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Summary

This document is one output of the Interreg Project coop MDD (DTP1-1-259-2.3) and summarises the guidelines for a dynamic river corridor. One goal of coop MDD is to harmonize the management within the area of the future 5 country Transboundary Biosphere Reserve Mura-Drava-Danube (TBR MDD).

The guidelines, on which all partners of the Interreg project coop MDD agreed, show which objectives need to be reached to protect and restore the dynamic river corridor for the rivers Mura, Drava and Danube. They should apply to the future 5 country *Transboundary Biosphere Reserve Mura-Drava-Danube* (TBR MDD), spanning the countries of Austria, Slovenia, Hungary, Croatia and Serbia. The scope of these guidelines is based on the zonation and the principles of the UNESCO *Man and Biosphere* Program. Additional to the three zonation schemes the low- and non-intervention area, also an area with minimal disturbance was added.

Within the Interreg project coop MDD three workshops on Guidelines for a Dynamic River Corridor were held. These workshops were used to get input on Obstacles, Visions and Objectives (Guidelines) from all partners, out of 5 countries, about the following 9 topics:

- Cross-border and cross-sectorial cooperation
- Species and habitat protection
- River management and engineering
- Fish ecology and fishing
- Forest management and forestry
- Meadow management and agriculture
- Game management and hunting
- Visitor management, Education and Tourism
- Spatial planning and regional development

Section I

Introduction

1 Motivation for the Guidelines for a dynamic river corridor

The Guidelines for a dynamic river corridor development were formulated with the goal **to harmonize the management within the area of the future 5 country Transboundary Biosphere Reserve Mura-Drava-Danube** (TBR MDD), stretching over five countries (Austria, Slovenia, Hungary, Croatia, Serbia).

Currently, the management of the various Protected Areas (PA) within the TBR MDD differs, as they represent different protection categories, management systems and settings as well as legal base and use of resources. A commitment was created in order to start working on a joint vision, joint goals and joint principles which were developed by all PAs within the future 5 country TBR MDD. The Goal of this engagement was and is to work towards one pentalateral transboundary Biosphere Reserve in order to preserve a united corridor of three rivers.

The ultimate goal of the future 5 country TBR MDD is to **preserve and restore a dynamic river system**,

- where the rivers can change the river bed freely between the limits;
- where the hydro-morphological dynamics are preserved, restored or improved, with adequate compensation of private land;
- where the natural resources are used sustainably, adapted to the river;
- where the whole region, including local people and stakeholders, is included in all processes;
- where the biodiversity and geodiversity is preserved and restored.

In order to monitor the success of the implementation of the Guidelines, the PAs agree to: jointly discuss the implementation status on a regular basis, to continuously exchange experience on challenges and successes, along with mutual support in implementing the Guidelines for a dynamic river corridor.

The Guidelines for a dynamic river corridor also help to achieve many goals which are defined by the United Nations in the “2030 Agenda for Sustainable Development” (United Nation, 2015). A healthy natural environment (and the ecosystem services it provides) plays a key role to achieve at least 11 out of 17 SDG’s (Sustainable Development Goals), so even though the main focus is on nature protection, the aims described in this document can bring a benefit to the broader well-being of society within and around the Biosphere Reserve.

2 Area of investigation

The area of investigation and the project area are defined by the future 5-country *Transboundary Biosphere Reserve Mura-Drava-Danube* (TBR MDD), which will stretch along the rivers Mura, Drava and Danube spanning the countries of Austria, Slovenia, Hungary, Croatia and Serbia. At the moment a TBR exists on bilateral level between Hungary and Croatia on national level for the Mura River in Slovenia and Bačko Podunavlje in Serbia, the Austrian nomination will be submitted in autumn 2018.

The idea is to bring together these Biosphere Reserves that are seamlessly bordering each other under the roof of one Transboundary Biosphere Reserve.

The map below shows the Protected Area network on transboundary level which is the basis for the designation of the TBR MDD.

To facilitate the reading of the document, the future 5-country Biosphere Reserve Mura-Drava-Danube will be referred to as TBR MDD, planned TBR MDD or future 5 country TBR MDD in subsequent chapters.

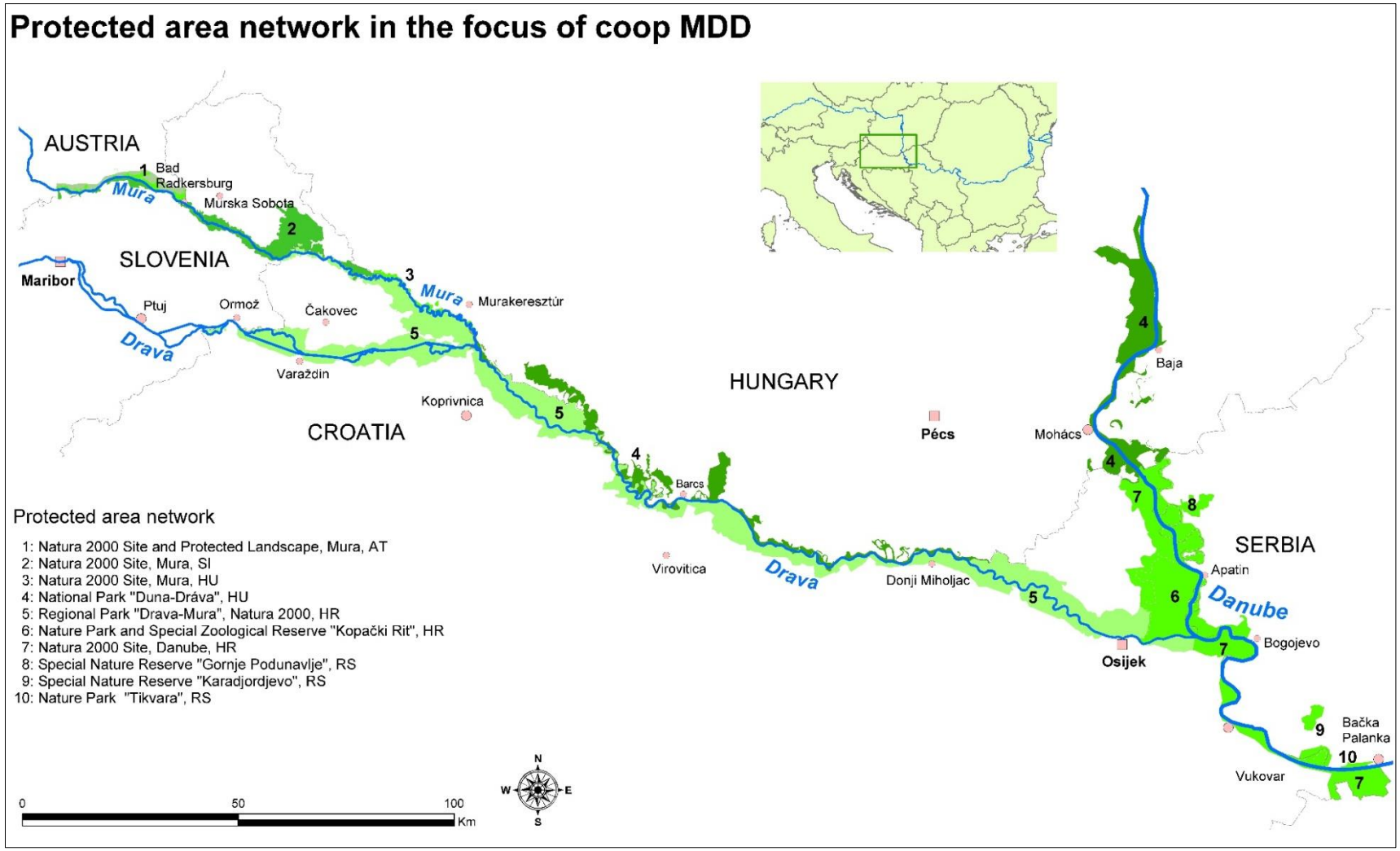

Figure 2-1: Overview of existing protected areas in the region of the future TBR MDD.

3 Development process

The coop MDD project is co-financed from the Danube Transnational Programme (Interreg) and brought together the managers and responsible institutions of all 12 currently existing PA within the TBR MDD and given the chance for intensive discussions on the future joint management.

The following process was applied:

- **Questionnaire on current management**
  A questionnaire on current management practices was sent out to all partners as a knowledge base for the development of the guidelines and as a resource of good practice examples. Nine answers were received.
- **1st Workshop (March 2nd, 2017)**
  Within a full-day workshop, the basic inputs for the guidelines were collected within the group of PA managers and responsible institutions. Current obstacles to a dynamic river corridor, as well as suggested guidelines and actions for overcoming them were discussed.
- **drafting of Guidelines (April-May 2017)**
  The first draft was compiled by Revital Integrative Environmental Planning GmbH (subcontractor) based on the inputs from the 1st workshop, and taking into consideration further issues mentioned in the "Common Principles TBR MDD", a (not yet finalized or agreed) working document of the TBR Coordination Board from 2013.
  This draft was sent to all PA managers who sent back their feedback. Based on this feedback the decision was taken to define objectives instead of guidelines and to change the whole structure of the document and to combine the objectives and the actions in one “Transboundary management programme”.
- **2nd Workshop (Mai / June 2017)**
  During the field trip to the BR Mittelelbe, that lasted for one week, two half-day workshops were held, where the objectives were adjusted. Through an intense discussion, suitable compromises or ways forward were defined for the topics, where diverging opinions existed in the group.
- **2nd and 3rd draft of the Guidelines (June – November 2017)**
  Based on the input from the 2nd Workshop and discussions with experts, the document was adapted, new chapters, objectives and sub-objectives were added and sent out to the partners again to give their feedback.
  The gained feedback was again included into the document. If the feedback was unclear or in contradiction with the feedback from other partners, the partners were called and these issues were clarified.
  The result was the 3rd draft of the Guidelines, which was sent out to all partners shortly before the 3rd workshop.
- **3rd Workshop (November 2017)**
  The 3rd workshop took place in Velika Polana. The 3rd draft of the TCP was presented to the partners, and they agreed on the Obstacles, Vision and Objectives of the chapters River Management and engineering, Fish ecology and fishing, Forest management and forestry,

Meadow management and agriculture, Game management and hunting, Visitor management and education, Spatial planning and regional development. Economic objectives and the Cross- border and cross-sectorial cooperation as well as the Species and habitat protection where elaborated further.
After the workshop the decision was made to split the Guidelines and the actions into two separate documents again.

- **Final version of Guidelines (November - December 2017)**
  Based on the results and decisions of the 2nd workshop, the final version of the Guidelines was drafted and agreed with all partners by email.
- **Written feedback round and workshop on 1st October 2018**
  In autumn 2018, all partners were asked again to review the Guidelines and consider if any changes would be necessary, based on the newly gained experiences with the stakeholder processes for the Local Action Plans and based on the discussions for the Transboundary Action Plan. Those suggested changes were voted for/against in an online questionnaire and finally agreed upon at a joint partner workshop on October 1st 2018.

Figure 3-1: Project Partners and workshop participants from coop MDD at the first workshop in Noskovci (Croatia), February 28th -March 2nd 2017.

Figure 3-2: Project Partners and workshop participants from coop MDD at the second workshop in Havelberg (Germany), May 30th -May 31st 2017.

4 Zonation

The zonation of the designated and planned BR in the five countries currently follows different principles, regarding what type of land (e.g. active /former floodplain, agricultural land, etc.) is included in which zone. This difference is especially important for the core area and buffer zone, which have a strong focus on nature protection. The UNESCO rules for zonation were interpreted in the designation process much milder. In Slovenia and Croatia for example the core area is not composed as an area of strict protection; forests or agricultural land in the core area can be partially used sustainably. The Buffer zone of the planned TBR MDD actually includes whole villages or solitary farms and houses. In Austria at the reverse, because of the fact that according to the Austrian rules for Biosphere Reserves the core area needs to be taken completely out of use, most probably only a strip of 1 m aside the shoreline will be declared core area.

As the zonation has only been established in the recent years, it is joint opinion of the project partnership that any prospect of changes of the zonation in the upcoming years would be unrealistic. The TCP was developed, based on the currently existing zonation, despite existing differences or issues.

4.1 MAB Zonation

The common basis for the zonation are the goals and principles outlined by the UNESCO *Man and Biosphere* Program. These goals and principles that are valid for all Biosphere Reserves around the world are quoted in this chapter. Although these goals and principles exist, the zonation is based on different national legislations that differ from state to state. This leads to big differences by defining the zones.

The Transboundary Management Programme considers the aspects of different national legislations and different interpretation of the zonation. The Objectives defined in this document follows mainly the structure defined in the *Man and biosphere* (MAB) program.

Core area:

> *"Securely protected sites for conserving biological diversity, monitoring minimally disturbed ecosystems, and undertaking non-destructive research and other low-impact uses (such as education). In addition to its conservation function, the core area contributes to a range of ecosystem services which, in terms of the development functions, can be calculated in economic terms (e.g. carbon sequestration, soil stabilization, supply of clean water and air, etc.). Employment opportunities can also complement conservation goals (e.g. environmental education, research, environmental rehabilitation and conservation measures, recreation and eco-tourism)."*
> *See list of references* (Zoning schemes)

Buffer zone:

> *"Zone, which usually surrounds or adjoins the core areas, and is used for cooperative activities compatible with sound ecological practices, including environmental education, recreation, ecotourism, and applied and basic research. In addition to the buffering function related to the core areas, buffer zones can have their own intrinsic, 'stand-alone' functions for maintaining anthropogenic, biological and cultural diversity. They can also have an important connectivity function in a larger spatial context as they connect biodiversity components within core areas with those in transition areas."*
>
> *See list of references* (Zoning schemes)

Transition area:

> *"Area with a central function in sustainable development which may contain a variety of agricultural activities, settlements and other uses and in which local communities, management agencies, scientists, non-governmental organizations, cultural groups, economic interests and other stakeholders work together to manage and sustainably develop the area's resources. "*
>
> *See list of references* (Zoning schemes)

4.2 Low- and non-intervention area:

During the zonation process of each country of the TBR MDD, the goals and principles outlined by the UNESCO *Man and Biosphere* Program were interpreted by each country in a slightly different way. To implement also the strictest interpretation of the core zone goals and principles as mentioned by the

MAB Program, *the low- and non-intervention area* as a management tool is defined for the whole TBR MDD, and appears in many chapters of the guidelines for a dynamic river corridor. The low- and non-intervention area is not a part of the zoning categories of the MAB Program. It is however recommended that the areas of the low- and non-intervention areas are spatially determined.

Low- and non-intervention area:

> "A network of securely produced sites exists to protect and monitor minimally disturbance ecosystems"

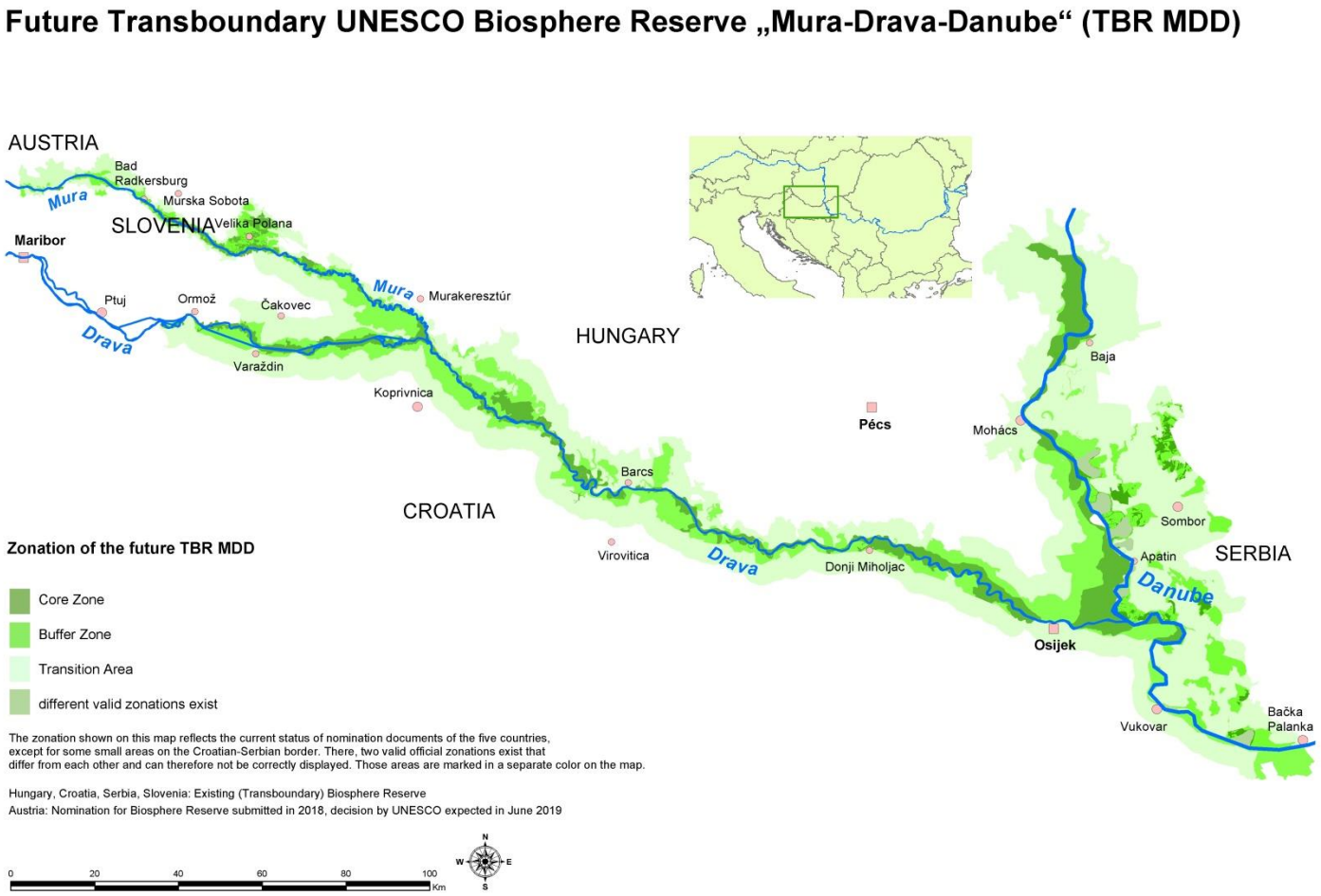

Figure 4-1: Map of the proposed and potential future zonation of the TBR MDD.

Section II

Guidelines for a dynamic river corridor

1 Cross-border and cross-sectorial cooperation

1.1 Obstacles

Bureaucracy procedures cost a lot of effort, time and human resources to set up cooperation. Concerning cross-border or cross sectoral cooperation the **bureaucracy procedures and efforts** are even higher.

Other aspects like **different languages, laws, economics, political interests and culture** can lead to **misunderstanding** and therefore be seen as a main reason why cross-border and cross-sectoral cooperation are difficult to be implemented.

Besides that the **lack of a legal background, political willing and a joint approach** are seen as obstacles on the political level.

The **lack of communication, effort to understand the core issues or the missing involvement of young people** make it even harder to realise cross-border and cross-sectoral cooperation.

Another issue is, that **people tend to stick to established groups or stakeholder sectors,** and that **too little efforts are made to truly understand other sectors thinking,** and **things are taken too serious**. This leads to **prejudices** concerning changes or cross-border and cross-sectoral cooperation.

The **uncertainties of project-based funding (because of missing basic financing)** or the **fear of doing/implementing projects** are further obstacles.

1.2 Vision

The Transboundary Cooperation Programme is implemented in a transboundary and cross-sectorial effort by all relevant stakeholders, based on trustful cooperation. Educational measures, exchange of know-how and experience, and joint research and monitoring efforts continuously support this joint effort. Joint communication measures towards the public supports the image of one connected region and ensures public outreach and support for the goals of the TBR MDD.

1.3 Objectives

Objective 1.1 Management and Coordination institutions of Protected Areas[1] within the TBR MDD effectively cooperate within a well-developed transboundary coordination framework.

Sub Objective 1.1.a The Management and Coordination Institutions of all Protected Areas within the TBR MDD work together on the basis of a formally agreed and signed cooperation agreement.

Sub Objective 1.1.b The staff of the Management and Coordination Institutions of all Protected Areas within the TBR MDD knows each other, trusts each other, and uses informal ways of coordination and information exchange in their daily work.

Sub Objective 1.1.c The Management and Coordination Institutions of all Protected Areas within the TBR MDD are supported in their coordination work on five country level by their relevant (superior) Ministries or Provincial Governmental Institutions both with goodwill and in financial terms.

Objective 1.2 All relevant stakeholders are contributing to the good management of the TBR MDD both on regional as well as on transboundary level.

Sub Objective 1.2.a The coordination bodies for the TBR MDD adequately integrate the local authorities and sectoral stakeholders from all five countries into their work, based on a formalized coordination structure.

Sub Objective 1.2.b Within TBR MDD, local authorities and sectoral stakeholders (e.g. forestry agencies, water management authorities, fishery associations, hunting associations, agricultural chambers, municipalities, regional administrative bodies, environmental NGOs) work together on five-country level to exchange experiences and good practices.

Sub Objective 1.2.c The Management and Coordination Institutions of the TBR MDD Protected Areas continuously implement activities in cooperation with the relevant stakeholders concerned.

Sub Objective 1.2.d Different funding possibilities from various funding sources support a variety of projects within the TBR MDD.

[1]Protected areas: Natura 2000, National parks, Regional parks, Nature parks, Nature reserves, Biosphere Reserves or any other areas established for the protection of natural values.

Objective 1.3 All people and organizations dealing with the TBR MDD have a good understanding of river ecosystems functioning and their values and the goals of the Transboundary Biosphere Reserve.

Sub Objective 1.3.a The local population in the TBR MDD region is aware of the benefits the TBR gives to them and therefore actively support the protection of the nature of the three-river corridor.

Sub Objective 1.3.b The Protected Area Administrations expert staff is (highly) respected by sectoral stakeholders and involved in further education measures for their members and staff.

Objective 1.4 Experts and scientists of all relevant fields work together intensively across borders and exchange research data and results as well as field experience openly.

Sub Objective 1.4.a Protected Area Management and Coordination Institutions are coordinating their monitoring and research activities across borders.

Sub Objective 1.4.b University researchers, NGO experts, and other non-management experts are strongly involved into the monitoring and research activities on transboundary level.

Sub Objective 1.4.c Research and monitoring results are actively made available across borders.

Objective 1.5 The general public perceives the TBR MDD as one joint region and Protected Area due to attractive joint branding and communication on transboundary level.

Sub Objective 1.5.a The population living in and around the TBR MDD is well aware and proud of living in the worlds' first five-country Transboundary Biosphere Reserve.

Sub Objective 1.5.b Anyone interested can find harmonized information about the TBR MDD in one joint transboundary website and in all main Protected Area communication tools, in English and in all five national languages.

Sub Objective 1.5.c All visitors of the area recognize that they are visiting a five-country Transboundary Biosphere Reserve by communication tools in the field.

2 Species and habitat protection

2.1 Obstacles

Central obstacles concerning species and habitat protection are the **lack of funds and money as well as expertise** (e.g. for implementing nature protection measures). Missing **communication between sectors** or the absence **of public and political interest and support** (in/for species and habitats protection) on national level, are an inappropriate base for transboundary coordination.

The **lack of data** (monitoring, species), **controls and inspections** and **human capacity** (economic circumstances) are further obstacles concerning species and habitat protection.

Aspects like **cancelling funds**, **wrong or old fashioned management** in combination with **high costs of measures or no economic income from nature protection measures** reinforce the situation for species and habitat protection in a negative way.

Species and habitat protection is faced with **different interests of land owners and nature protectionists** in their daily work.

Apart from those structural threats, different species are faced with different threats in the field. Some of the most common ones are the continuous loss or disruption of natural habitats, change of land use, the loss of natural dynamics, and climate change. Some species are especially threatened by specific human actions like illegal shooting or poisoning.

2.2 Vision

All typical riverine habitats, such as dynamic pioneer habitats, floodplain forests, wet meadows, heathlands, oxbow lakes, etc. exist in a typical pattern and continuously change due to natural dynamics. Typical river and floodplain species are abundant, and the area is a refuge for species of European importance. The habitats and species are well-studied thanks to close cooperation of Protected Area managers across borders and with research institutions.

2.3 Objectives

Objective 2.1 Within the TBR MDD natural dynamic processes are improved and preserved.

Sub Objective 2.1.a River and riverine habitats like flood plain forests or flood plains can develop in a natural way or a way close to nature.

Sub Objective 2.1.b A network of securely protected sites exists to protect and monitor minimally disturbed ecosystems.

Sub Objective 2.1.c Negative Impacts on natural dynamics are minimized or where necessary natural dynamics are stimulated/restored.

Objective 2.2 Natural conditions for indicator and flagship species of dynamic river and floodplain habitats are sustained or created.

Sub Objective 2.2.a The number of individuals and indicator species and flagship species are increased.

Sub Objective 2.2.b A transboundary harmonized monitoring system for indicator species of the rivers and their floodplains, based on the common monitoring methodological approaches, is functioning.

Objective 2.3 Favourable conservation status for Natura2000 species and habitats is reached and ensured on the long term.

Sub Objective 2.3.a No deterioration and improvement of species and habitats of the Habitats and Birds Directives.

Sub Objective 2.3.b Management plans are developed and implemented or objectives and measures are integrated in other sectoral plans for all Natura 2000 areas.

Sub Objective 2.3.c Management measures for common Natura2000 species and habitats are set and coordinated across borders.

Objective 2.4 An extensive use by humans of habitats of the cultural landscape is maintained and established to ensure a good conservation status.

Sub Objective 2.4.a The amount and size of extensively used areas are increased by the extensivation of intensively used land.

Sub Objective 2.4.b Species protection projects on extensively used areas are monitored, the management is adapted if needed and shows positive effects.

Objective 2.5 The corridor function of the TBR MDD river corridor and the connectivity with surrounding natural areas is well-preserved.

Sub Objective 2.5.a Mura, Drava and Danube as well as their adjacent floodplains act as a transboundary ecological corridor in aquatic, forest and meadow habitats.

Sub Objective 2.5.b The TBR MDD is well connected to other natural areas in the surrounding by near-natural tributary rivers or stepping stones of natural forests, extensive meadows, and wetlands.

3 River management and engineering

3.1 Obstacles

The river management and engineering practices of the 5 TBR MDD countries differ a lot from country to country and were developed over the last decades. The points listed below may be obstacles in one country but at the same time do not occur in other countries.

The **maintenance of regulated river corridors** is still present and prevents a natural river flow and development. For example the existing **river training structures** like **groins**, **embankments and dykes** have a big impact on the flow of the rivers and reduce their natural dynamics (e.g. hinder the shifting of meanders or the creation of gravel islands or steep banks).

The construction of different river training structures over the last decades led to **narrow floodplains** between the dykes or natural terraces, and shortened the river length by cutting off meanders and straightening the river bed. These training structures are often built and maintained to protect private land from erosion. This presents a problem not only for nature, but also for flood protection.

A major problem is the **riverbed deepening**, which as a result disconnects river and floodplain. **Gravel and sand extraction by dredging** because of navigational purposes or commercial use is one reason for the riverbed deepening. These **sediment extractions are done without appropriate regulations or assessments**, for example environmental impact assessments (EIA) or strategic impact assessments (SIA). Another issue is the former river regulation, by cutting curves the velocity of the water increases and riverbed deepens.

The energy sector, especially its hydropower plants do have the severest impacts on the river dynamics – not only in the dammed section which loses its river characteristics completely, but also far downstream. The trapping of sediments at their dams is one of the major reasons for the lack of sediment and riverbed deepening. The lack of side erosion also contributes to the lack of sediments in the river. Additionally **hydropower plants** change the hydrology by their **peak mode and dam operations** (d. Dubrava). Peak mode changes the natural discharge of a river. Low, middle and high water levels can differ so much within a day and on a daily basis, that habitats for animals (e.g. fish, insects, birds, etc.) become unusable. Flushing of dams, which is done to clean the storage space of a hydropower plant, can cause high amounts of fine sediments in the lower river sections (as hydropeaking does on a more continuous basis). This high amount of fine sediment can become dangerous for fish, especially destroying their breeding habitat. They also cover gravel- and sand banks which might affect insects or nesting birds. Hydropower plant operation modes also have impacts on the residual flow in old river branches or downstream, for example the residual flow of the Stava Drava is too small. The **intensive cleaning of melioration channels** and the **removal of trees**, which fell into the river, or the **removal of riparian vegetation**, reduce the natural functions and habitat elements of the rivers. Those are nature conservation issues, which are not considered to an adequate extent by existing **water management and flood protection concepts**.

Soil and water pollution harm the water quality and damage natural populations of fish and invertebrates. **Permanent anchoring of old barges**, which are out of use, can influence the quality of

the rivers as well. Because **wells** can lower the groundwater level they also affect the water balance of the river and its branches and oxbows, which are connected to and supplied by the groundwater body, at least partly.

All these obstacles mentioned above prevent the creation of typical habitats for a dynamic river and may create conditions in which **invasive alien species** affect negatively and displace present native species (fauna and flora).

Further problems have to be seen in the **lack of cooperation between water management and nature conservation**, in a **lack of innovation, interest and ownership,** as well as the **missing enforcement of nature conservation law**.

The status of river banks for the whole TBR MDD region has been assessed by FLUVIUS (Dr. Schwarz, 2013). River banks have been categorized in the following three main categories: Natural high dynamic banks (steep and shallow banks), mostly near natural banks (miscellaneous type of banks) and impacted banks (rip-rap, groins)

The study shows for the river Mura 12% natural, 33% mostly near natural, and 55% impacted banks. The river Drava is expelled with 9% natural, 35% mostly near natural and 56% impacted banks. The river Danube is expelled with 10% natural, 47% mostly near natural and 43% impacted banks. To decrease the high number of impacted banks, projects like the river restoration concept Drave (2014) are set up.

In the field of water management, the protected areas, water companies, water management directorates and the municipalities are relevant stakeholders.

3.2 Vision

The Mura, Drava and Danube Rivers in the area of the TBR MDD form a free-flowing river ecosystem, where fish and other fauna migrate freely up- and downstream. Smaller and bigger floods occur naturally in the large floodplains and therefore cause no damage to populated areas. The rivers form their own beds and courses within the wide active floodplain, with steep eroding slopes, gravel and sand bank or islands, and recreating river branches and oxbows –appear – all determined solely by the flow of the rivers themselves. The groundwater stored in the gravel layers below the floodplain guarantees healthy and affordable drinking water for people living in the region. It also continues to form a mosaic landscape determined by various hydrological conditions, even outside the active floodplain. For preservation of all those functions provided by the river and floodplain, water management authorities and nature protection authorities work together across sectoral or country borders to find the best possible solution for each site.

Good practice example: Mura-Menti Landscape Protected Area
The Management Plan of the Mura-Menti Landscape Protected Area defines that the river can move freely inside the flood protection dykes and natural terraces, so that no river training structures are necessary unless the river reaches the dyke. This standard is yet waiting for implementation by restoration measures, but the principle laid down in the Management Plan could set the standard for Protected Area Management Plans within the whole TBR!

Good practice example: Drava Life Project
The "DRAVA LIFE – Integrated River Management" project is introducing a new paradigm in integrated river management and aims to create a transformative shift from river regulation to river restoration in Croatia and the region. Main goal of the project is to ensure flood protection but also to improve the ecological status, and to enhance natural dynamics of river habitats of the Drava River. Partners will achieve this through introduction of innovative river restoration measures such as opening and creation of new side-arms, removal of bank revetments and groins, preservation of dynamic steep river banks, preservation of existing and creation of new floodplain areas, and reduction of human disturbance through visitor management plans and awareness raising campaigns.

3.3 Objectives

Objective 3.1 Mura, Drava and Danube within the TBR are free-flowing rivers within a well-connected active floodplain.

Sub Objective 3.1.a In consultation with all relevant stakeholders and institutions, the rivers can move freely between the dykes or within the natural terraces

Sub Objective 3.1.b The longitudinal connectivity of the rivers is restored; no new hydropower plants will interrupt the free flow.

Sub Objective 3.1.c In all five countries, a compensation programs for private land, which is affected by river restoration measures, exist.

Objective 3.2 The sediment transport of the rivers Mura-Drava-Danube takes place in a natural way within the TBR area.

Sub Objective 3.2.a The intact sediment balance ensures the continuous creation of natural habitats.

Sub Objective 3.2.b The connection between the river and the active floodplain remains, because the riverbed deepening is stopped due to sufficient sediment transportation within the rivers.

Objective 3.3 The waterbodies are maintained in a nature friendly way, the maintenance is minimized as much as possible.

Sub Objective 3.3.a In sections of the rivers without legally built buildings or other main infrastructure like bridges, the waterbody can change its bed freely.

Sub Objective 3.3.b Flood protection of existing legal buildings or major infrastructure is done in the ecologically most sensitive way.

Sub Objective 3.3.c Oxbows are neither cleaned nor spilled.

Objective 3.4 Existing hydro power plants are operating in a way that their negative impacts on the dynamic river corridor are mitigated as much as possible.

Sub Objective 3.4.a The operation of existing hydropower plants incl. the donation of the residual flow stretch is adjusted to the regulations specified in the Water Framework Directive.

Sub Objective 3.4.b By modification of the operations, the water level changes are following natural highs and lows, including small floods and excluding daily changes because of hydropeaking.

Sub Objective 3.4.c By change of operations, the sediment let through the hydropower plants is in a semi natural mix of sizes to prevent silting of river banks and floodplains.

Objective 3.5 The impacts of currently existing international navigation routes on natural values of Danube and Drava are decreased and mitigated as much as possible.

Sub Objective 3.5.a The maintenance of the Danube River navigation route is minimized as much as possible by applying non-structural measures before structural measures.

Sub Objective 3.5.b The classification of the navigation route on the Drava River is adjusted to the actual use.

Objective 3.6 The groundwater sources provided by the rivers and floodplains are abundant enough and kept clean to ensure sustainable and healthy drinking water sources.

Sub Objective 3.6.a The local population benefits from sustainable and clean drinking water in a sufficient quantity.

Sub Objective 3.6.b The ground water sources are not affected by negative chemical influences.

Sub Objective 3.6.c The hydrological exchange between river and floodplain is maintained and improved.

Objective 3.7 People and their assets living along the rivers Mura-Drava-Danube within the TBR are protected from floods.

Sub Objective 3.7.a Passive flood protection by enlarging the active floodplain is promoted and implemented within the TBR.

Sub Objective 3.7.b Flood protection measures are constructed in a nature friendly way, making use of the multiple synergies between flood protection and nature protection.

4 Fish ecology and fishing

4.1 Obstacles

Both, recreational (angling) and commercial fishing, is an important topic along the three rivers Mura, Drava and Danube. For fishing purposes, large numbers of fish are restocked. Although it is mostly forbidden to restock **non-native species**, they are still released into the river (either on purpose illegally, or by accident as part of a large number of native fish, or passively while draining the fishponds during fish harvesting). Also the restocked native fish species are often not fit for survival in a natural river, or the restocking is being carried out with inappropriate species or subspecies.

The habitats for native fish species are getting smaller and are deteriorating due to human impacts, and to natural changes that occur more intensively in a changing environment. By closing oxbows or river branches (partly with the aim to create fishponds) installing embankments, or building barriers (hydropower plants) **natural spawning areas decrease in number and quality**. In the whole TBR the **lack of spawning areas** is evident. Changes in river hydrology affect the dynamics of the sediment, which then causes silting of the spawning areas.

Illegal fishing practices like electrofishing, fishing with explosives and with different toxic substances or driftnet fishing, as well as **fishing without permission,** also have substantial negative effects of the natural fish stock.

Another issue is the building of **illegal fishing huts** on gravel banks, embankments, **floating fishing lodges or weekend resorts near the spawning areas within the floodplain.** Also, in order to reach the best fishing sites fishermen **drive motor vehicles** through the floodplain or walk on gravel / sand banks. Especially the ground breeding birds on the sand and gravel banks are disturbed by these actions and buildings.

The main stakeholders are **fishing associations, anglers, managers of protected areas, managers of fishing areas, inspectorate, fishermen, owners of fish dish restaurants and owners of tourist lodges and weekend resorts**.

4.2 Vision

Mura, Drava and Danube are thriving with a wide diversity of native fish species. Populations renew themselves naturally thanks to well-protected and restored spawning areas (e.g. shallow gravel areas at the river, tributaries, oxbows, flooded areas like meadows in the floodplain) to support different fish species. They are free to move up- and downstream at any time, as well as into the floodplain at high water levels. Both local people and tourists enjoy the abundance of fish and the nature experience coming with low-impact fishing. The close cooperation between fishermen, tourism, and nature protection ensures local income

from fishery while also protecting the natural resources it depends on. The local economy benefits from increased valuation of native fish species on the market and fishing tourism.

Good practice example: "Three Rivers=One Aim" Hungarian-Croatian IPA project

This project was implemented between 2014 and 2015 and one of the actions was renovation of angling infrastructure within the Duna-Drava National Park (DDNP). The target area was the Belső-Béda oxbow, situated south to Mohács town next to Hungarian-Croatian state border.

This water body had been used for angling for several decades, formerly managed by the local angling association. Hundreds of angling piers had been constructed without any plan or permission, most of them became abandoned, when the national park directorate got the fishing management right.

Within this project all angling piers have been demolished and removed from the protected area. At the beginning of the project more than 400 piers of different status have been counted, few of them were in use, loads were collapsed into the water or only some columns were left visible. The removed piers and litter was transported off the protected land.

Within the project only 65 new angling piers have been constructed in different sizes, a few of them incorporate shelters for overnight fishing. Furthermore four traditional wooden boats were purchased. The boats and new piers can be used by anglers, who purchased licenses from DDNP Directorate.

4.3 Objectives

Objective 4.1 The native fish populations are healthy and self-sustaining.

Sub Objective 4.1.a Sufficient spawning areas of high quality ensure sufficient natural reproduction of native fish species.

Sub Objective 4.1.b Native fish species can freely migrate along the entirety of three-river corridors and their tributaries.

Sub Objective 4.1.c Non-intervention areas are an ideal undisturbed retreat for fish.

Objective 4.2 The populations of invasive alien fish species are under control and not posing a threat to native fish species.

Sub Objective 4.2.a Fishery works together with nature protection and water management authorities to ensure a natural stock of native species.

Sub Objective 4.2.b Native fish are preferred over non-native fish by local people and fishing tourists, gastronomy and local markets.

Objective 4.3 Fishermen and Protected Area Managers work together to ensure sustainable fishery practices.

Sub Objective 4.3.a All legal obligations and restrictions are followed by all fishermen, and strongly supported by the fishery associations.

Sub Objective 4.3.b The definition of non-intervention areas, fishing zones, non-fishing zones, closed periods for fishing, quantity of fishing licences, as well as quantities that can be fished are set in a joint process of fishery associations and Protected Area Managers, and coordinated on transboundary level.

Sub Objective 4.3.c Ethical standards of fishing practices do not disturb any other species living in the dynamic river corridor in any sensitive season and place.

Objective 4.4 Fishery provides a great nature experience with as little infrastructure as possible.

Sub Objective 4.4.a All existing fishing infrastructure is legal starting from the moment of construction.

Sub Objective 4.4.b Fishing infrastructure is reduced along the river to a small number of fishing spots with minor infrastructure (table, possibly small hut) per local village, and that are shared among the inhabitants of the villages.

Objective 4.5 The Fishponds within the TBR MDD are built and operating according international nature protection standards.

Sub Objective 4.5.a The fishpond management practices actively support the aims of the TBR MDD regarding healthy soils and water.

Sub Objective 4.5.b Self-sustaining native fish populations can grow in the fishponds and can be reintroduced into the rivers.

Sub Objective 4.5.c Fishponds are breeding habitats for all kinds of birds.

Sub Objective 4.5.d A functioning market for native fish species makes breeding of native fish in fishponds profitable for the local population, as well as for its sale in markets and restaurants.

Objective 4.6 Sustainable fishing within the TBR MDD plays an important role for the diversified economy, tourism offer and leisure time of locals.

Sub Objective 4.6.a The TBR MDD and its inhabitants benefit from sustainable fishing.

Sub Objective 4.6.b The TBR MDD is well known as an ideal spot for sustainable fishing tourism on the fish ponds and for natural ecological fishing.

5 Forest management and forestry

5.1 Obstacles

The forest management practices of the 5 TBR MDD countries differ a lot from country to country and were developed over the last decades. Changing these practices will again take decades due to long development cycles of forests and plantations. The topics listed below may be an obstacle in one country but at the same time can be a common, legal, official and accepted methodology or management practice in another country.

One obstacle can be found in **large scale clear cutting, which** has a great impact on the local ecosystem and takes a long time to regain a climax community. This way of forest management often correlates with a **forestry which is based purely on commercial purposes**. **In some areas taking out of biomass** (felled trees, deadwood, and branches) in combination with the production of **wood chips** has a negative effect on certain species like the smallest soil organisms and dead wood inhabitants. Often the local water management argues clear cutting is needed to fulfil **flood protection concepts**.

For transporting the timber out of the forest, **forest roads** have to be built. Often **channels or side arms are closed permanently** by this, and disturbance is increased by easier access to the floodplain.

Additionally the **planting of non-native trees** and the increase of **invasive alien species** can dominate and replace the existing autochthon species. Sometimes **planted trees are genetically not adjusted to the local conditions** and are non-native species. Also the **decreasing level of groundwater** affects species, which are dependent on the higher ground water level. Therefore the change of the groundwater level leads to a change of the autochthon species composition. **Growing plantations in flooded areas** counteract the development of natural forests as well. All the obstacles mentioned so far can be summarized as “ecologically unsustainable forest management practices”, as they do not take ecological needs adequately into account.

Another problem is caused by a too **high population of deer in some areas**, which can cause great damages in existing forests (peel and bite damages, eutrophication and consequential vegetation succession). Especially natural rejuvenation is hindered or made nearly impossible, except with high costs for fencing these areas to avoid bite damages.

The **ownership** of forestland, the right of its use, the rights also for local people to use it, the plot size and the heritage law play central roles for future development of a forest.

The forest along the three rivers Mura, Drava and Danube is used by **various different stakeholders**: the local population, state forestry companies, water management directorate, forestry companies, and private owners.

5.2 Vision

Natural floodplain forests, which are formed and transformed by the dynamic rivers, are thriving with life, of birds of prey, hidden species like Black Stork, uncountable insects, spiders, mushrooms, moss and other species. They are abundant thanks to allowing natural forest cycles, from formation on the pioneer habitats to dying and rotting trees. Those natural and semi-natural forests build the basis for sustainable forestry, the invaluable water retention, air cleaning and recreational functions of the floodplain. Forestry companies in the region are among the most innovative companies in Europe and worldwide, joining together economic income and protection of natural forest functions, processes and habitats.

Good practice example: Forest management in Styria

The maximum size of clear cuts in Styria allowed without prior permission is 0,5 ha. Every clear cut beyond this size needs permission from the responsible forest management authority. In case this clear cut is situated in a Natura2000 area, also the nature protection authority needs to give permission.

This regulation could set the standard for forests in the buffer zone of the TBR. An additional regulation would have to be set however for cumulative effects.

Good practice example: "Eco-Cells" in Slovenia:

Recently, Slovenia introduced the possibility to protect valuable forest stands (e.g. old-growth stands, valuable habitat trees, nesting trees, valuable and rare species, including their surroundings) by contractual measures. The so-called "eco-cells" are small patches of forest, which are protected by a contract over the period of 10 years (the same time as the forest management plans), and for which the forest owner receives compensation.

The adoption of similar regulations in all countries could support the establishment of stepping stones of forest habitats within the transition zone, and thus support the corridor function of the whole TBR. The contracts however should be made lasting for a much longer time period, reflecting the long development cycles of forests (e.g. 50 or even better 100 years).

Good practice example: Virovitica-Podravina county
In the last two years, the practice has been introduced that when the owner of private forests in the area of TBR MDD wishes to cut down the forest, the authorized representatives of Croatian Forests and Public Institution for Nature Protection jointly go the field and determine the quantity and allocate the trees that are allowed to cut. In several cases it is forbidden to cut off the trees because the nests of a white-tailed eagle or black stork are nearby.

5.3 Objectives and Actions

Objective 5.1 The forests within the TBR offer a high habitat quality for all naturally occurring species.

Sub Objective 5.1.a Within the non-intervention area, the forests develop naturally by dynamic processes and thus form the backbone of a transboundary floodplain forest corridor.

Sub Objective 5.1.b Forests within the TBR offer high habitat quality for typical floodplain forest species.

Sub Objective 5.1.c Used forests within the core and buffer zone show characteristics of semi natural forests, including: natural mix of tree species, mix of age groups and high amount of dead wood.

Sub Objective 5.1.d Forestry companies and forest owners in the TBR take over a leading role in nature protection within the TBR. They are financially compensated or subsidized for their active nature protection work.

Objective 5.2 The forests in the TBR follow natural dynamics and show a natural tree species composition.

Sub Objective 5.2.a Within the non-intervention area, natural rejuvenation (without human intervention or support) of floodplain forests works again thanks to large-scale restoration projects bringing back the necessary hydrological and hydro morphological dynamics.

Sub Objective 5.2.b The coverage with invasive alien species has decreased by coordinated, nature-friendly actions.

Sub Objective 5.2.c Replanting of native species in commercial forests is easier due to a functioning market for saplings of native species and increased market demand for timber of native species.

Objective 5.3 The maintenance and use of road infrastructure respects sensitive habitats and seasons and is reduced to the minimum necessary.

Sub Objective 5.3.a Large areas of floodplain forest in the non-intervention area are undisturbed due to few access possibilities.

Sub Objective 5.3.b The maintenance and renovation of existing road infrastructure respects and adjusts according to the needs of important natural habitats.

Sub Objective 5.3.c Within the non-intervention area and core area the construction of new roads is waived.

Sub Objective 5.3.d The seasonal use of road infrastructure is adjusted to natural requirements like protection of soils or non-disturbance during breeding season..

Objective 5.4 Forestry companies and forest owners in the TBR are recognized Europe-wide for their nature-friendly forest use.

Sub Objective 5.4.a Within the non-intervention areas, no timber harvesting takes place.

Sub Objective 5.4.b Within the used parts of core areas and buffer zone, timber tendering and harvesting practices replicate natural dynamics.

Sub Objective 5.4.c Forestry companies within the TBR are aware of the market advantages of sustainably produced timber and see the benefit of using in depending labelling and certifications. The certifications are seen as minimum standard for sustainable timber production.

Sub Objective 5.4.d The state supports forestry companies the produce their products in a nature-friendly way.

Objective 5.5 Nature-friendly forestry within the TBR MDD plays an important role for the diversified and sustainable local economy.

Sub Objective 5.5.a Forestry companies within the TBR benefit financially from selling timber produced with high ecological standards.

Sub Objective 5.5.b The sustainable produced timber and wood products within the TBR MDD are well known outside the TBR MDD.

Sub Objective 5.5.c The effects of the changing climate conditions are examined and forestry practices are adjusted to the new conditions.

Sub Objective 5.5.d Small forest owners benefit from the use of firewood or timber usage for their own needs, according to the legal status, without needing to invest a lot in forest tendering.

6 Meadow management and agriculture

6.1 Obstacles

The **change from natural habitats into agricultural land** is a development that has grown constantly over the last years. The **intensive agricultural land use** (incl. intensive use of pesticides and fertilizers) or the **conversion of meadows into arable fields** counteract the development of a dynamic river system with natural biotope types or extensively used land. By enlarging arable land, natural **forest edges are destroyed**. The existing **arable land within the active floodplain** also blocks the development of a natural system along the rivers because of the need to protect it from erosion.

On the one hand the **conversion into arable land or drying out of wetland** takes place; on the other hand **farmers quit farming** and meadows are **not managed in the old traditional way** anymore**.** As a result the **meadows are overgrowing with bushes or shrubs**, and some specific habitats and species that depend on extensively used meadows might get lost.
To protect the fields from unwanted entering by animals or people the fields are **surrounded by fences**. These fences often block animal trails preventing animals from unhindered movement.
All these aspects mentioned above demonstrate the influence and responsibility of the **local farmers** on the current ecology, affecting the future dynamic river system. Most time small scale local farmers can do little against the influence of the larger **ministries, municipalities, agriculture chambers, big industrial farming companies and inspectors** pertaining to the development of agriculture in the region.
Beside the mentioned aspects of agricultural land use, the general availability of land for nature protection purposes is a further obstacle. For example the existing **property regulations** cause for difficulties in land purchase pertaining to nature protection. As **state owned land is sometimes reused for agricultural purposes**; the use of such land in terms of nature protection and conservation is not possible, also due to long-term lease contracts that cannot be easily terminated earlier. In accordance with the reuse of land, in some cases, the **non-transparent granting of concessions for the use of state owned land** in floodplains hinder the development of a dynamic river system.

6.2 Vision

Agriculture in the TBR MDD region serves as a model for nature-friendly farming on a European level. The active floodplain is mostly used for extensive mowing and grazing, adding to the natural mosaic landscape and producing speciality meat and dairy products from traditional breeds. All around the pentalateral Transboundary Biosphere Reserve, farmers are voluntarily producing organically and are finding even more ways to protect the source of their income and of local lives with their sustainable production: a healthy soil for growing vegetables and fruits, healthy groundwater as main local drinking water source, and a vital and diverse arthropods population for pollination and natural protection of their crops from vermin. Local farmers are working together for further processing, better

marketing, and raising local sales of their products. Farmers and experts are working to develop economic models and agricultural practices, which enable sustainability of nature-friendly farming practices in the TBR.

Good practice example: "Three Rivers=One Aim" Hungarian-Croatian IPA project
Within the frame of project „Three Rivers=One Aim“ implemented between Croatian and Hungarian protected areas of nature (project ended in November 2015), the total of 8 hectares of native pasture along Mura river in Međimurje County, Croatia was restored through reintroduction of domesticated but critically endangered native breed of Međimurje’s Horse on the field. Eight mares (female horses) were purchased from local farmers and released to graze free and therefore to restore pasture’s vegetation consisted of native flora. Within the timeframe of two years only, succession of vegetation from invasive to native floristic species is already visible. The flora was not the only biological group to gain benefit from this project, but also the fauna of birds, wildlife and several species of bugs (Scarabeidae) are now present in the pasture in higher density of population then in period before project. The pasture is completely managed as grazing area i.e. open range for eight horses of this project and 20+ cows from neighbouring farmer.

6.3 Objectives

Objective 6.1 Agriculture in the TBR MDD supports the protection of natural resources, biodiversity and mosaic habitats.

Sub Objective 6.1.a The core area and buffer zone offer a valuable habitat mosaic of extensively managed meadows, forests, bushes as well as small-structured and nature-friendly managed arable land.

Sub Objective 6.1.b Local farmers are sensitized in extensive and nature-friendly farming.

Sub Objective 6.1.c Farmers manage their land with the awareness of the impact on soil and water.

Objective 6.2 The meadows within the TBR MDD are managed in a nature friendly way and extensively.

Sub Objective 6.2.a Local farmers and agriculture companies play an important role in the preservation of biodiversity in the TBR MDD by extensive management of their meadows.

Sub Objective 6.2.b The agricultural use within the core area is limited to extensive use of valuable meadows, where the grazing and mowing regime will be defined together with the PA managers.

Sub Objective 6.2.c Meadows with rough vegetation are kept open and the number of meadows can rise by reducing the number of crop fields in the buffer area.

Objective 6.3 Nature-friendly agriculture within the TBR MDD plays an important role for the diversified and sustainable local economy.

Sub Objective 6.3.a Farmers have a reliable and rising income due to diversification, further processing and better marketing of their high quality produce.

Sub Objective 6.3.b The agricultural products are also known outside the TBR MDD.

Sub Objective 6.3.c Agricultural products from the TBR MDD represent sustainable and nature oriented farming.

7 Game management and hunting

7.1 Obstacles

The different landscape, habitats and hunting practices lead to different obstacles within the TBR MDD. Not all listed obstacles are therefore a problem in all countries.

The **density of red deer, roe deer, fallow deer and wild boars is very high** in parts of the TBR. Apart from the lack of big predators, the large populations are also due to the supplementary feeding, which keeps especially deer numbers on a high level. This high number of hunted species **destroys natural** habitats - it is especially a problem for the natural rejuvenation of forests and for natural grasslands that are destroyed by wild boars.

A lot of **fences** are erected around **game management sites**, that are partly large areas (>20 ha). Another reason for erecting fences is to protect agricultural land from damages. On the other hand, newly planted trees or forests are fenced to be protected from bruising damage. This abundance of fences establishes barriers for larger terrestrial animals, counteracting the corridor function of the TBR. Another issue is, that outside new fences the density of animals increases, because less land is available, which results in more damage, subsequently more fences are erected.

Another obstacle is the topic of **illegal hunting**. The poaching of water birds forms a large problem, in some regions; however, illegal hunting via traps is still an issue. Hunters also erect **illegal buildings** (hunting huts, hiding places) on sand banks and cause disturbance of breeding birds on sand or gravel banks.

The **lack of cooperation and communication** between hunters, farmers, forestry and PA managers also forms an issue in the TBR. The hunters' education about non-hunted species lacks widely, resulting in accidentally shot animals due to misidentification.

The main stakeholders involved in the activities around hunting are hunters themselves, the hunting associations and state forestry companies.

7.2 Vision

Red deer, roe deer, wild boar and other hunted species are key inhabitants of floodplain forests. They are supporting natural meadows and habitat creation like open soil or small puddles with their behaviour. Because of predators or hunters, they are low enough in number to allow natural forest rejuvenation and agricultural activities without fencing. Hunting provides speciality meat to local people and visitors, and is a resource for the local economy without needing any additional investments in feeding infrastructure or maintenance of fences. Hunters are proud of their first-hand knowledge of the forest and openly share their information and observations with nature conservation to jointly support the natural development of the floodplains.

Good practice example: Cooperation with hunters in Medjimurje County

Medjimurje Nature, the public institution responsible for Protected Area management in Medjimurje County in Croatia, is a rather small institution with about five staff members and therefore need to prioritize their work, including also the work with stakeholders.

Their approach is to intensively focus on a different stakeholder group every year and establish a relationship with them. These build the basis for continuous work on a smaller scale.

In 2017, they focused on hunters as a stakeholder group. Actions included workshops on species knowledge (e.g. protected species that might be mistaken for a hunted species), setting up a volunteering group among hunters, who use their time in the forest also for monitoring activities and bring valuable knowledge to the nature protection institution, and general awareness-raising on the ecology of the floodplains.

7.3 Objectives

Objective 7.1 The populations of hunted species are self-sustaining, adjusted to their natural habitats, and regulated to a natural size.

Sub Objective 7.1.a The regulation of the population size is determined by the natural occurrence of food, habitat size, predators and hunters.

Sub Objective 7.1.b The role of predators is taken over by responsible hunters, as long as predators are largely missing.

Objective 7.2 Hunting infrastructure in the TBR respects the needs of natural habitats, species and their migration routes.

Sub Objective 7.2.a Migration barriers due to hunting infrastructure within the core area and buffer zone are minimized.

Objective 7.3 Hunters within the TBR are active supporters of the protection of the MDD ecosystem corridor and its species.

Sub Objective 7.3.a Hunting practices within the TBR MDD do not have any side-effects on non-hunted species.

Sub Objective 7.3.b There is no more illegal killing within the TBR.

Sub Objective 7.3.c Hunters are active and highly respected contributors to the monitoring of species, habitats, and human actions especially within the TBR MDD.

Sub Objective 7.3.d The definition of non-intervention areas, hunting zones, non-hunting zones, closed periods for hunting, quantity of hunting licences, as well as quantities that can be hunted are set in a joint process of hunters and Protected Area Managers, and coordinated on transboundary level.

Objective 7.4 Responsible hunting within the TBR MDD plays an important role for the sustainable local economy, diversified tourism offer and leisure time of locals.

Sub Objective 7.4.a The TBR MDD is known as a sustainable and natural hunting area also outside the TBR MDD.

Sub Objective 7.4.b The local economy benefits from a high quality hunting tourism based on an intensive nature experience instead of trophy hunting.

8 Visitor management, Education and Tourism

8.1 Obstacles

An overall obstacle is represented in the fact, that neither a **proper (central and harmonized) visitor management plan nor a harmonized and coordinated strategy,** exists. The **lack of guides** or the **low capacities of managing institutions** are circumstances which correlate to this. The results are **randomly chosen tours,** the **lack of an exact tour planning, exceeding visitor capacities at some places** and the **disturbance of wildlife, for example birds during their breeding season**. At the same time, some regions could very much benefit from increased tourism, provided that the tours chosen are nature-friendly and sustainable tourism principles are applied to make sure the local population benefits from the income.

The **usage of motorized vehicles in the nature, damages of the forest by visitors, vandalism, illegally built infrastructures or steeling goods** are additional negative aspects caused by visitors which are currently occurring in the TBR.

Individual visitors and tourists, owners of objects on the banks of waterbodies like tourist lodges, owners of fish dish restaurants, canoeists, municipalities, state forestry companies, private enterprises are relevant stakeholders concerning the problems mentioned.

8.2 Vision

The Mura-Drava-Danube region is an implemented hotspot and positive example concerning the harmonization of tourism, research and education regarding biodiversity, natural dynamic processes, and ecosystem services. Universities, schools, kindergardens, NGOs, tourism representatives and Protected Area Managers work together making use of their synergies. They cooperate cross border based on a harmonized strategy. The RIVER`SCOOL Network is a main stepping stone along with meeting places in a large network of educational and research sites, which contribute to a nature friendly tourism within the region. Tourism, with the Amazon of Europe Bike Trail as a regional lead offer, is an important source of income for the local population. Both the local population and visitors find a broad range of offers regarding environmental education over the course of the year. Research results from the region are used worldwide for better protection of riverine habitats. Tourism income contributes to the funding of environmental and nature conservation projects.

Good practice example: PE Vojvodinašume
European charter for sustainable tourism (awarded by Europarc federation in December 2014 in an official ceremony in Brusels) would support PE Vojvodinašume as a manager of SNP Gornje Podunavlje in protecting the natural and cultural value of the region through the development of this area, providing a high quality experience in all aspects of tourism, forming new and high quality tourism products and implementing a system for monitoring the effects on the environment. "The **core element of the "Charter" is working in partnership with all relevant stakeholders to develop a common sustainable tourism strategy and an action plan** on the basis of a thorough situation analysis. The aim of all Charter projects and activities is the protection of the natural and cultural heritage and the continuous improvement of tourism in the Protected Area in terms of the environment, local population and businesses as well as visitors." *See list of references* (EUROPARC, 2017)

Good practice example: PE Virovitica-Podravina county
Nationally recommended school programs in Croatia: In Croatia, most children go to a „school in nature" at 3rd or 4th grade of elementary school. The Public Institution for Nature Protection of Virovitica-Podravina County develeoped therefore their programme based on the school curriculum of those grades. It was approved and officially recommended by the Agency for Education and the Ministry of Education of Croatia. The program includes school subjects of nature and society, art, physical education and hygiene. It is based on the accommodation capacities of their center, nature-related contents presented at the center, equipment of the bio research station, and natural values in the park around the Center and in the nearby surrounding areas (educational trail, bird watching, Natura 2000 areas). The program promotes a healthy attitude toward nature, raises awareness of young people about the values and importance of preserving natural values, encourages the research spirit and socialization of young people.

Good practice example: PE Virovitica-Podravina county
Cooperation with Universities: The Public Institution for Nature Protection of Virovitica-Podravina County collaborates with Universitie and welcomes groups of students at their center. They have designed the field education programs for students on the basis of the requirements of the students teachers - exploration of aquatic habitats, bird ringing, bird watching, seeding and microscopy of collected samples from nature. Programs usually last for three days and they are part of the regular classes of students. In autumn 2017, the results of the project evaluation are expected, in which they reported the didactic development of 4 three-day programs for students of the faculty of natural sciences.

8.3 Objectives

Objective 8.1 A visitor management plan that respects nature is implemented for the whole TBR.

Sub Objective 8.1.a Visitors (local people and tourists) are seen and treated as a part of the TBR and protected areas including the active floodplain.

Sub Objective 8.1.b Different educational and recreational offers are effectively steering visitors to less sensitive places that still offer impressive and positive nature experiences.

Sub Objective 8.1.c Local stakeholders like hunters, fishermen or farmers respect nature and its needs.

Objective 8.2 Local people and tourists have sufficient attractive, nature-friendly, well-known and highly accepted possibilities to access and enjoy the river system.

Sub Objective 8.2.a The river and the floodplain are important source of local identity and pride.

Sub Objective 8.2.b The number of visitors is effectively reduced in sensitive areas and seasons by well-accepted access points to the river.

Objective 8.3 RIVER`SCOOLs are the main hubs in a well-visited environmental education network spanning across the whole TBR.

Sub Objective 8.3.a The eight RIVER`SCOOLs are established, well-functioning and well-visited, and their offer is enlarged continuously.

Sub Objective 8.3.b A strong cooperation between PAs, tourism operators, landowners, NGOs, nature protection institutions, and educational institutions is established.

Sub Objective 8.3.c All offered leisure activities include educational components of different scope, where visitors can learn about the TBR, its nature and its protection.

Objective 8.4 Sustainable tourism plays an important role for the diversified and sustainable local economy.

Sub Objective 8.4.a Local people strongly benefit economically from raised touristic interest in the region, by well-paid jobs or by being touristic entrepreneurs themselves.

Sub Objective 8.4.b Other economic sectors benefit from sustainable tourism development, as touristic offers strongly integrate local agricultural produce, handicrafts, cultural associations, and the like.

9 Spatial planning and regional development

9.1 Obstacles

One of the main issues concerning spatial planning are **buildings within the flooded area**. On the one hand they are **built without any permission (illegal buildings)**, on the other hand flooded areas are sometimes also **converted into building land without** consulting the PA or water management authority.

This also happens, because the spatial planning process is **not harmonized with nature protection.** If Protected Areas are designated and management plans of protected areas exist, they are not always taken into consideration in the spatial planning process or integrated in land-use plans – which then results e.g. in plans to build hydropower plants within Natura2000 areas.

Other obstacles are the **different goals of the local and regional spatial planning levels**. This causes confusions because they are not harmonized, decisions and strategies on regional level are not communicated or implemented on the local level and vice versa.

The river system is a dynamic system. The basis for spatial planning is one snap shot of this system. Within one year the situation along the rivers can undergo drastic change, e.g. former forest can be a water body. This dynamic and not projectable change of land is currently not taken into consideration in spatial planning, or in the distribution of responsibilities between different stakeholders (e.g. water management authority, state forestry).

The missing waste management leads to further problems. Within the flooded area **illegal depositions of solid waste** exist and in the visitor areas litter remnants are left.

The stakeholders for spatial planning are the **state, municipalities and local communities.**

Spatial planning is the **basis for all other topics** that are described in in this document.

9.2 Vision

Nature protection forms an integral part and objective of spatial planning in the region and is well integrated into (transboundary) spatial plans. Politicians and administrations are fully aware of the importance of the TBR MDD and involve its managers into spatial planning procedures. The regional economy of the TBR MDD, based on locally owned businesses, supports local livelihoods and guarantees a good living standard for all inhabitants. The region is well-connected within itself and outside by public transport, while keeping natural habitats intact. Villages, towns and economically used land is well-protected from floods, as they are situated outside the enlarged active floodplain, which offers a large enough retention area.

9.3 Objectives

Objective 9.1 The spatial planning processes and spatial plans respect the needs and goals of nature protection.

Sub Objective 9.1.a New infrastructure is planned and built in accordance to nature protection and its needs.

Sub Objective 9.1.b No new settlements or buildings are built in the core zone.

Sub Objective 9.1.c Within the buffer zone further building is limited to development of existing settlements and homesteads, upon an approval of the nature protection institutions.

Sub Objective 9.1.d Bridges, streets and other line-infrastructure cutting through the floodplains are only built when they are not disturbing the corridor functions and river dynamics.

Objective 9.2 Standards for a spatial planning that adequately takes into account nature protection for the whole TBR exist.

Sub Objective 9.2.a There is an active cooperation between spatial planning institutions of all five countries.

Sub Objective 9.2.b The spatial planning of all five countries is harmonized and follows the same strategic nature protection objectives.

Objective 9.3 The regional economy of the TBR MDD supports local livelihoods and guarantees a good sustainable standard for all inhabitants.

Sub Objective 9.3.a Regional and local spatial plans support the development of a local sustainable economy.

Sub Objective 9.3.b The regional economy promotes local products, based on eco system services of the TBR MDD.

Sub Objective 9.3.c The regional economy is based on locally owned businesses.

Sub Objective 9.3.d The five states and countries are aware of the benefit of the Transboundary Biosphere Reserve and support it.

Objective 9.4 The region is well-connected within itself and outside by public transport, while keeping natural habitats intact.

Sub Objective 9.4.a Public and non-motorised transportation is people's first choice, because a well-developed offer.

Sub Objective 9.4.b A dense development within existing settlements is enforced.

Sub Objective 9.4.c Urban sprawl is minimized.

Objective 9.5 Villages, towns and economically used land are well-protected from floods.

Sub Objective 9.5.a Villages, towns and economically used land are situated outside the enlarged active floodplain.

Sub Objective 9.5.b The retention area offered by active floodplains is large enough to protect villages, towns and economically used land from floods.

Sub Objective 9.5.c No new buildings are built in areas which are currently endangered by floods.

Sub Objective 9.5.d The TBR is promoted as showcase of near natural flood protection.

Section III Annexes

1 List of abbreviations

AT	Austria
CRO	Croatia
HUN	Hungary
MAB	Man and biosphere
PA	Protected area
SLO	Slovenia
SRB	Serbia
TBR MDD	Transboundary region Mura Drava Danube
TCP	Transboundary Cooperation Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WWF	World Wide Fund for Nature

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