by communities, politicians, etc.). It was underlined that it is difficult to get land for widening a river and that it is necessary to change existing laws. We also need to pay attention to spatial planning and intervene in spatial programs.

It was also stressed that besides the continuation of projects, we need a common vision for the restoration of the TBR MDD. We need more trust in the river (self-restoration), removing structures from the river and letting the river shape the landscape itself.

On the aspect of side branch reconnection, it was noted that most of these are unsuccessful in the long term. The lesson to be learnt from projects that have already been carried out is that restorations need to be carried out on a larger scale, as small side branch restorations do not usually work in the long term. They need to be maintained and gravel removed after each flood.

Such up-scaling to large-scale river restoration requires political support and work at the policy level. In the framework of the five-country BR, politicians are automatically reached as they are part of the TBR MDD Steering Committee. In addition, the TBR MDD is on the EU agenda through projects such as LIFE RESTORE for MDD.

The involvement of the private sector is also needed. As an example, it was mentioned that in the DRAVA LIFE project, cooperation between a municipality and a farmer made it possible to protect a steep bank for sand martins. The farmer pays less rent for the loss of arable land and thus allows the erosion processes to continue. It was also mentioned that a mineral water company provides funding for freshwater initiatives. A change in people's attitudes was noted.

In order to avoid that the importance of restoration and floodplain forests only becomes visible to politicians in critical situations, it is crucial to improve the visibility of the importance of floodplain forests and to initiate small projects that will have a visible impact in the next 4-5 years.

Hydropeaking was mentioned as one of the most pressing ecological problems on the Drava River. Due to these circumstances, measures can only have a limited effect. Without the willingness of the hydropower plant operators to cooperate, it is difficult to achieve much. Joint strategies involving the transboundary, political and EU levels will be necessary to ensure that hydropower dam operators face up to their responsibilities and that the management of dam operations is improved in the long term.

SESSION 2: KICK-OFF SEDIMENT DIALOGUE IN TBR MDD

KEYNOTE Sediment management – challenges and opportunities on Mura, Drava and Danube	Helmut Habersack , University of Natural Resources and Life Sciences
Practical examples: Management plan Grenzmur (Go Mura) and River Restoration Toolbox (LifelineMDD)	Stephan Senfter , Revital
Kick-off and introduction to the Sediment Dialogue (LIFE RESTORE for MDD)	Tamás Gruber , WWF-HU
PANEL DISCUSSION How to improve sediment management in the TBR MDD	Speakers of presentations in the session; Igor Tošić , Croatian Waters



KEYNOTE

Sediment management – challenges and opportunities on Mura, Drava and Danube



Helmut Habersack, University of Natural Resources and Life Sciences 

Helmut Habersack holds an UNESCO Chair on “Integrated River Research and Management”, coordinates the UNESCO IHP “World’s Large Rivers Initiative”, and is a full Professor of Hydraulic Engineering and Modelling at the University of Natural Resources and Life Sciences, Vienna. He has more than 30 years of experience in sediment transport, river engineering/morphology/restoration, flood risk management, hydropower, ecohydraulics and navigation.



The sediment budget of rivers is determined by multiple factors. For natural dynamic river ecosystems, a balanced sediment regime and a dynamic riverbed are key elements.



Normally, gravel and sand are constantly transported along the river. In channelized rivers, transport capacity is increased beyond the supply from upstream. Instream reservoirs for hydropower plants often significantly decrease the amount of sediment available for downstream river sections or at least change the natural seasonal cycles and processes.

The incision is further accelerated by influences that decrease sediment supply from upstream.

The missing sediment is the result of a disturbed sediment connectivity, caused by e.g. check dams or dredging. Lateral bedload mobilisation is often retained by bank protection. The total suspended sediment input to the Danube delta and the Black Sea decreased by more than 60% over the past century.

The development of the Mura, Drava and Danube in recent decades shows a disbalance between erosion, transport, sedimentation and remobilisation. There are many hydropower plants with dams that hold back sediments in the TBR MDD catchment area. However, a sediment balance is needed to sustain river functions which provide high quality habitats and ecosystem services.

Urgent measures need to be taken to restore sediment balance, stop riverbed erosion and improve river dynamics within the TBR MDD. As there is a hierarchy of sediment supply (from basin to reach to local scale), the deficits regarding bedload continuity in the catchment cannot be improved with measures at selected river sections only. This requires long-term and catchment-wide bedload management concepts.

Riverbed stability in free-flowing river sections can be achieved in a number of ways, including a change of the sediment regime, increase of bed resistance, reduction of energy slope and the minimisation of bed shear stress.

The increase of width and curvature and sediment supply provide morphodynamics and habitats; bedload supply is needed for natural morphology and morphodynamics. Wider and/or more curved channels need less sediment supply for a balanced budget.

Actions to be taken are not only needed to restore but also just to preserve the rivers in their present state. A way needs to be found for the rivers to make them resilient against climate change and other challenges. The question is if we could care about sediment imbalance. If sediments in free-flowing sections are missing, we need to take care as this has far-reaching consequences e.g. the groundwater level is going down. It is crucial to explain the importance of sediments to decision makers in a simple way.

It was recommended to exchange with the projects DANUBE4all, InnoSed, DanubeSediment and DanubeSediment_Q2 in future activities.

Practical examples: Management plan Grenzmur (Go Mura) and River Restoration Toolbox (LifelineMDD)

Stephan Senfter, Revital 



Stephan Senfter is a civil engineer and works in the field of River Engineering and Water Management, with a focus on River Restoration at REVITAL Integrative Naturraumplanung GmbH. He has been involved in river restoration projects for over 15 years, focusing on the development, planning and the support of the execution of revitalisation measures.

Through the involvement in various projects in the MDD area for more than 10 years, as well as conducting of trainings and courses on river revitalization, he is familiar with the region and local partners and could gain insights into the specific challenges of the affected river areas.

He has supported the DRAVA LIFE project together with Klaus Michor with his river restoration experience throughout its development. The engaging and educational professional exchange, along with the friendly and warm community across all disciplines, makes this work something truly special for him.



Sediment management is a crucial issue for a sustainable development of rivers in future for both flood protection and ecology. Within the lifeline MDD project a Toolbox for Restoration measures was developed together with project partners, with special consideration of sediment balance issues. The "Initial Channels" module was shown as an example. Within the goMURra project a medium scale plan for a stretch with the core problem of disbalanced sediment conditions was developed.

An important point in this context was the designation of a corridor for river-related measures. In conclusion, the effective management of sediment dynamics is vital for maintaining the ecological health of river systems, ensuring the sustainability of water resources, and mitigating flood risks, making it an indispensable component of river basin management.



Kick-off and introduction to the Sediment Dialogue (LIFE RESTORE for MDD)



Tamás Gruber, WWF-HU 

Tamás Gruber is a geographer and freshwater programme manager at WWF-Hungary. He is interested in river and wetland restoration and the combination of field measures and policy components. He is supporting and developing cross-border and cross-sectoral cooperation.



The MDD River Sediment Dialogue is a task led by WWF-Hungary in the frame of the LIFE RESTORE for MDD project. A long-term sediment strategy to solve the central problem of sediment balance shall be developed and coordinated between the five riparian states of the project area. At the end of the project (building on the DRAVA VISON Declaration of 2008 in Maribor) a commitment to jointly deal with the topic shall be achieved at the political level.

At the same time, the MDD River Sediment Dialogue aims to build the basis for a permanent MDD River Sediment Dialogue Forum.

For the development of a sediment strategy, it is necessary to define sediment management objectives. Once these are agreed by the key experts and stakeholders, an action plan to reach these goals will be developed.

There have been many activities so far which directly or indirectly contribute to the sediment management of the three rivers, but a comprehensive strategy is missing.

The sediment dialogue will involve experts to finalize the draft objectives and activities to reach the objectives, and to identify the knowledge and / or funding gaps. Through the dialogue, discussions with policy / decision makers will begin in order to get their support.

The draft sediment management objectives have been preliminary formulated by WWF-Hungary and have been discussed during the session by requesting feedback from the invited experts and the panel speakers. There were no objections against the proposed draft objectives and sub-objectives, the colleagues basically supported the approach. The draft objectives are open for comments after the event, remarks will be integrated. A discussion with the leaders of the parallel ongoing projects (D4all, Innosed, Danube Sediment #2) is to be organized during the upcoming months.



PANEL DISCUSSION

How to improve sediment management in the TBR MDD



Panel discussion in Session 2

Speakers of presentations in the session; Igor Tošić, Croatian Waters

It was emphasized that a new approach to sediment management is needed and that we should focus not only on the Drava, but also on the Mura and Danube River. We need major side branches, not just small side branches that close down after a few years. We need large-scale projects - if we don't do them, the consequences will be greater. The risk of doing nothing to improve the situation (e.g. falling groundwater levels) must be made visible to decision-makers and the public.

For the Sediment Dialogue in the LIFE RESTORE for MDD project, a process-based approach was proposed, starting from the status quo of what has been achieved and what still needs to be achieved.

It was also recommended to analyze what the cost of doing nothing would be and whether there were economic interests that could be addressed, e.g. the creation of new jobs.

It was considered difficult to predict whether the objectives of the sediment dialogue could be achieved. Achieving the goals requires parties who are willing to contribute to the dialogue. It also requires people who feel responsible for certain tasks. If all stakeholders and local authorities are on board in the planning, it is likely that some measures can be achieved. This includes hydropower dam operators, who need to be involved alongside water managers. The management of dam operations needs to be discussed and resolved with the dam operators, but also at the political level. The Sediment Dialogue was also seen as an opportunity to raise public and political awareness of the issue. The public still lacks information. The opportunity should be taken to gather as much useful data as possible for future planning.

The effects of hydropower dams on the Drava will not be solved by the last dam, where all the fine sediments are collected. The problem are all the dams upstream, so sediment management needs a holistic approach. It is not enough to allow bank erosion and bed widening, because in channelized rivers the bed incision also prevents lateral erosion. It has been said that "a river can only do its job if it is given the chance".

Film and book presentation



In the evening, the film **"DRAVA LIFE - New Life for Drava"** by the filmmakers Goran Šafarek and Diana Bartolić and the book **"DRAVA - Yesterday, Today, Tomorrow"** by the author Goran Šafarek and the contributors Zdenko Kereša, Igor Tošić and Arno Mohl were presented. Participants were able to discuss with the filmmaker and the authors, and received the books and the film on USB sticks.



1. Film presentation "DRAVA LIFE - New Life for Drava" / 2. The book "DRAVA - Yesterday, today, tomorrow"
3. Contributing author Zdenko Kereša / 4. Filmmaker and author Goran Šafarek



SESSION 3: AMBASSADORS OF DYNAMIC RIVERS – Re-introduction of riverine plants, habitat management of riverine birds and fish ecological monitoring

Successes and challenges in reintroducing riverine plants in Europe	Gregory Egger, Aueninstitut – KIT/ Naturraumplanung Egger
Re-introduction of Dwarf cattail (<i>T. minima</i>) and German tamarisk (<i>M. germanica</i>) on Drava within the DRAVA LIFE project	Dragica Purger, University of Pécs
Monitoring of gravel and steep bank breeders within the TBR MDD and population trends of river birds	Ivan Darko Grlica & Ivan Grlica, PD Drava
Challenges for Little tern and Common tern on Drava and other rivers	Veronika Lončar, Faculty of Science, University of Zagreb
Requirements and possibilities of fish ecological monitoring as an instrument for evaluating the success of river restoration measures	Gerald Zauner, ezb
PANEL DISCUSSION Lessons learned and success factors for the survival of riverine plants, birds and fish in the TBR MDD	Speakers of presentations in the session and Tibor Mikuska, CSBNP

Successes and challenges in reintroducing riverine plants in Europe

Gregory Egger, Aueninstitut – KIT/ Naturraumplanung Egger 



Gregory Egger is a researcher and CEO at Naturraumplanung Egger e.U. He has been working in the research field of riparian ecosystems since 1988. His focus is on analyzing interactions between floodplain vegetation and hydrogeomorphology. While he initially worked primarily in alpine river systems, he later expanded his investigations to global scales.

In addition to his work as a researcher, he is also engaged in consulting with his own office 'Naturraumplanung Egger e.U.' in Austria. His field of activity is expert assessments on environmental and nature conservation projects and landscape management. He supported the re-introduction activities of riverine plants within the DRAVA LIFE project with his scientific and practical expertise since 2017.



In response to significant habitat loss in the riverine landscapes of the Eastern Alps, the reintroduction of native plant species has become essential. Most native riparian plant species have experienced severe population declines, necessitating restoration efforts. This study focuses on reintroducing *Myricaria germanica* and *Typha minima*, species which serve as key indicators of river ecosystem health. Sensitive indicator species in riverine ecosystems are characterized by two critical phases. These are germination and establishment due to the high morphodynamics of the sites, and the stage at which they enter competition with the faster and higher growing pioneer woody plants. Effective reintroduction relies on large, diverse restoration areas, well-connected subpopulations, allowance for natural flood cycles, and maintaining sediment balance. Key strategies include using local source populations, consistent monitoring, and adaptive management to support natural reproduction and all life stages of these plants. This approach, integrating both pioneer and mature riparian stages, demonstrates that reintroduction is a long-term commitment requiring sustained ecological support for resilient riverine plant communities.

Reintroduction of Dwarf cattail (*T. minima*) and German tamarisk (*M. germanica*) on the Drava within the DRAVA LIFE project



Dragica Purger, University of Pécs 

Dragica Purger is a senior lecturer at the University of Pécs, Hungary. She is a dedicated botanist, working as a lecturer and researcher at the University of Pécs, but also as a field biologist in various projects. Together with her husband Jenő Purger, a zoologist, she dedicates much of her time to the Drava ecosystem. She has been doing monitoring of flora and vegetation for more than 25 years on some sections of the Drava or its side branches and collaborated in several projects with the Duna-Dráva NP in Hungary. Since 2017, Dragica Purger, together with the DRAVA LIFE team, has been carrying out and monitoring riverine plant re-introduction activities.



The dwarf cattail *Typha minima* and the German tamarisk *Myricaria germanica* are pioneer species, specialists of newly created gravel and sand bars of braided rivers and are therefore considered to be indicator species of rivers with natural hydro-morphological dynamics of sediments and riverbed changes. Before the re-introduction of the two plants on the Drava River in Croatia, in 2016 and 2017 a comprehensive study has been developed and wide consultations were conducted with local and international experts. Since the dwarf cattail is regionally extinct in Croatia, rooted plants originated from the upper section of the Drava River in Austria. They were planted on Forjanov siget and on selected sites near the Mura – Drava confluence during the re-introduction performed in 2018, 2019 and 2024.

German tamarisk has only been found on two gravel pits, Turnišće and Cirkovljani and the drainage canal of HPP Donja Dubrava. The adult plants from gravel-pits were transplanted to the selected sites on the Drava River in 2018, and re-populations were performed by using plant cuttings and seeds in 2019, and rooted cuttings from arboretum Marcan in 2023. The genetic analysis of German tamarisk sample from Donja Dubrava showed a high level of genetic diversity, which means that these plants are suitable for reintroduction.

Monitoring showed that the majority of re-introduced plants did not survive long-lasting floods or were buried by deposits or washed away by strong water-flow. It is obvious that for the successful reintroduction of these plants the hydrological conditions of the Drava River are crucial, first of all water level and water discharge, as well as the dynamics of deposits. The dynamics on the Drava River are unpredictable, with some extremely high peaks and daily fluctuations related to the dam operation management and hydropeaking. Currently there are a few survivors of Dwarf cattail on Šoderica lake, and a few German tamarisk plants on Stara Drava. The river restoration projects will help to improve the natural dynamics and hence riverine habitats for these plants. It will be extremely important that the dam operation management is improved; the daily fluctuations have to be mitigated. We will continue with the re-introduction efforts with the plant material, seedlings from the Arboretum and Botanical gardens and we can possibly start breeding of large numbers of *Typha minima* from seeds from Upper Drava section hopefully it will be successful.

Monitoring of gravel and steep bank breeders within the TBR MDD and population trends of river birds



Ivan Darko Grlica & Ivan Grlica, PD Drava 

Ivan Darko Grlica and Ivan Grlica are father and son, both are biologists.

Ivan Darko Grlica has been president of the Natural History Society “Drava” from 1996 - 2024, he is an author, co-author and project leader of numerous projects for birds, fish and habitats and bird ringer since 1982.

Ivan Grlica has been a member of the Natural History Society “Drava” since 2011.

They are both experienced in ornithology, ichthyology, botany and ecology and have been doing monitoring of birds on the Drava River for 20 years. They are long-time partners for bird monitoring of WWF-Austria.



The Natural History Society “Drava” with its members has done 20 years of bird monitoring on the Drava River from 2005-2024, while on the Mura and Danube Rivers in 2008, and from 2011 until 2024. The monitoring was done in a boat with cameras, binoculars and GPS. The colonies and breeding pairs of birds were recorded with GPS. The targeted species of this monitoring were the steep bank breeders and the gravel and sand bank breeders.

Steep bank breeders: The Kingfisher (*Alcedo atthis*) has been observed in increasing numbers on all three rivers. This is due to the fact that it doesn't need a large area for its hole to dig.

The sand martin (*Riparia riparia*) has been observed on all three rivers with a steady decline in the number of pairs as well as colonies from 2005 onwards. The numbers dropped from 12,000 recorded pairs on the Drava to less than 4,000. This is due to the intensive destruction of its natural habitat (steep banks).

The bee-eater (*Merops apiaster*) has been observed only in the Drava and Danube Rivers and the colony trend was slightly rising until 2021, when it began to fall again.

Gravel and sandbars breeders: The common sandpiper (*Actitis hypoleucos*) has been observed on all three rivers with a decline in the number of pairs except for the Mura River, but in the last years it has been in decline there as well.

The little ringed plover (*Charadrius dubius*) has been observed on all three rivers with a rise in the number of pairs.

The little tern (*Sternula albifrons*) has only been observed on the Drava River with a steady decline of pairs due to hydropeaking of the HPP dam, human disturbance of the colony and destruction of habitat.

The common tern (*Sterna hirundo*) has also only been observed on the Drava River with a steady decline of pairs due to hydropeaking of the HPP dam, human disturbance of the colony and destruction of habitat.

The main challenges and threats for the birds are the construction of river regulation structures, the extraction of sediment from the riverbed (gravel, sand), the reduction of sediment flow, the increasing proportion of fine sediment from arable land, the hydropeaking of HPP Donja Dubrava, the illegal constructions for recreational activities, the poisoning of mosquitos and the human presence on gravel and sand banks during breeding season.

The recommendation is to preserve existing steep banks and gravel/sand banks, remove current and avoid building new unnecessary river regulation structures, abandon sediment extraction, minimize impact of hydropeaking of the Donja Dubrava dam during the breeding season and to avoid human contact with gravel and sand breeding birds during the breeding season.

Challenges for Little tern and Common tern on Drava and other rivers



Veronika Lončar, Faculty of Science, University of Zagreb 

Veronika Lončar is a research assistant and PhD student at the Faculty of Science, University of Zagreb and funded by the Croatian Academy of Sciences and Arts. She is researching the genetic diversity of Common Terns in Europe in the frame of prof. Jelena Kralj's (Institute of Ornithology of the Croatian Academy of Science and Arts) project "Land or sea: ecological and genetic aspects of habitat choice in the Common Tern".

The Ornithological Institute and WWF have worked together on cleaning actions of breeding islands of Common Tern on Šoderica lake within the DRAVA LIFE project.



The Little and Common terns need both flat bare surfaces to breed and shallow water for foraging. In riverine habitats, they are threatened by the increase in water level and lack of sediment that forms gravel/sand islands, as well as by succession of vegetation, disturbance, and predation or competition. Ongoing conservation measures are mostly focused on breeding habitats: creation of breeding platforms or management of gravel islands.



Tracking studies showed that terns breeding on gravel pits mostly forage in the shallow part of the river, with colonies situated closer to the old breeding grounds and good foraging sites having shorter foraging trips and longer colony attendance. This is especially important for the little tern which forages on much lower distances than the Common tern. Intensive prospecting and low genetic divergence in the Common tern indicate the connectivity among populations and the possible repopulation of abandoned breeding sites if properly managed. Possible short-term and long-term measures to protect riverine populations of these two species are discussed.

Requirements and possibilities of fish ecological monitoring as an instrument for evaluating the success of river restoration measures



Gerald Zauner, ezb 

Gerald Zauner is a fish ecologist and CEO at the Technical Office for Applied Limnology and Fisheries Management (Eberstaller Zauner Büros Engelhartzell, Upper Austria). His fields of work are ecological planning and assessment, revitalization, applied aquatic and fish ecology, ecological construction supervision, expert opinions, protected area management, Natura 2000 and project management. In his dissertation he engaged with the revitalization of large watercourses, in particular the Danube. His company has been involved especially in the revitalization of the Danube and the Inn for a long time. In 2017, he led the DRAVA LIFE team to river restoration projects on the Austrian Danube.



In many natural sciences, the constant monitoring of natural phenomena is one of the central tasks. It serves the acquisition of data and knowledge to test hypotheses and to gain a better understanding of natural phenomena.



Monitoring in LIFE projects has to evaluate the effectiveness of the measures of the LIFE project. The primary objectives are conservation, protection and promotion of species of community interest. Requirements for meaningful results, in particular for fish ecological monitoring, includes a biological sampling that is targeted to check the effectiveness of implemented measures, a collection of relevant abiotic parameters and a linkage of biotic and abiotic data sets.

Requirements for meaningful monitoring in the context of LIFE projects include that the monitoring must be directly related to the measures (biotic/abiotic), the effects of the project must be presented for the species of community interest, monitoring must take into account the temporal dimension (longevity of measures, 'reaction time' of biota) and it must be implemented in a timely manner (possibly over several LIFE project periods). The monitoring report should contain statements on further measures and must include concrete planning-relevant statements for future projects (concrete suggestions for improvement).

Close coordination between the 'monitor' and the planner is required prior to project planning.



PANEL DISCUSSION

Lessons learned and success factors for the survival of riverine plants, birds and fish in the TBR MDD



Panel discussion in Session 3



Speakers of presentations in the session and Tibor Mikuska, CSBNP 

Tibor Mikuska is a wetland ecology scientist at the Croatian Society for Birds and Nature Protection, Osijek. His field of research is wetland ecology and wetland related birds (colonial waterbirds, white-tailed eagle). His personal connection to the TBR MDD comes from the long-term (over 40 years) study of Kopački rit wetlands at the Drava and Danube confluence. Professionally, he was involved in the ornithological studies along the Drava and Danube floodplains in Croatia and Serbia. He was supporting the TBR MDD Bird Action plan and other planning documents in the frame of the DRAVA LIFE working groups.

The benefits of EU LIFE projects were highlighted and it was pointed out that LIFE is a useful tool to enforce certain actions and also to increase support and motivation.

With regard to plant reintroductions, it was pointed out that a large number of connected and secure areas are needed for long-term introductions. The restoration of rivers and the reduction of hydropeaking play a crucial role if positive long-term results are to be achieved. Unless habitat requirements are improved, long-term establishment of river plants is unlikely. The best option would be to propagate and reintroduce local plants, as they have a higher chance of survival. Also, large quantities of plant material and several sites will be needed for successful reintroduction.

Riverine birds suffer from habitat loss, as evidenced by their drastic decline in recent decades. Gravel-breeding birds face the same challenges of habitat degradation as riverine plants. For gravel-breeders to recover, hydropeaking in particular needs to be stopped or at least reduced. For steep-bank breeders, the remaining steep banks need to be protected. Both habitats - steep and gravel banks - and therefore the birds, will only have a chance in the long term if river dynamics are increased through large-scale restoration measures and improved management of hydropower dams.

With regard to fish populations, it was discussed that the deterioration of the situation between the 1980s and 2000s is due to a number of reasons, the most important of which are the long-term effects of river regulation; hydropeaking also plays an important role. The negative trend can be counteracted by restoration projects, which create a lot of new habitats. Monitoring needs to be well planned and carried out beyond the end of the project to provide meaningful results.

It was emphasised that developed tools and documents, such as the River Birds Action Plan in the TBR MDD, need to be implemented by ministries and public enterprises to be effective.

The EU Nature Restoration Law was mentioned as an "ice-breaking approach" for flood protection.



SESSION 4: INTERNATIONAL PERSPECTIVES ON EUROPEAN RIVERS

Balkan Rivers – Saving the Blue Heart of Europe	Ulrich Eichelmann , Riverwatch
Nature-based solutions on large rivers (examples: Alpine Rhine, Sava and Lech)	Klaus Michor , Revital
Large-scale dike relocations on the River Elbe in Germany - from concept to implementation; achievements and outlook	Georg Rast , River Management Expert
River restoration and natural floodplain management by grazing on Morava River (Austria/Slovakia)	Jurrien Westerhof , WWF-AT
Integrative river restoration projects on the Danube in Austria (East of Vienna and in Wachau)	Ursula Scheiblechner , viadonau
PANEL DISCUSSION What are the key success factors for river restoration?	Speakers of presentations in the session

Balkan Rivers – Saving the Blue Heart of Europe



Ulrich Eichelmann, Riverwatch

Ulrich Eichelmann, CEO of Riverwatch, is a nature conservationist focusing on river protection and restoration. He is a life-long river lover and fighter for rivers and came in contact with Danube and Drava during his years working at the WWF-AT, where the Drava was threatened by a hydropower plant in Croatia. He knows most parts of the Danube, from Austria to the delta and was engaged in several battles for the Danube (hydropower, navigation projects...).



There are more than 80,000 km of rivers on the Balkans, a large number of these rivers is still in a (near) natural state. Protection of these pristine, free-flowing rivers is needed, before they are also lost, like rivers elsewhere in Europe.



However, rivers are threatened by hydropower. In autumn 2022 there were 1,726 hydropower plants operating, 108 were under construction and 3,281 were planned. 50% of these are located inside protected areas.

The Balkan rivers host 113 freshwater fish and mollusc species that are listed in one of the three IUCN threat categories and/or listed in one or more of the annexes of the European Habitats Directive or Bern Convention. 69 endemic fish species are found here and nowhere else on the planet, making it one of the highest concentrations of endemic fish species in Europe. Freshwater fish and molluscs are the two most threatened taxonomic groups in Europe - 28% of Europe's endangered fish and 40% of Europe's endangered molluscs are found in the Balkan rivers. If further dams are built in this area, 49 fish species will be faced with either the threat of extinction or loss of between 50 and 100% of their Balkan distribution. This equals 10% of all known European freshwater fish species. Eleven of these are endemic, so would be globally extinct.

The "Blue Heart" movement comprises different groups of people: activists for rivers, lawyers for rivers, policy for rivers, scientists for rivers, artists for rivers and communication for rivers. These groups are active in different ways.

The **Scientists for Balkan Rivers** is a group of international experts that helps to assess the biodiversity in the region. Their data is often used by the **Lawyers for Rivers** for their legal battles. So far, the Blue Heart campaign finances nine legal experts across the Balkans.

While scientists and lawyers use rational arguments, **Artists for Balkan Rivers** support the protection of the Balkan rivers on the emotional side, with concerts, exhibitions etc.

Affected people and activists who go on the barricade against hydropower projects are the cornerstone of the fight for the threatened river heritage. They are supported by the "Blue Heart" movement as much as possible.

An important cornerstone is also the communication for rivers - by using an arsenal of communication tools it is possible to reach out to ever-larger national and international audiences, creating awareness of the Blue Heart of Europe and its need for protection beyond the "bubble" of river defenders.

The Vjosa Wild River National Park is Europe's first wild river national park and consists of a network of 404 km of rivers and streams. However, this is just the beginning - there is an urgent need for more wild river national parks in future.

Nature-based solutions on large rivers (examples: Alpine Rhine, Sava and Lech)



Klaus Michor, Revital

Klaus Michor is an environmental planner, founder and managing director of REVITAL Integrativ Naturraumplanung GmbH. He has been deeply rooted in river restoration and the development, planning, and support of revitalisation projects for 35 years. Especially in the Mura-Drava-Danube region, he has closely networked for decades and knows the framework conditions and key players.

Being a Drava resident himself, he personally feels very comfortable in the TBR MDD and considers the cross-border designation of these three river stretches as a TBR to be one of the greatest highlights in his professional life.

Klaus Michor has supported the DRAVA LIFE project together with Stephan Senfter with his river restoration experience from scratch - during many field expeditions the DL project was developed together with Croatian Waters, WWF-AT and other stakeholders.



River restoration projects on large, channelized rivers usually combine the demands of flood protection, ecology and local recreation in a synergetic way. Other important aspects are the sediment and groundwater balance. Using three examples, the Alpine Rhine (a border river between Austria and Switzerland), the Lech in Augsburg (Bavaria, Germany) and the Sava in Zagreb (Croatia), innovative solutions for integrative hydraulic engineering projects are presented. With all these projects, rivers get more space by widening their beds. This creates additional retention area and improves flood safety by increasing the discharge capacity. At the same time, the ecological functionality of the watercourses also increases. In some cases, riverbed widening is used to counteract incision processes and thus improve the groundwater balance, whereby the change in groundwater levels can be a key point in the planning process.

In urban areas, people love to reinstall access to the river, allowing them to experience and appreciate their river again.

Nature-based river restoration projects can be implemented successfully if they are discussed in broad-based participatory processes with stakeholders and local people.

Large-scale dike relocations on the River Elbe in Germany - from concept to implementation; achievements and outlook

Georg Rast, River Management Expert 



Georg Rast is a civil engineer and was a consultant for hydraulic engineering and water management at WWF-Germany, Berlin. Now he is a retired consultant. He has many years of experience with nature conservation projects, water management and flood protection in river and floodplain landscapes.

His professional connection to the TBR MDD developed via WWF, but recently also by his consultancy for the project 'Preparing Fairway2 Works in the Rhine – Danube Corridor', which deals with the cross-border Danube section Croatia-Serbia. He is especially interested in the restoration activities on the Drava River.



The Biosphere Reserve 'Flusslandschaft Elbe' has a total area of 278,660 ha of which +50,000 ha are Natura 2000 sites. The historical development had big effects on the river development. Key aspects have been the system change in the Elbe region (East and West Germany reunified) in 1990, the development of first state-wide concepts on floodplain restoration (1993-1995, approx. 150,000 ha outlined), an extensive research programme on the Elbe River (1993-1999), increased political and public interest, the development of new regional development plans, the engagement of several big NGOs on different river sections and the establishment of the UNESCO Biosphere Reserve 'Flusslandschaft Elbe' in 1997.

Furthermore, there have been funding programs set up by Federal Government (on-going), apart from EU-funding programs and substantial contributions by private sponsors. First, concrete projects have been designed from mid-90's onwards. State land has been provided (at low cost) for nature conservation; land acquisition was supported by state agencies.

The extreme floods in 2002 and 2013 increased the political pressure on finding solutions. Dykes were built higher and wider, however climate change was still not yet seriously considered in the design. Around 2006 big dike relocation projects were developed and implemented by NGOs, despite it being the responsibility of state bodies. A major challenge here was getting state owned forests for the relocation of dykes without paying for it. An important step was informing key stakeholders in the area, which was vital to get trust and support from local key players. During the planning process there were a lot of demonstrations against some of the measures (e.g. removing part of the forest to make space for the dike), however when works started, complaints/public interest died down.

Due to the huge efforts a system of dike reallocations all along the Elbe River and major tributaries (new effective lateral connectivity on about 2,500 ha) could be achieved. Numerous organizations (state and non-state organizations) took responsibility for projects (always with their share of financial contribution matching external funding limits). Each dike relocation is not just a nature conservation improvement, but facilitates also significant reduction of flood levels. While dike relocations have been found to be the best way from an environmental point of view, relocation of flood defense systems for managed floodplain areas (polder) serve also the spatial aspect (flood protection limits other land use interests).

It is challenging to sustain capacities in public administration and non-state organizations to implement projects, consequently provision of strategic support for NGOs is needed in the long term.

'Low hanging fruits' have already been 'harvested' (e.g. state land, relocation with significant positive hydraulic effects, low land use conflict areas), now it is time to tackle areas with bigger conflict potentials.

New projects face strong agricultural interest and sensitive socio-economic conditions in rural regions, therefore alternative, economically viable land use options with local businesses should be tested. Ecotourism (cycling) is an interesting trigger having a real socio-economic impact.

There is a need for systematic long-term monitoring and maintaining information and involvement of riparian communities.

It should also be noted that sustainable river corridor management is not successful without restoring sediment balance and riverbed dynamics. Spatial expansion i.e. providing room for the river is one important precondition.

River restoration and natural floodplain management by grazing on the Morava River (Austria/Slovakia)

Jurrien Westerhof, WWF-AT 



Jurrien Westerhof is a civil engineer and responsible for WWF-AT's work in the Morava-Dyje-Danube region, northeast of Austria. His focus of work is floodplain conservation, nature reserve management and river restoration.



WWF-Austria has in its work a focus on the area along the river March/Morava, in the northeast of the country. Partly, this is for historical reasons: Since 1970, WWF co-owns a floodplain area of 1,120 ha close to the city of Marchegg.



Due to river regulation and climate change, the water level is falling, leading to a degradation of the floodplain ecosystem and a decrease in the number of many species depending on water or wetlands, like fish, amphibians or water birds. A solution would be to restore natural river dynamics as much as possible. Main measures would be removing the artificial stone banks, reconnecting old meanders including blocking the artificial shortcut, and even leading the river out of its current bed through an initial channel. Smaller measures include reconnecting side branches to have a positive effect, most likely this works only temporarily, as long as the river dynamics are not restored.

Another measure to encounter the loss of biodiversity is the re-introduction of extensive grazing by large herbivores. As a result of grazing, many structures that are relevant for many species, and that had disappeared from the landscape, returned. Monitoring shows that many species quite quickly profit from grazing, especially insects, and consequently also birds. In this way, we managed to turn a negative biodiversity trend into a positive development.

Integrative river restoration projects on the Danube in Austria (East of Vienna and in Wachau)



Ursula Scheiblechner, *viadonau* 

Ursula Scheiblechner is a project manager in Ecological Hydro Engineering at viadonau, Austrian Waterway Administration. She is working on LIFE Projects on the Danube East of Vienna and Wachau dealing with monitoring and monitoring programs. She is working primarily on the implementation of renaturation projects in two free-flowing stretches of the Danube, with the aim of achieving good ecological status in accordance with the EU Water Framework Directive.



Viadonau's ecological hydraulic engineering measures aim to preserve and improve the living conditions for flora and fauna on the Danube, Morava and Dyje Rivers without impairing other uses of the waterways or flood protection. The aim is to achieve good navigation status as well as good environmental status in the relevant river sections.



The main challenges in the free-flowing Danube sections “Wachau“ and “East of Vienna“ are the disturbance of sediment transport (riverbed degradation), some nautical deficits (e.g. insufficient fairway depth) and a number of ecological deficits (above all morphological deficits).

viadonau pursues an interdisciplinary approach in order to realize the renaturation potential of the free-flowing stretches of the Danube. To enable interdisciplinary planning from the start, a stakeholder board has been operating on the Danube east of Vienna since 2012. The stakeholder board offers a well-structured, permanent communication platform for all interest groups. In Wachau, stakeholder participation is organized as part of the individual LIFE projects. Most of the affected municipalities are part of these projects and help to coordinate different stakeholders, ground owners and interest groups.

On both free-flowing stretches, comprehensive restoration concepts are pursued. A step-by-step approach is taken to implement these overall concepts. A number of small projects (instead of one major one) is implemented. This makes the management more flexible regarding time, budget and legal procedures. A learning system from project to project is possible and the respective monitoring results can be taken into account.

In recent years, a number of restoration projects (e.g. Spittelauer sidearm reconnection, riverbank restoration Thurnhafen, LIFE+ Wilderness Wachau) have been implemented to improve and preserve the habitats of the Danube, Morava and Dyje based on the legal requirements of the EU Water Framework Directive and the Natura 2000 Directives (FFH and Birds Directive). These have been realized in part thanks to the support of the EU environmental funding programme LIFE.



PANEL DISCUSSION

What are the key success factors for river restoration?



Panel discussion in Session 4

Speakers of presentations in the session

Pristine and free-flowing rivers need to be protected before restoration becomes necessary. This is a key message that we should not forget. River protection is a key and river restoration a great opportunity for our many modified and heavily impacted rivers.

River restoration projects are usually synergistic and have multiple positive effects on flood protection, river species, sediment and groundwater balance and local recreation. Stakeholder involvement is therefore necessary to balance and make visible the different needs.

In restoration projects, it is particularly important to involve landowners from the outset, otherwise problems will arise later. A comprehensive stakeholder analysis and communication strategy can support the success of projects. Trust is an important element. However, funding schemes are often not adapted to cooperation/integration of different stakeholders. Intensive stakeholder participation - as experienced in the projects on the Danube, Morava and Dyje Rivers in Austria, where ecological improvements have to be reconciled with navigation and flood protection interests - seems to be a good approach also for the TBR MDD.

As has been learned from the Elbe River, large-scale restoration projects with a significant impact on flood protection will require the purchase of large areas of land. Depending on the availability and use of the land and whether it is publicly or privately owned, this will be a major challenge and a key success factor for sustainable and long-term river restoration.

Another key success factor for the management of floodplains and restored areas is the reintroduction of extensive grazing. The example of the Morava River shows promising monitoring results of grazing, which benefits biodiversity and thus counteracts the continuous loss of biodiversity.

With regard to the EU Nature Restoration Law, it was discussed that it is not yet fully tangible and comparable to the process of implementing the Water Framework Directive.

It was pointed out that we should focus on the synergies between water supply, flooding, agriculture etc. and start working together rather than against each other.



SESSION 5: VISION AND FUTURE OF RIVER RESTORATION IN THE TBR MDD

Summary – lessons learnt and key success factors	WWF-AT & Facilitator
From Vision to Implementation: River Restoration in the TBR MDD	All

Summary – lessons learnt and key success factors



The diverse presentations showed how rivers can be restored and protected at local, national and EU levels. Freshwater ecosystems are the most threatened, with a staggering 85% loss of freshwater species. Protecting and restoring rivers is therefore a key responsibility of countries.

The key elements for healthy rivers are natural flow, sediments and sufficient space. With known threats such as river engineering and hydroelectric dams with all their negative consequences such as hydropowering and lack of sediment, the question is: how do we achieve these key elements in the TBR MDD?



- On the one hand, through dialogue between the different sectors, understanding the different needs and working together to implement synergetic solutions. The DRAVA LIFE project is a good example of this. It was an icebreaker for cooperation between water management, nature conservation and NGOs in Croatia. Efforts at cross-sectoral cooperation are being taken to the five-country level in the LIFE RESTORE for MDD project within the TBR MDD. In the future, we will also need to involve the operators of hydroelectric dams in order to make river restoration a success.
- River restoration and management of dam operations with no or at least buffered hydropowering will be key to halting the decline of river birds and many other species, and to enabling the long-term return of German tamarisk and dwarf cattail to the Drava River.
- A shift from restoration of individual sites to more ambitious restoration of whole river reaches is needed to achieve meaningful and lasting impacts.
- In the medium and long term, dike reallocation in the TBR MDD will be necessary and also possible, as shown by the example of the Elbe River in Germany.
- Land purchase and availability will be a key success factor for river restoration within the dykes, but even more so if the dykes are re-allocated.
- Grazing projects, such as the one on the Morava River on the border between Austria and Slovakia, could offer new ways of managing land between dykes.
- The impressive presentation of the Blue Heart of Europe highlighted the need not only to restore but also to protect free-flowing or pristine rivers from destruction.

From Vision to Implementation: River Restoration in the TBR MDD



Answers to the following question from the participants:

How can you or your organization contribute to the implementation of the visions for the future development of the restoration of the TBR MDD?

- Support stakeholder involvement
- Contribute with scientific knowledge
- Connect people of all ages with nature
- Contribute by implementing high quality monitoring (pre- and post-construction monitoring)
- Manage and monitor the area
- Appreciate the views of others – managers of the protected areas to do the best for the nature but need to cooperate with all stakeholders
- Try to understand other points of view – the river connects us
- Take part in projects
- Share insights into other projects, e.g. with on-site visits
- Use the TBR MDD as pilot area for new technologies
- Support land purchase all along the rivers to develop measurements
- Continue to learn how these complex systems are working and to share the expertise and experience
- Ministries could be more active in the implementation, e.g. through helping to find financial sources for financial measures
- Advocate to create a network in the river basins for cooperation
- Contribute to the pre- and post-monitoring – to visit the failed restoration sites to learn from the failures
- Communicate and raise awareness
- Improve hydropower dam management and operation on the Drava River through lobbying/projects
- Support cooperation between the partners on the same level – how to learn from each other (West-East and East-West)
- Share the passion for the TBR MDD



Evening programme in the wine hills

Posters

DANUBE dragon CONSERVATION – Danube Crested Newt (*Triturus dobrogicus*) conservation

Authors: Vlatko Rožac¹, Matej Marušić², Elena Kmetova-Biro³

1 Public institution "Nature park Kopački rit"

2 DANUBEPARKS – Danube River Network of Protected Areas

3 Nationalpark Donau-Auen GmbH



The Danube WILD island Habitat Corridor as best practice for river restoration and preservation.

Authors: Matej Marušić¹ & Elena Kmetova-Biro²

1 DANUBEPARKS Association

2 Donau-Auen National Park, WILD island Project



LIFE IRIS - Integrated river planning in Austria: Advancing towards free-flowing rivers.

Authors: Martin Wenk & Helena Mühlmann

Austrian Federal Ministry of Agriculture, Forestry, Regions and Water Management



MAURICE – Management of Urban Water Resources in Central Europe Facing Climate Change. Challenges of Groundwater and Surface Water Management in Urban Areas – Pilot Area Varaždin.

Authors: Biondić, R., Plantak, L., Loborec, J., Leskovar, K., Meaški, H., Oskoruš, D., Kovač, I., Grčić, I.

University of Zagreb, Faculty of Geotechnical Engineering



Restoring the Amazon of Europe: Reconnecting riverine habitats across a First five-country UNESCO Biosphere Reserve.

Authors: Marina Grgić, Nevenka Lukić Rojšek, Goran Vreljanski, Ivana Laginja

WWF Adria



Art exhibition "For the Green" by Kristina Pongrac:

View PDF:



EXCURSION: THURSDAY, 24th OCTOBER 2024

Nature info points on Stara Drava, Varaždin	By JU ZDP VŽ
View of the future side arm restoration site C.2	By Croatian Waters
Introduction to the excursion and film/photos of the restoration sites at the Croatian Waters "Educational water centre"; Educational activities	By Croatian Waters; JU VPŽ, Green Osijek
Mura Drava confluence and educational path/activities (Legrad Municipality) Returning Drava stones to the river with your wishes, drawings or concerns	By JU KKZ
Steep bank at Libanovec (Đelekovec municipality)	By Croatian Waters; WWF-AT
Initial channel at Gabajeva Greda	By Croatian Waters



In the morning the excursion started at the **Nature Info Point in Varaždin that was introduced to participants** by Marijeta Barlek (Public Institution for Management of Protected Natural Values in Varaždin County). Six of these informative and educational rest areas have been set up within the Mura-Drava Regional Park in the Varaždin County. The goal of this activity is to engage visitors — including locals, hikers, and cyclists — by showcasing the natural significance and protection of the area along the Drava River, to educate them on the importance of preserving river habitats and the unique plant and animal species vital to the area. By providing accessible information, the rest areas help to raise awareness and foster better understanding of the importance of preserving the natural values along the Drava River.



Igor Tošić, Croatian Waters, introduced the **planned side branch restoration and riverbed widening on Stara Drava in Varaždin (location C.2)**. The restoration at this location focuses on reconnecting the old river with the main riverbed. The participants discussed the effect of the hydropower dams above, which is obviously severe (too low residual flow, lack of sediments, severe hydropowering, etc.), and possible ways how this situation can be improved in the future. It was concluded that hydropower dam operation management needs to be urgently tackled.



At the **Educational Water Center** in the municipality of Legrad, Igor Tošić (Croatian Waters) introduced the new water center and its history to the participants. Croatian Waters manages two buildings near the confluence of the Drava and Mura Rivers, both dedicated now to public, educational, and social purposes. The Educational Water Center was restored within the DRAVA LIFE project and serves as a hub for river stakeholders and visitors, educational institutions, organizations, and the local community for conducting educational and field activities, workshops, and lectures. Igor Tošić informed about the DRAVA LIFE restoration sites and their progress. A video, which was made during the construction phase, gave insight into the implemented restoration works on the locations close to Legrad and Donja Dubrava (C.3) and close to Novačka (C.5).



Nikolina Stjepanović, Green Osijek, introduced the comprehensive **Toolkit for the “Schools in Nature Programme”** along LIFE actions and Information Centers and Points. This toolkit is based on a methodology that focuses on interpreting NATURA 2000 along the Drava River, emphasizing the significance of understanding habitats, species, and the dynamics of lowland river ecosystems.



Tatjana Arnold Sabo informed about the **educational trail near The Drava Story Visitor Centre in Noskovci**. As part of the project, the existing educational trail has been expanded into the new DRAVA LIFE educational trail. This new educational trail is equipped with 25 information boards and two additional observation towers for area surveillance, species monitoring and bird watching. Winding through the forest and along a stretch of the Drava River, the trail creates an educational and inspiring connection between the Visitor Centre and the scenic beauty of the river.



Tanja Nikowitz, WWF-Austria, shared the diverse **planning documents** that were produced within the DRAVA LIFE Project with the audience (Nature Visitor Guidance Plan for the Drava, Natura 2000 – Drava Management Strategy, Action Plan for River Birds within the TBR MDD) as well as **educational materials** like the little tern leaflet and the booklets for kids about little tern and sand martin.



At the **confluence of the Mura and Drava Rivers** in the municipality of Legrad the symposium participants threw painted Drava Stones with their wishes for the future of the Drava River in a joint action back to the river.



Marta Lenac and Željka Kolar presented their **Nature Education Corner**. This area includes an educational trail along Drava with two watchtowers, information boards, rest areas with benches, and recycling bins. School classes and locals use the information hub.



At the **steep bank at Libanovec** in the municipality Đelekovec, Tanja Nikowitz, explained the efforts in protecting the valuable steep bank (with often more than 1,000 breeding pairs of sand martins) through cooperation with the municipality and the farmer. Together, they agreed to safeguard the area – by allowing natural erosion of the farmland, while the farmer’s rental fee was reduced as compensation. The proud municipality of Đelekovec was awarded the honorary title of “Sand Martin Village”. Participants could visit the info board and view the steep bank from a viewpoint.



The last excursion stop was at the newly created **initial channel close to the settlement Gabajeva Greda (location C.5.2)**. Igor Tošić explained the so far biggest restoration within the DRAVA LIFE project which aims to enhance flood protection and river dynamics. A 1,196-meter-long initial channel was created. This represents a best practice example of integrated river management, achieved through cooperation between water management and nature protection sectors. At this location, the Drava faces a bottleneck, with flood protection dikes situated much closer – only 800 metres away – compared to up to 1,500 metres elsewhere. The initial channel was therefore constructed to reduce water pressure on the left embankment. Rather than reinforcing the embankment, additional space has been provided for river flow, which not only improves flood protection but also enhances river dynamics and encourages the formation of new sandy and gravel islands. The discussion with experts on this site and the long-term effects of this restoration was discussed. Further discussions with maps, hydrological parameters and planning documents would be necessary for a joint estimation of the situation.



Acknowledgments

The DRAVA LIFE Symposium was a success thanks to the support and contribution of many people and organisations.

We are grateful to the City Museum of Varaždin and especially to the staff of the Herzer Palace for hosting us in their beautiful meeting room and museum.

We thank Jana Baumgartner (E.C.O.) for the excellent moderation and her extraordinary knowledge of the subject and language skills.

We thank Iva Naglić Dolić for the excellent organisation of the related press conference and photo exhibition, as well as the presentation of the book and film.

We would like to thank Aleksandra Uhernik Đurdek and the ProConventa event management team for all the support before and during the event, for the excellent technical support and for the great photos by Alen Medić.

Special thanks to Nikola Ščurić, Drava Ranger from the Public Institution for Management of Protected Natural Values in Varaždin County, for bringing more than 100 stones on which to paint our wishes, and to all DRAVA LIFE partners for bringing their materials and for their support.

Sincere thanks to the WWF-AT team for their incredible support: for writing the minutes (Hajnalka Rezner), for giving feedback on the agenda and invited speakers (Arno Mohl & Lisa Wolf), for supporting the photo exhibition and logistics on site (Jasmin Maier) and for writing the report (Kerstin Böck).

Last but not least, we would like to thank all speakers, poster and photo presenters for their time and effort, and all participants for their contributions to fruitful discussions.

Thank you very much!



Authors

Kerstin Böck & Tanja Nikowitz

Editing & proofreading

Jasmin Maier, Arno Mohl,
Hajnalka Rezner & Lisa Wolf

Photo selection

Iva Naglić Dolić

Layout & design

LIFT Communication & Design
(Jelica Matijevic Leitao & Carlos Leitao)

Photo credits

Alen Medić