Project Acronym: SEE River
Work package: WP4 – Application of the SEE River Toolkit on the Drava River Corridor
Action: 4.1. Preparation of the Drava River Framework – Analysis of the International Drava River Corridor

Preparation of the Drava River Framework
Analysis of the International Drava River Corridor

NATIONAL DRAVA RIVER CORRIDOR ANALYSIS REPORT OF SLOVENIA

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1. INTRODUCTION – PURPOSE OF THE ANALYSIS REPORT

This report is one of the five National Drava River Corridor Analysis Reports (NDRCAR) describing pilot areas selected in each of the five Drava countries. The report is based on the detailed analysis of pilot areas selected in each Drava country – in this case this is the Drava river from Maribor to Zavrč. Information and insight gained on the pilot area shall make possible the extension of the experiences to cover the whole of the Drava River Corridor.

![Pilot area for Slovenian part of Drava](image)

Figure 1: Overview map of the Drava river basin with the pilot in Slovenia’s Drava river corridor

1.1. What this report analyses and what is it used for

The aim of the Report is to provide a sound basis of information on the resources, risks, opportunities, potential synergies and conflicts among nature values and existing or potential uses of the river corridor.

The purpose of the Report is to support the regional or local consultations held on the management and development of the Drava River Corridor (DRC) with the stakeholders. As some of the information this Report is to contain will be available at a later stage of the SEE River project only, first the “baseline” part of the Analysis Report was issued, covering Chapters 1 to 8. This will be extended with further chapters, utilizing the information revealed by the stakeholder consultations and the results of the development of the Drava River Toolkit.

This first issue of the Report contains the baseline analysis of the Drava in terms of:

- Resource analysis (Status of the river corridor regarding Nature values, Water related resources including quantity and quality, Cultural values)
- Risk analysis (Flood risks and status of flood defence, Climate change, droughts)
• Spatial analysis (Spatial structure, Identification of the Drava River Corridor)
• Institutional setup analysis (legal, institutional, organisational setup within the DRC per country)
• Project analysis (Projects – past, ongoing, planned, foreseen development and conservation projects, including potential threats and benefits involved)
• Stakeholder analysis (Identification of stakeholders, the existing and future goals and aspirations)
• Map of Hotspots (to visualise the existing or potential conflict zones between river uses, nature values and development projects)

In order to help the process leading towards sustainable and integrated development, thus to move the river corridor towards the notion of a Contemporary River, the Report will at a later stage contain two more chapters on:
• Synergies and conflicts analysis (as identified among projects, stakeholders, conservation and development issues)
• Feasible measures (→ Toolkit) to dissolve conflicts.
• Progress indicators and benchmarks (to measure the distance of the present and foreseen status of the river corridor from the goals set in the Drava River Declaration).

The Report is based on an extensive set of previous reports, documents, plans and other material relevant to the management of the Drava River Corridor. They are listed in the chapter named
• Reference documents.

1.2. Pilot area versus National Report

The goal of this National Drava River Report is to give a detailed insight to the pilot area and to provide a general overview for the rest of the river corridor within the country. This difference in expected elaboration allowed different approaches to be followed within the pilot area and outside of it.

Pilot areas – where the SEE River project could carry out a detailed survey – cover about 25% of the length or area of the Drava River corridor. On the remaining 75% basically the same type of information was needed for the overview, although the goal of the Analysis Report allowed less exact characterisation. In this latter part estimation methods were mainly applied, ranging from extrapolation and analogy, through fast surveys, to the use of available GIS information and expert judgement.
Some of the analysis presented in this report has been carried out by the detailed survey of the pilot area and for the rest of the corridor information is based on sources readily available (mainly from river basin management plans, as for example in the case of resource, risk and spatial analysis). From other aspects, practically the same information is valid for the whole area (e.g. institutional setup analysis). In case of the stakeholder and project analyses, a detailed survey of the pilot area has been carried out, meanwhile for the rest of the national river section only the most important projects and stakeholders were identified. Nevertheless, some features of the corridor outside the pilot area were extrapolated or generalized from the pilot area studies.

Based upon the contents of the National Reports, a joint report covering the full length of the Drava River will be compiled. The International Drava River Report (IDRR), is mainly derived by the synthesis of the National Reports, has a parallel structure and follows the same line of thinking.
2. RESOURCE ANALYSIS

In this chapter a short overview of the natural, economic, and social resources intrinsic to the Drava river corridor is provided in concise sections. Resources are understood in a broad sense, including all assets this part of the Drava region might rely upon in its development towards becoming a contemporary river – in terms of nature values, water related resources, economic assets and potential, cultural values.

2.1. Location information

Pilot area (160 km²):
- Drava river course (46 km)
- 2 derivation channels,
- 15 local communities,
- 2 hydropower plants (Zlatoličje, Formin),
- accumulation lake Ptuj (4.2 km²),
- \( sQs=300\text{m}^3/\text{s} \),
- \( Qes \approx 10-20 \text{m}^3/\text{s} \),
- frequent floods (largest flood on 5th November 2012).

Pilot area on Slovenian Drava starts after the hydropower dam of Melje, which is located on the south side of the city of Maribor, and ends at the town of Zavrč, just before the border with Croatia. The pilot area covers 160 km² and includes the old Drava River stream, which is 46 kilometres long and two derivation channels, which were made for hydropower plants Zlatoličje and Formin. Derivation channel Zlatoličje runs from the dam at Melje to the city of Ptuj where it joins the old Drava river course. After 1.5 kilometers after the junction Drava forms the Ptuj lake, which covers 4.2 km² and is actually an artificial lake, as a result of hydropower dams and derivation channel of Formin. Formin is the second derivation channel, in pilot area and starts at the end of the Ptuj lake and joins old course of the Drava River, when Drava floats from Croatia back to Slovenia. The channel is not completely inside pilot area, but is cut off at the proximal place when the old Drava river course enters Croatia.

The biggest city in the pilot area is Maribor with 111374 inhabitants, which is located on the northwest border of the pilot area. The second largest city in the pilot area, which lies in the centre of the pilot area is the city of Ptuj, which is also the 4th largest city in Slovenia. Other large towns in pilot area are Miklavž na Dravskem polju, Zgornja Hajdina and Gorišnica. The river corridor runs through 15 local communities. The largest community is Maribor city community, but the pilot area cover only 6.5 % (9.6 km²) of its territory, while the community of Markovci with 29.8 km² lies completely inside pilot area.
### 2.2. Nature values

Nature characteristics of the river corridor are defined by river Drava, which has a low land hydromorphological character with seasonal floods, meanders and oxbows. The river has been subject to intensive and systematic river bed regulations since early the 19th century. In the late 1960s and 70s the section between Maribor and Zavrč had been dedicated to hydro power use. As a consequence Drava’s natural flow dynamic has changed and since then it depends mainly on hydro power management water regime. Despite all changes Drava river has gone through in the past, it’s bed with riparian forests still represents a crucial habitat for some of Europe’s most endangered species and is subject to intensive nature conservation. Larger part of Drava pilot site is part of Natura 2000 network. In the river corridor there are numerous protected areas, valuable natural features and ecologically significant areas.

#### 2.2.1. Protected areas

Nature protected areas were established by one or more local communities. In a protected area activities shall be carried out in accordance with the prescribed rules of conduct (protection regime) and management plan, if prescribed. In Drava river corridor there are more than 17 natural monuments, 2 natural reserves and 2 landscape parks.

### Table 1: Municipalities in pilot area

<table>
<thead>
<tr>
<th>Local community</th>
<th>Area (km²)</th>
<th>Area inside PA (km²)</th>
<th>Percentage of area inside PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markovci</td>
<td>29.83</td>
<td>29.83</td>
<td>100.00 %</td>
</tr>
<tr>
<td>Starše</td>
<td>33.97</td>
<td>24.96</td>
<td>73.47 %</td>
</tr>
<tr>
<td>Hajdina</td>
<td>21.82</td>
<td>15.02</td>
<td>68.83 %</td>
</tr>
<tr>
<td>Miklavž na Dravskem polju</td>
<td>12.54</td>
<td>8.30</td>
<td>66.18 %</td>
</tr>
<tr>
<td>Gorišnica</td>
<td>29.11</td>
<td>19.16</td>
<td>65.83 %</td>
</tr>
<tr>
<td>Ptuj</td>
<td>66.66</td>
<td>25.46</td>
<td>38.20 %</td>
</tr>
<tr>
<td>Duplek</td>
<td>39.98</td>
<td>9.18</td>
<td>22.95 %</td>
</tr>
<tr>
<td>Dornava</td>
<td>28.40</td>
<td>4.29</td>
<td>15.12 %</td>
</tr>
<tr>
<td>Videm</td>
<td>79.99</td>
<td>11.30</td>
<td>14.13 %</td>
</tr>
<tr>
<td>Maribor</td>
<td>147.47</td>
<td>9.61</td>
<td>6.52 %</td>
</tr>
<tr>
<td>Kidričevo</td>
<td>71.50</td>
<td>1.97</td>
<td>2.76 %</td>
</tr>
<tr>
<td>Cirkulane</td>
<td>32.07</td>
<td>0.70</td>
<td>2.18 %</td>
</tr>
<tr>
<td>Zavrč</td>
<td>19.33</td>
<td>0.28</td>
<td>1.47 %</td>
</tr>
<tr>
<td>Ormož</td>
<td>141.56</td>
<td>0.01</td>
<td>0.01 %</td>
</tr>
<tr>
<td>Hoče-Slivnica</td>
<td>53.71</td>
<td>0.00</td>
<td>0.00 %</td>
</tr>
</tbody>
</table>

### Table 2: Overview of protected areas in River corridor

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
<th>Short description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Krajinski park Drava</td>
<td>landscape park</td>
<td>Old Drava river bed between Maribor and Ptuj</td>
</tr>
<tr>
<td>Krajinski park Šturmovec</td>
<td>landscape park</td>
<td>Riparian forest landscape park near Šturmovci</td>
</tr>
<tr>
<td>Videm pri Ptuju - platane</td>
<td>natural monument</td>
<td>Plane tree</td>
</tr>
<tr>
<td>Videm pri Ptuju - lipi</td>
<td>natural monument</td>
<td>Linden (Tilia cordata)</td>
</tr>
</tbody>
</table>
### 2.2.2. Valuable natural features

Valuable natural features, according to Slovenian Nature conservation Act, are rare, valuable or well-known natural phenomena; a component or part of the living or non-living nature; nature area or part thereof; an ecosystem; landscape; or designed landscape. In the Drava river corridor there are 39 valuable natural features defined by national nature protection law.

#### Table 3: Overview of valuable natural features in River corridor

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
<th>Short description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Videm pri Ptuj - platane</td>
<td>natural reserve</td>
<td>Floodplain trees with extraordinary dimensions in Videm, south of Ptuj</td>
</tr>
<tr>
<td>Videm pri Ptuj - lipi</td>
<td>natural reserve</td>
<td>Linden trees with extraordinary dimensions in Videm, south of Ptuj</td>
</tr>
<tr>
<td>Murkova lipa</td>
<td>natural monument</td>
<td>Linden with extraordinary dimensions in Videm, south of Ptuj</td>
</tr>
<tr>
<td>Maherjeva lipa</td>
<td>natural monument</td>
<td>Linden with extraordinary dimensions in Pobrežje, south of Ptuj</td>
</tr>
<tr>
<td>Habjaničeva lipa</td>
<td>natural monument</td>
<td>Linden with extraordinary dimensions in Pobrežje, south of Ptuj</td>
</tr>
<tr>
<td>Koletnikova lipa</td>
<td>natural monument</td>
<td>Linden with extraordinary dimensions in Stojinci, south of Ptuj</td>
</tr>
<tr>
<td>Markovci - lipa</td>
<td>natural monument</td>
<td>Linden at the chapel in center of Markovci, south of Ptuj</td>
</tr>
<tr>
<td>Prvenci - lipa</td>
<td>natural monument</td>
<td>Linden in Prvenci, east of Ptuj</td>
</tr>
<tr>
<td>Starše - dob</td>
<td>natural monument</td>
<td>Oak tree next to the road to Starše, northwest of Ptuj</td>
</tr>
<tr>
<td>Starše - gabrov drevored</td>
<td>natural monument</td>
<td>Beech tree avenue in Starše, northwest of Ptuj</td>
</tr>
<tr>
<td>Loka - rastišče navadnega raketovca</td>
<td>natural monument</td>
<td>Common sea-buckthorn (Hippophae rhamnoides) growing site</td>
</tr>
<tr>
<td>Jama pri Pruhu</td>
<td>natural monument</td>
<td>Cave</td>
</tr>
<tr>
<td>Lemeževa lipa</td>
<td>natural monument</td>
<td>Linden (Tilia cordata)</td>
</tr>
<tr>
<td>Zrkovci - lipa</td>
<td>natural monument</td>
<td>Linden (Tilia cordata)</td>
</tr>
<tr>
<td>Ferlovi tisi</td>
<td>natural monument</td>
<td>Yew (Taxus baccata)</td>
</tr>
<tr>
<td>Malečnik - topol</td>
<td>natural monument</td>
<td>Poplar (Populus sp.)</td>
</tr>
<tr>
<td>Dupleški log - gozd naravni spomenik</td>
<td>natural monument</td>
<td>Riparian forest</td>
</tr>
<tr>
<td>Miklavž - izviri in ribniki - hidrološki, zoološki in botanični naravni spomenik</td>
<td>natural monument</td>
<td>Springs and ponds</td>
</tr>
<tr>
<td>Drava - stara struga, hidrološki naravni spomenik</td>
<td>natural monument</td>
<td>Area of old Drava river bed</td>
</tr>
<tr>
<td>Naravni in gozdnii rezervat Zlatoličje</td>
<td>natural reserve</td>
<td>Natural forest reserve</td>
</tr>
<tr>
<td>Naravni rezervat Struga</td>
<td>natural reserve</td>
<td>Drava side arm</td>
</tr>
<tr>
<td>Location</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Ekartova lipa</td>
<td>Linden in Starše, northwest of Ptuj</td>
<td></td>
</tr>
<tr>
<td>Loka - rastišče navadnega rakitovca</td>
<td>Common sea-buckthorn (Hippophae rhamnoides) growing site</td>
<td></td>
</tr>
<tr>
<td>Lemeževa lipa</td>
<td>Linden in Zrkovci, east of Maribor</td>
<td></td>
</tr>
<tr>
<td>Zrkovci - lipa</td>
<td>Linden in Zrkovci, east of Maribor</td>
<td></td>
</tr>
<tr>
<td>Ferlovi tisi</td>
<td>Yew (Taxus baccata) in Zrkovci, east of Maribor</td>
<td></td>
</tr>
<tr>
<td>Malečnik - topol</td>
<td>Poplars of extraordinary dimensions in Malečnik, north of Maribor</td>
<td></td>
</tr>
<tr>
<td>Podvinci - nižinski gozd in ribniki</td>
<td>Habitats of endangered plant and animal species in lowland forest at Podvinci pond, northeast of Ptuj</td>
<td></td>
</tr>
<tr>
<td>Podvinci - Veliki ribnik</td>
<td>Habitats of endangered plant and animal species in Podvinci pond, northeast of Ptuj</td>
<td></td>
</tr>
<tr>
<td>Ptujsko jezero</td>
<td>River Drava (hydro dam) reservoir, south of Ptuj, important secondary habitat</td>
<td></td>
</tr>
<tr>
<td>Šturmovci</td>
<td>Well preserved riparian forest, South of Ptuj</td>
<td></td>
</tr>
<tr>
<td>Drava - reka 1</td>
<td>Drava river bed with river banks and gravel beds between Markovci and Zavrč</td>
<td></td>
</tr>
<tr>
<td>Struga</td>
<td>Old side arm south of Dvorjane, southeast of Maribor</td>
<td></td>
</tr>
<tr>
<td>Zlatoličje - poplavni gozd</td>
<td>Riparian forest on river Drava sediments at Zlatoličje, northwest of Ptuj</td>
<td></td>
</tr>
<tr>
<td>Duplek - rastišče navadnega rakitovca 2</td>
<td>Common sea-buckthorn (Hippophae rhamnoides) growing site, southwest of Maribor</td>
<td></td>
</tr>
<tr>
<td>Miklavž - izviri in ribniki</td>
<td>Springs and ponds at Miklavž, south of Maribor</td>
<td></td>
</tr>
<tr>
<td>Ptičji gaj</td>
<td>Preserved forest in Brezje, east of Maribor</td>
<td></td>
</tr>
<tr>
<td>Dupleški log</td>
<td>Riparian forest at Duplek, southeast of Maribor</td>
<td></td>
</tr>
<tr>
<td>Drava - rečna loka 2</td>
<td>River Drava with riparian forest between Markovci and Zavrč</td>
<td></td>
</tr>
<tr>
<td>Šturmovci - rokav Drave</td>
<td>Preserved river bed of former river Drava side arm in Šturmovci, south of Ptuj</td>
<td></td>
</tr>
<tr>
<td>Duplek - rastišče navadnega rakitovca 1</td>
<td>Common sea-buckthorn (Hippophae rhamnoides) growing site in Duplek, southeast of Maribor</td>
<td></td>
</tr>
<tr>
<td>Gris - prodišče</td>
<td>Creek with gravel bed near river Drava at Zavrč, southeast of Ptuj</td>
<td></td>
</tr>
<tr>
<td>Drava - rečna loka 1</td>
<td>River Drava with riparian forest between Maribor and Ptuj</td>
<td></td>
</tr>
<tr>
<td>Hajdinska studenčnica</td>
<td>Studenčnica and former side arm of Drava, south of Ptuj reservoir</td>
<td></td>
</tr>
<tr>
<td>Turniška studenčnica</td>
<td>Source west of Turnišče castle, south of Ptuj</td>
<td></td>
</tr>
<tr>
<td>Tržec - gramoznica</td>
<td>Abandoned gravel extraction pit in Tržec, east of Majšperk</td>
<td></td>
</tr>
<tr>
<td>Vumpah - ješev log, rastišče sibirske perunike</td>
<td>Riparian alder forest and growing site of Iris sibirica in Vumpah at Vurberg, southeast of Maribor</td>
<td></td>
</tr>
<tr>
<td>Borl - poplavno območje</td>
<td>Flood plain north of Borl</td>
<td></td>
</tr>
<tr>
<td>Drava - stara struga</td>
<td>Drava river bed with river banks and gravel beds between Maribor and Ptuj</td>
<td></td>
</tr>
<tr>
<td>Dvorjane - gozd</td>
<td>Forest complex at Dvorjane, southeast of Maribor</td>
<td></td>
</tr>
</tbody>
</table>

### 2.2.3. Ecologically important areas

An Ecologically important area, according to Nature conservation Act, is an area of a habitat type, its part or a large ecosystem unit which significantly contributes to biodiversity conservation.
Table 4: Overview of Ecologically important areas in the Drava river corridor

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Short Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>41500</td>
<td>Drava – spodnja</td>
<td>Despite numerous negative effects as a consequence of human interventions, this ecologically important area has kept extraordinary qualities. In some sections (especially downstream of Ptuj) Drava river has remained in a nature-like condition. Hydro-geomorphological processes still shape gravel beds, side erosion forms new steep river banks, high waters still fill up side arms and oxbows, and floods still cover areas with riparian forests. Diverse water and riparian habitats, two major reservoirs, some gravel pits and a relatively well preserved traditional cultural landscape with extensive meadows and fields form a living space to more than 270 species of birds, 50 species of fish, about 40 species of dragonflies, 30 species of mammals, 14 species of amphibians, 9 species of reptiles and to over 600 species of plants.</td>
</tr>
<tr>
<td>42500</td>
<td>Dravsko polje</td>
<td>Dravsko polje is an area with an important ecological corridor function between the Alpes and the Pannonian Basin. Preservation of this particular function is connected with the preservation of a continuous area with forests, agricultural land use and water use. In this area important nature conservation habitat types and habitats of endangered plant and animal species are present. It is an important nesting place for white storks, since a large proportion of the Slovenian population nests in this area.</td>
</tr>
</tbody>
</table>

2.2.4. NATURA 2000 areas

Natura 2000 areas are ecologically important areas which are within the European Communities important for the maintenance or attainment of a favorable status of species, their habitats and habitat types. In the Drava river corridor there are two Natura 2000 areas: Special protection area (SPA) Drava and Site of Community interest (SCI) Drava. No management plan exists so far for those two areas. Natura 2000 aims and measures have to be integrated into sectorial management plans.

Table 5: Overview of Natura2000 areas in River corridor

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Short description</th>
</tr>
</thead>
</table>
Drava River in Slovenia has a catchment area of 3233 km² and runs through Slovenia for about 133 km. Its altitude on the route through Slovenia falls for 148 m which means that Drava river has a slope of approximately 1.113 ‰. River network density of Drava’s catchment area is about 2.1 km/km². The selected pilot area from Maribor to Zavrč covers 46 km of Drava river with a catchment area of 1269.4 km² on this section. From Ormož to Maribor Drava River has a slope 1.29 ‰ and downstream from Maribor Drava is a lowland river with a slope approximately 1.05 ‰.

2.3. Water regime of the Drava

The Drava is a typical fluvo-glacial river and has its highest flow in July and its minimum flow in February. Next table presents average statistical flows of Drava River at different water gauging stations. Data is taken by EARS (Environmental Agency of the Republic of Slovenia).

<table>
<thead>
<tr>
<th>Gauging station</th>
<th>Dravograd</th>
<th>Maribor</th>
<th>Ptuj</th>
<th>Markovci dam</th>
<th>HPP Formin</th>
<th>Borl</th>
<th>Ormož</th>
</tr>
</thead>
<tbody>
<tr>
<td>sQs - mean daily discharge [m³/s]</td>
<td>241</td>
<td>297</td>
<td>303</td>
<td>19</td>
<td>255</td>
<td>179</td>
<td>292</td>
</tr>
<tr>
<td>sQnp – mean of annual minimum daily discharge [m³/s]</td>
<td>90</td>
<td>90</td>
<td>95</td>
<td>4</td>
<td>69</td>
<td>54</td>
<td>86</td>
</tr>
<tr>
<td>nQnp – lowest daily disc. in the entire period of measur. [m³/s]</td>
<td>58</td>
<td>52</td>
<td>49</td>
<td>3</td>
<td>14</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>vQnp – highest peak disc. in the entire period of measur. [m³/s]</td>
<td>1361</td>
<td>2585</td>
<td>2587</td>
<td>1159</td>
<td>730</td>
<td>2595</td>
<td>1994</td>
</tr>
</tbody>
</table>

SCl Drava is a botanically and zoologically rich area with a high diversity of habitats and habitat types. SCl Drava has the following classified species: Rhinolopus ferrumequinum, Myotis emarginatus, Lutra lutra, Apium repens, Coenagrion ornatum, Ophiogomphus cecilia, Carabus variolosus, Callimorpha quadripunctaria, Aspius aspius, Cottus gobio, Gymnocephalus baloni, Emys orbicularis, Cucujus cinnaberinus, Gobio uranoscopus, Rhodeus sericeus amarus, Cobitis taenia, Bombina variegata, Castor fiber, Umbra krameri and the habitat types: Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae), Illyrian oak-hornbeam forests (Erythronio-Carpinion), Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation, Water courses from lowland to montane levels with Ranunculion fluitantis and Callitricho-Batrachion vegetation, Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation, Rupicolous calcareous or basophilic grasslands of Alysson-Sedion albi, Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites).
Locations of water gauging stations on Drava river in Slovenia are represented in the following figure. Selected pilot area as a river corridor is marked with red line.

![](image1)

**Figure 2: Locations of gauging stations on Drava river in Slovenia**

### 2.3.2. Groundwater regime

The groundwater regime is directly connected to the water regime of the Drava. Most of the water is running from Pohorje to Drava, as it can be seen from the next picture.

![](image2)

**Figure 3: Hydrological map of Drava-Ptuj field**
2.3.3. Hydro-energy capacity

The entire reach of the Drava in Slovenia is subject to a heavily modified water regime due to hydropower plants. There are 8 large hydropower plants and 2 small hydropower plants (SHHP) along the Drava river water course in Slovenia. Their locations are shown in the next figure.

![Figure 4: Hydro power plants on Drava river](http://www.dem.si/)

Capacities and annual power productions of these HPPs are shown in the next table. The total generation of the HPPs on Drava river in Slovenia represents around 25 % of the electric power generated in Slovenia.

<table>
<thead>
<tr>
<th>Name of hydropower plant</th>
<th>Annual production [GWh]</th>
<th>Installed power [MW]</th>
<th>Installed discharge [m$^3$/s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dravograd</td>
<td>142</td>
<td>26</td>
<td>420</td>
</tr>
<tr>
<td>Vuzenica</td>
<td>247</td>
<td>56</td>
<td>550</td>
</tr>
<tr>
<td>Vuhred</td>
<td>297</td>
<td>72</td>
<td>550</td>
</tr>
<tr>
<td>Ožbalt</td>
<td>305</td>
<td>73</td>
<td>550</td>
</tr>
<tr>
<td>Fala</td>
<td>260</td>
<td>58</td>
<td>525</td>
</tr>
<tr>
<td>Mariborski otok</td>
<td>270</td>
<td>60</td>
<td>550</td>
</tr>
<tr>
<td>Zlatoličje</td>
<td>577</td>
<td>126</td>
<td>530</td>
</tr>
<tr>
<td>Formin</td>
<td>548</td>
<td>116</td>
<td>500</td>
</tr>
<tr>
<td>SHPP Dam Melje</td>
<td>8.7</td>
<td>2.3</td>
<td>33</td>
</tr>
<tr>
<td>SHPP Markovci</td>
<td>5.4</td>
<td>0.9</td>
<td>10</td>
</tr>
</tbody>
</table>

One SHPP (Markovci) and two large channel type HPPs (Zlatoličje and Formin) are situated in the selected pilot area from Maribor to Zavrč. More than 40 % of power generation on the Slovenian Drava river is provided by those two HPPs. Zlatoličje HPP produces about 21.7 % and Formin HPP about 20.6 % of all energy that is produced on the Drava in Slovenia. Two HPPs in the pilot area are important not only for their size, but also because they each have big reservoir lakes which
guarantee reserve power (for example by filling up the reservoirs during the night and emptying them during the daytime). Ptuj Lake serves as a reservoir for the Formin HPP and is the largest lake in Slovenia. Its accumulation volume is $17.1 \times 10^6$ m$^3$. Supply channel length for Formin HPP is 8.1 km. Zlatoličje HPP has an accumulation lake with $4.5 \times 10^6$ m$^3$ volume and a 17.2 km long supply channel.

2.3.4. Surface and groundwater body status according to the RBMP

Drava river’s catchment area is divided into 24 surface water bodies and 4 ground water bodies. Drava river is divided into 6 surface water bodies, from which 3 are considered as heavily modified according to the River Basin Management Plan for the Danube Basin in Slovenia (2009-2015). There are also 2 HPP channels, which are considered as artificial water bodies. Next figure shows the surface water bodies on Drava river in Slovenia and their status. The selected river corridor for the pilot area contains 2 surface water bodies (Drava Maribor – Ptuj and Drava Ptuj – Ormož), 1 heavily modified surface water body (Ptuj Lake) and 2 artificial surface water bodies (Channel HPP Formin and Channel HPP Zlatoličje).

![Surface water body status on Drava River in Slovenia](image)

Next figure shows the hydro morphological alterations in the Drava river corridor. Hydro morphological alterations are divided into 3 classes: yellow color represents water courses which are little or moderately altered, orange color represents water courses which are significantly altered and the red color represents water courses which are strongly or very strongly altered.
All four water bodies of ground water of the Drava river’s catchment area are estimated to have good quantitative status according to the RBMP for the Danube Basin in Slovenia. Three of those water bodies are estimated to have a good chemical status and one (Dravska kotlina) is estimated to have poor chemical status. As it is shown in the next figure, part of Dravska kotlina is in the selected river corridor.

2.3.5. Water quality stresses

First outcomes for the determination of achieving a good status are presented in the next figure. Based on information from the proposal of the RBMP for Danube basin, figure 24 presents the estimation of probability to achieve a good ecological status of surface waters bodies in the Drava.
sub-basin by 2015. Main reasons for not reaching the environmental objectives are hydro-
morphological impacts (weirs, dams, derivations, etc.)

Figure 8: Estimation of probability to achieve a good ecological status of surface water bodies in the Drava sub-basin by 2015

2.3.6. Sediments

The sediment balance in the Drava river in Slovenia is disrupted mainly because of the HPP chain in Austria and Slovenia. Transport of sediments in the riverbed is low because of the low discharges (in average Qes is 5 – 20 m$^3$/s) and most importantly due to the lack of new sediment material supply. Most of the sediment material stays in reservoirs behind dams. Low discharges don’t have enough power even to move sediments with smallest fractions and this causes an overgrowth of riverbed and riverbanks. (Sovinc, 1995)

According to the study made for the Drava river section between Zavrč and Ormož, there is only 335 m$^3$/year average sediment transport behind Markovci dam. It was also calculated that this figure was 136000 m$^3$/year before the dam was built. Considering that there is 5770 m$^3$/s average sediment transport from Zavrč to Ormož is, and that average sediment transportation behind Markovci dam is 335 m$^3$/s, we can see that Drava’s tributaries on this section contribute around 94 % of all sediment material and the upper Drava section contributes only 6 %. (Sovinc, 1995)

2.4. Cultural values

The area of the Slovenian Drava river corridor has been always been at the crossroads between western Europe and the vastness of the Pannonian lowland, Alpine valleys and the expanse of the Balkans. It has been settled since the Stone Age. In the Late Iron Age it was settled by Celts. By the 1st century BC, the settlements were controlled by Ancient Rome. Since Roman Period the whole area has been an important historical, trade and cultural site. Proofs of diverse cultural and historical activities are numerous cultural monuments, archaeological and heritage sites, which are spread over the pilot area.
The area in the vicinity of the river corridor has two larger cultural centres: Maribor and Ptuj, which played a major role in the history and development of this area. Ptuj’s history reaches back to the pre-roman period. The city thrived throughout the Middle Ages and today still has a well preserved city centre with a castle on top of the hill, which is open for visitors. The region of Dravsko-Ptujsko polje, hosts various ethnological and modern festivals. One of the most known festivals is the Ptuj Carnival, which is held every year around Shrove Tuesday. The Carnival is known nationwide because of typical local carnival masks called Kurenti and the local ethnological heritage.
Every year numerous culture events are being held in local municipalities as well. Almost every larger village and town has a cultural hall, where occasional gatherings, professional or amateur performances are being presented to the broader public.

![Figure 11: Ptuj carneval (Source: www.ptuj.info)](image)

2.5. Economic resources

**Economic significance of the area:** give a short account of the type and significance of the agricultural (including forestry), industrial (including hydropower generation) and services sector (including tourism) within the pilot area, and with a short outlook to the river corridor outside the pilot.
3. RISK ANALYSIS

Risk analysis deals with the three major risks within the Drava River Corridor: flood risk, water quality hazards and droughts. The analysis detailed in this chapter covered the risk phenomenon, its expected probabilities and effects on the Corridor, and the mitigation measures taken or contemplated to be taken in the future. The probable effect of climate change both on expected floods and droughts is part of the analysis.

3.1. Flood risk

3.1.1. Characteristics of flood events

Due to the narrow valley floods upstream from Maribor are limited to local inundation areas in the vicinity of the river bed. On the plain from Maribor to the Croatian border at Zavrč and from Zavrč to Središče ob Dravi, where river Drava flows partially on Slovenian and on Croatian territory, the flood plains are significant. Most of the flood plain is flooded at HQ10, where about 70 to 80% of total flood area at HQ100 is flooded. Probable maximum flood discharges of the Drava river are shown in the next table.

Table 8: Probable maximum flood discharges of river Drava in Slovenia

<table>
<thead>
<tr>
<th>FLOW PROFILE</th>
<th>CATCHMENT AREA [km²]</th>
<th>HQ10 [m³/s]</th>
<th>HQ100 [m³/s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drava HE Dravograd</td>
<td>12091</td>
<td>1826</td>
<td>2612</td>
</tr>
<tr>
<td>Drava HE Mariborski otok</td>
<td>13437</td>
<td>1953</td>
<td>2794</td>
</tr>
<tr>
<td>Drava g.s. Maribor</td>
<td>13458</td>
<td>1957</td>
<td>2800</td>
</tr>
<tr>
<td>Drava HE Zlatoličje + dam Melje</td>
<td>13527</td>
<td>1960</td>
<td>2804</td>
</tr>
<tr>
<td>Drava HE Formin + dam Markovci</td>
<td>13636</td>
<td>1967</td>
<td>2815</td>
</tr>
<tr>
<td>Drava g.s. Borl + dam Markovci</td>
<td>14661</td>
<td>2025</td>
<td>2897</td>
</tr>
</tbody>
</table>

Urban areas of Dogoše and Duplek are most endangered in the section from Maribor to Ptuj. Land use of the flood plains is mostly agricultural, close to the river there are floodplain forests, settlements are located higher, but some of them are still flooded at HQ100. Decrease in the maximum flood discharge in the natural river channel due to the flow via the derivation channels have very small effect on floods. This is due to the high density of vegetation that overgrows the natural stream channel river banks as a result of low flows in river for most of the year. The flooded area of the river Drava in Slovenia and the land use is shown in the next table.

Table 9: The land use of flooded area of the river Drava in Slovenia (HQ100)

<table>
<thead>
<tr>
<th>Land use of the flood plain</th>
<th>Flooded area at HQ100 [ha]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural areas</td>
<td>2074.8</td>
</tr>
<tr>
<td>Agricultural areas covered with forest</td>
<td>26.2</td>
</tr>
<tr>
<td>Dry land with special vegetation</td>
<td>4.0</td>
</tr>
<tr>
<td>Extensive orchards</td>
<td>21.7</td>
</tr>
<tr>
<td>Forest</td>
<td>1393.9</td>
</tr>
<tr>
<td>Greenhouses</td>
<td>3.4</td>
</tr>
<tr>
<td>Orchard</td>
<td>4.7</td>
</tr>
<tr>
<td>Land of hops</td>
<td>23.9</td>
</tr>
</tbody>
</table>
### 3.1.2. Flood protection measures

For some areas subject to Drava river floods in Slovenia, flood risk maps have been prepared as shown in the next two figures.

![Flood risk map of Drava river from Maribor to Starše](image-url)
According to the legislation, the flood hazard maps are regarded as one fundamental information to be considered in spatial planning as one type of non-structural measures for flood protection.

Very important and efficient is also the flood warning system, which is organised by the civil protection service. Cooperation between Austrian, Slovenian and Croatian services, including HPP staff, is of big importance for the flood forecasting and warning system in all the countries along the Drava river; the most endangered areas downstream of Maribor can be warned at least 1 day before the flood arrives.

For the next two years the flood protection measures for Dogoše and Duplek are planned to be realised. For the flood protection of Dogoše the 2.5 km of flood protection dike is planned to be built and for the protection of Duplek about 5 km of dikes will be constructed.
3.1.3. Historical flood situation

During the last 50 years the biggest floods occurred in early summer in 1965 and 1966 at a return period of more than 50 years (about 2500 to 2600 m³/s).

The last flood situation of river Drava happened in November 2012 with discharges estimated at more than HQ100. Flood levels have been geodetically measured, so a good data basis exists for calibrating the flood modelling in the future. Besides the damage in urban areas in Dogoše and Duplek and in smaller settlements, there was a big damage also in agriculture.

The flood flow of the river Drava destroyed the infrastructure of the HPP Zlatoličje and Formin (power channels and power engine of HPP Formin); the embankments of the reservoirs from Dravograd to Maribor have been damaged, some parts of the roads have been flooded and destroyed. The flood event is still in the analysing process, including the evaluation of the influence of the reservoir operation management to the flood retention in Austria, where more international cooperation will be needed.

3.1.4. Climate change effects on flood levels

Although it is impossible to say at this point whether the latest flooding of river Drava was a result of climate change, some computer predictions and experts say that we can expect to see more extreme weather events such as flooding in the future. With a projected change of extreme precipitation and with the use of hydrological models we can calculate an effect of increased precipitation for a 100yr discharge. Even though heavier precipitation is expected with human-induced global warming, other factors also play a vital role:

- **Floodplains** - are important for decreasing a peak discharge and volumes, but many of them are shrinking due to urbanization and flood protecting measures (levees ...).
- **Vegetation cover** - the area surrounding the river can have a thick vegetation cover, which intercepts lots of precipitation. In addition, the peak discharge will decrease because vegetation will absorb the water and lose it through transpiration and evaporation. Moreover, the lag time in such areas is kept comparatively long.
- **Urbanisation** – in this process, areas with natural soils are covered with impermeable materials like concrete which will increase surface run off and reduce the amount of water being stored. As water doesn’t infiltrate easily in urban areas storm drains were built that run directly into a river. This results in increased peak discharge and reduced lag time (lag time is the time difference between the peak precipitation and the peak discharge).

Cumulative effects of climate change together with an environmental impact are therefore likely to increase the flood risk significantly and progressively for all areas.

3.2. Water quality hazards

Describe potential risks relevant in the pilot area, involving accidental river water pollutions due to industrial spills, transportation catastrophes, sewage treatment plant failures, etc.
3.3. Droughts

3.3.1. Hydrological drought

Non-uniform distribution of precipitation is the key reason for drought phenomena in Slovenia with impact on agriculture and water quantity of surface and groundwater. A continuous period with low river flows in Slovenia is recorded since 1980, with the only exception in 2010. Minimum flows with a duration of over 30 days are statistically decreasing, mostly in hilly river basins. Less snow in the winters of the last 30 years is the reason for lower flows in spring and early summer, what is specific for the Drava river with its pluvio-nival hydrological character.

Hydrologically extreme dry years were 1947 and 1949, later 1993 and the period between 2000 and 2003. The highest extreme was recorded in 2003.

Decreasing of the river flows and groundwater levels is the consequence of a decreasing of annual precipitation and an increasing of the annual air temperature and evapotranspiration. The prognosis for climate changes predicts a decreasing of the river flows and an increasing of the duration of the hydrological drought.

3.3.2. Agricultural drought

Water deficits in the vegetation periods of the last 52 years caused 15 times agricultural droughts in Slovenia: in 1971, 1973, 1977, 1983, 1992, 1993, 1994, 2000, 2001, 2003, 2006, 2007 and 2012. Drought impacts vary over the years and regions. Generally, damage in agricultural production is increasing. The most severe damage was recorded in 2003, when 60% of the Slovenian territory was damaged due to drought. Soils with low water holding capacity are most vulnerable to drought. The extent and severity of drought is dependent on the type of agricultural production, crops, soils and technology. The crucial factor of drought severity is the distribution of dry periods.

North-eastern Slovenia is among the regions which are most vulnerable to drought. In spite of a slight decrease of summer precipitation, there is a statistically significant increase of cumulative evapotranspiration in the vegetation period. In the last twenty years more extreme dry and very dry vegetation periods are recorded.

Meteorological water balance (precipitation minus evapotranspiration) from April to the end of August at the meteorological station Maribor-Tabor in the period 1961-2012 is shown in the next figure. In Podravje region in the years 2003 and 1992 the highest water deficit was recorded, followed by year 2000, 2011, 1971, 1993, 2012 and 1983. In the year 2003 the water deficit in this period was – 361.4 mm.
It is a fact that the sustainable agriculture production in NE Slovenia is becoming increasingly vulnerable to the lack of water during the vegetation period in the past decade. Existing studies on potential impacts of climate change on agriculture in Slovenia focused firstly on the spatial distribution of potential soil moisture deficit areas in Slovenia and on the water deficit variability change. In the last 10 years over 2000ha of irrigation systems have been built in the area of Dravsko polje and Ptujsko polje in Drava river basin, using the Drava river as the irrigation water source.
4. SPATIAL ANALYSIS

The river corridor was defined considering key fluvial processes and ecological elements which took or take a significant part in the given area. Indicators which were used to define the river corridor were:

- topography,
- hydro-morphology,
- floods,
- phytocenology,
- pedology,
- Natura 2000

4.1. Hydro-morphology

The most important hydro-morphological phenomena that were used in river corridor definition were river terraces. All the terraces were defined using topographical maps and then revised based on field work. Because of the many levels of river terraces the most distant from the river stream were used for the outer borders definition, because they represent the wider plain where the river used to run in the past. On some places the consistency of the terrace could not be defined, so the missing line of the terraces was defined on the field. Where there were no evident terraces, other indicators such as flood plains, river vegetation, river soils were used as one of the indicators for river corridor definition.
4.2. Floods

Flood plains, 100 year floods and also the occurrence of recent, most extensive floods in November 2012 was also an indicator which was used for the river corridor definition. The recent floods extended to 100 year floods, so they had to be taken into account when defining the river corridor, because they demonstrated the importance of the accuracy in river corridor definition and later actions and decisions taken in the defined river corridor area. The defined pilot area is defined wider than the area where recent floods in November 2012 occurred.
4.3. Phytocenology

Vegetation, especially riparian forests, was also one of the indicators which contributed to the delineation of the river corridor. All the areas with riparian forests were included inside the river corridor. Phytocenology layer consisted only of the potential vegetation and not actual vegetation, so this indicator was considered only as a reference and not as a primary indicator. This indicator was used mainly to back up other indicators in the pilot area definition process.

4.4. Pedology

All the land that was covered with fluvial soils was also included inside the river corridor. Fluvial soils consisted mainly of Calcaric Fluvisol, Eutric Fluvisol and Dystric Fluvisol. There are also other soil types inside the pilot area but fluvial soils are the prevailing types of soil. The presence of other soil types is also the result of irrigation for agricultural purposes very close to the current river stream.
4.5. Natura 2000

Natura 2000 was also one of the key indicators which were used for pilot area delineation. Among many Natura 2000 areas only the Water Dependent Features of Natura 2000 were taken into account. Natura 2000 areas were carefully examined, because some of the areas which are Water Dependent Features of Natura 2000 were excluded from the pilot area, because they belong to tributaries and are not significant to the Drava River.
The river corridor definition process was divided into two phases, cabinet work and field work. In the first phase multi-sectorial meetings and discussions were held in order to decide which indicators are suitable and most significant for the Slovenian Drava River pilot area determination. In the next phase all the indicators were gathered in GIS layers and overlaid so they could be analyzed and the pilot area border could be defined. In the next phase, the draft definition of the river corridor was followed by the verification of the border on the field.

Two of the elements that also had to be included in the process of the pilot area definitions were the derivation channels which significantly influenced the other borders of the pilot area. Both channels were included into the pilot area because they influence the Drava River course and consequently the whole pilot area, even though other indicators used do not justify some part of the river corridor border which were modified due to the derivation channels. The only indicator that could be used on some parts of the pilot area border after the inclusion of the derivation channels are river terraces. Field work was the most important part of the verifications of the corridor border in these areas, because some river terraces could not be identified using only GIS layers. After the field verification the corrections were made to the river corridor and the final delineation was made for the Slovenian SEE River pilot area of the Drava River corridor.
Figure 20: Present built up areas on pilot area

Figure 21: Planned built up areas on pilot area
Figure 22: Map of land use on pilot area
5. INSTITUTIONAL SETUP ANALYSIS

This chapter provides an analysis of public bodies and authorities (institutions) that are involved in policy formulation, environmental or water permitting and regulation, bilateral or multilateral international negotiations related to the Drava river corridor. It provides an overview of local, regional/national and international level institutions and their role. These institutions follow procedures on regulating water or nature protection related activities, on generating, selecting, funding of projects and on their potential involvement in Multisectoral Agreements related to the Drava river corridor management.

In Slovenia, competent authorities for policy formulation, environmental or water permitting and regulation, bilateral and international relations are set up on the level of ministries, meaning the ministries are policy- and decision-making institutions. But there are public institutions on national level that are appointed by law or other acts to provide information, perform study analyses for competent authorities, support them with expert knowledge and background and/or implement environmental policy on national/regional and local level. For this reason, these public institutions are listed also in Chapter 7 – Stakeholders Analysis. Additionally, although these institutions are not formally appointed for international negotiations for Drava River Corridor, they have transnational connections through other projects and are marked in the analysis as organizations with multilateral connections.
<table>
<thead>
<tr>
<th>Name of Institution</th>
<th>Level of operation</th>
<th>Mandate</th>
<th>Transnational connections</th>
<th>Sector</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Agriculture and the Environment</td>
<td>national, transnational</td>
<td>authority</td>
<td>National, bilateral, multilateral</td>
<td>water management, nature conservation, agriculture, fishery, forestry, waste, climate changes, environment</td>
<td>Consultation on national and local level; Important for Multisectoral Agreements;</td>
</tr>
<tr>
<td>Ministry for Infrastructure and Spatial Planning</td>
<td>national, transnational</td>
<td>authority</td>
<td>national, bilateral, multilateral</td>
<td>Infrastructure, traffic, energy, spatial planning</td>
<td>Consultation on national and local level; Important for Multisectoral Agreements</td>
</tr>
<tr>
<td>Ministry of Economic Development and Technology</td>
<td>national, transnational</td>
<td>authority</td>
<td>national, bilateral, multilateral</td>
<td>tourism, regional development, entrepreneurship</td>
<td>Consultation on national and local level; Important for Multisectoral Agreements</td>
</tr>
<tr>
<td>Slovenian Environment Agency</td>
<td>national, regional/local</td>
<td>Public institution, consultation and implementation body</td>
<td>national, bilateral, multilateral</td>
<td>water monitoring, nature conservation, environment, climate monitoring</td>
<td>Participation on national and local level</td>
</tr>
<tr>
<td>Institute for Water of the Republic of Slovenia</td>
<td>national, regional/local</td>
<td>Public institution, consultation and implementation body</td>
<td>national, bilateral, multilateral</td>
<td>water management, planning and implementation, surface waters</td>
<td>Participation on national and local level; Appointed expert representative to attend meetings of bilateral water management commissions (SI-A, SI-HU, SI-CRO)</td>
</tr>
<tr>
<td>Institute of the Republic of Slovenia for Nature Conservation</td>
<td>national, regional/local</td>
<td>Public institution, consultation and implementation body</td>
<td>national, bilateral, multilateral</td>
<td>nature conservation, biodiversity</td>
<td>Participation on national and local level</td>
</tr>
<tr>
<td>Geological Survey of Slovenia</td>
<td>national, regional/local</td>
<td>Public institution, consultation and implementation body</td>
<td>national, bilateral, multilateral</td>
<td>underground waters,</td>
<td>Participation on national and local level</td>
</tr>
<tr>
<td>Slovenia Forest Service</td>
<td>national, regional/local</td>
<td>Public institution, consultation and implementation body</td>
<td>national, bilateral, multilateral</td>
<td>Forest management planning, forest and nature protection</td>
<td>Participation on national and local level</td>
</tr>
<tr>
<td>Organization</td>
<td>Type</td>
<td>Role</td>
<td>Sector</td>
<td>Activity</td>
<td></td>
</tr>
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<tr>
<td>Fisheries Research Institute of Slovenia</td>
<td>national, regional/local</td>
<td>Public institution, consultation and implementation body</td>
<td>national, bilateral, multilateral</td>
<td>freshwater and marine fisheries, business services of sport and recreational fisheries</td>
<td></td>
</tr>
<tr>
<td>Institute for the Protection of Cultural Heritage of Slovenia</td>
<td>national, regional/local</td>
<td>Public institution, consultation and implementation body</td>
<td>national, bilateral, multilateral</td>
<td>immovable cultural heritage, associated movable and intangible heritage</td>
<td></td>
</tr>
<tr>
<td>Chamber of Agriculture and Forestry of Slovenia</td>
<td>national, regional/local</td>
<td>Public institution, consultation and implementation body</td>
<td>national, bilateral, multilateral</td>
<td>Agriculture, Forestry</td>
<td></td>
</tr>
<tr>
<td>Permanent Slovenian-Austrian Commission for the Drava River</td>
<td>transnational</td>
<td>authority</td>
<td>bilateral</td>
<td>Monitoring and coordination of bilateral Drava River issues</td>
<td></td>
</tr>
<tr>
<td>Permanent Hungarian-Slovenian Water Management Commission</td>
<td>transnational</td>
<td>authority</td>
<td>bilateral</td>
<td>Monitoring and coordination of bilateral Drava River issues</td>
<td></td>
</tr>
<tr>
<td>Permanent Slovenian-Croatian Commission for water management</td>
<td>transnational</td>
<td>authority</td>
<td>bilateral</td>
<td>Monitoring and coordination of bilateral Drava River issues</td>
<td></td>
</tr>
</tbody>
</table>

*also listed in the Stakeholder Analysis
5.1. Transboundary Biosphere Reserve Mura-Drava-Danube (contribution by WWF)

WWF provided a “contribution to the Drava River Corridor Analysis Report for Drava countries, especially for Slovenia, Croatia and Hungary in regard to the future TBR MDD region”.

The Transboundary UNESCO Biosphere Reserve Mura-Drava-Danube

Spanning over Austria, Slovenia, Croatia, Hungary and Serbia, the lower courses of the Drava and Mura rivers as well as related Danube sections are among Europe’s most ecologically important riverine areas. Since 1993, NGOs have been campaigning to protect the unique landscape of the three rivers in a transboundary biosphere reserve (TBR), they call today “Amazon of Europe”. Step-wise, public administrations and NGOs are more and more cooperating to jointly achieve the TBR.

The Mura-Drava-Danube river corridor hosts highly valuable natural and cultural landscapes in all five countries, with long river sections forming the state borders - in the past the Iron Curtain. Here, despite numerous former human interventions, this stunning river landscape kept an amazing biological diversity with rare natural habitat dynamics. Since World War II the largest sections of the Mura-Drava system remained simply untouched (military-“protected” zones). There were only some basic water monitoring and small interventions by the border water commissions. Only in the late 1990s these river areas became subject of contradictory interests: resource exploitation (sediment extraction, hydropower, navigation) and old-fashioned river regulation vs. nature conservation.

Today, the corridor’s distinctive natural values are still at risk. Conflicting management practices and various “development plans”, such as regulating the natural river courses, extracting sediments and building new hydro dams, are threatening the TBR’s ecological integrity.

In spite of its relative intactness, the TBR river area is subject to important hydromorphological alterations, notably to a continued river bed deepening and floodplain degradation. More than a century of river regulation, building of flood protection dikes, gravel and sand extractions and the upstream hydropower plants (altering the water tables, flow and sediment dynamics etc.) have led to a loss of up to 80% of the former floodplain areas and to the alteration of about 1,100 km of natural river banks and stretches. These changes have direct negative impacts for the long term preservation of the region’s characteristic biodiversity and rich ecosystems.

Comprehensive restoration efforts are therefore essential in the upcoming decades, and one of the major tasks for the TBR “Mura-Drava-Danube” is to counteract and reverse these negative trends. Restoration measures will allow the riparian countries to achieve EU environmental objectives (WFD, FFHD, BD, FD) and the objectives agreed in the “Drava Declaration” (2008).

Besides, for many local people, the intact river and floodplains are vital for their livelihoods, such as fisheries, flood protection, clean water for drinking, forestry and agriculture as well as recreation and tourism. The rivers are part of their rich multi-ethnic cultural heritage.

Over the last 15 years, all five Governments set up 12 protected areas along these rivers, thus forming the TBR backbone. In 2009 Croatia and Hungary signed a Joint Declaration to establish the
MDD TBR, followed in 2011 by a 5-country Ministerial Declaration. On 11 July 2012, the UNESCO MAB Committee in Paris officially approved the Croatian-Hungarian part of the Biosphere Reserve “Mura-Drava-Danube”. These 630,000 ha cover some 80% of the future 5-country area. The Serbian part is awaiting UNESCO designation after their nomination of 170,000 ha in September 2013. Austria and Slovenia are proceeding with preparing their nomination. If accepted, this would become Europe’s largest riverine protected area and the world’s first pentalateral BR, as well as a flagship for innovative regional cooperation and harmonised sustainable regional development that also supports cross-border reconciliation.

The TBR aims at the conservation and restoration of natural and semi-natural habitats and ecosystems in the cross-border river area. The Ministers agreed that bi- and multilateral cooperation via existing and future framework must aim to improve, harmonise and sustain the management of a shared ecosystem. The new five-country Coordination Board serves to achieve and make the TBR function effectively as well as to develop common conservation and restoration projects and a sustainable use of the MDD river system. National management units shall cooperate with local communities for the benefit of sustainable development that improves ecosystem-based floodplain management and supports the local communities’ livelihood.

The first meeting of the new governmental Coordination Board (CB) establishing the MDD TBR was held in October 2011 in Budapest. It was preceded by the first meeting of the International Working Group (IWG), an informal stakeholder forum of some 70 TBR partners (27 NGOs, 3 international organisations, 26 public and governmental institutions, local communes and others) that is facilitated and supported by WWF to ensure regular and diverse inputs to the governments’ work. The CB then adopted a Road Map with all needed steps from nominations to a well-functioning TBR.

The 2nd meeting of CB and IWG in May 2012 in the Kopacki rit nature park (Croatia) served to exchange first views on the key issues, common principles and guidelines for harmonised management in the future TBR cooperation framework. This new dimension of coordinated nature and water management is being currently formulated and will be/was discussed at the 3rd CB meeting on 18-19 September 2013 in Vienna.

The TBR MDD has a focus on a very long riverine area and extends well beyond the protected areas and addresses various land uses in the buffer and transition zones of the biosphere reserve, in fact in the wider MDD river corridor. This region is mainly characterised by various, in- and extensive or abandoned agriculture that are at risk to lose valuable elements of the old cultural landscape. The TBR MDD success is strongly connected to a parallel engagement of governments, regional institutions, NGOs and other stakeholders, i.e. there is both a top-down and bottom-up contribution to the TBR. The fact that the entire TBR region is very big and complex, i.e. the sub-regions are different in their landscape character, development standards and priority issues, is perceived as strength but not as a weakness.
Transboundary UNESCO Biosphere Reserve “Mura-Drava-Danube”

Figure 23: Core and Buffer Zones on Transboundary Biosphere Reserve Mura-Drava-Danube

Trans-Boundary River System of the Mura, Drava and Danube

Figure 24: Protected Area Network Map of the Transboundary Biosphere Reserve Mura-Drava-Danube
Assessment of the Restoration Potential in the TBR MDD

Map 7: Potential Restoration Areas and all Restoration Measures

Figure 25: Potential River Restoration Sites Map - Transboundary Biosphere Reserve Mura-Drava-Danube

Assessment of the Restoration Potential in the TBR MDD

Map 1: Landuse and main habitats

Figure 26: Habitat Map - Transboundary Biosphere Reserve Mura-Drava-Danube
TBR - Slovenia:

The TBR’s Slovenian Drava, extending from Maribor to Ormoz at the border to Croatia is largely characterised by a series of river-impounding dams and diversion stretches. The old Drava river bed (“Stara Drava”), which is protected as a Natura 2000 site, still hosts remnants of characteristic rare habitats and species and is important as a natural flood retention area. A current EU Life nature project aims at improving the ecological conditions of the area. However, planned new flood protection measures might have negative ecological effects on the area.

Along the TBR’s Slovenian Mura, several protection and restoration measures on lateral connectivity and habitat quality were achieved, such as in the Life Bio-Mura project. Also, some valuable land was bought and public awareness actions executed (new info centres, education trail, publications). However, current plans to build a series of hydropower plants would threaten the ecological integrity and the connectivity of the Natura 2000 network of the river landscape of the TBR. The most advanced project is the planned hydropower plant “Hrastje Mota”, close to the Austrian border, which likely would have transboundary impacts on the Austrian, Hungarian and Croatian territories (Natura 2000 sites, sediment balance, flood protection, ecological status etc.).

A good example of combining nature conservation restoration and sustainable development is the commune Velika & Mala Polana (Slovenian Mura), named since 1999 “European Stork Village”. All their land is Natura2000 site or cultural heritage which the mayor considers “not a problem but an opportunity”: Sustainable tourism with >30,000 visitors provides new jobs and revenues invested into upgrading public infrastructure (sewage system, hiking/biking trails). Further, the commune’s meadow management has become a major field of actions (continuous awareness raising among local people to sustain the support for diverse actions; leasing of 25 ha of abandoned grasslands that were at risk to turn into forests and are now regularly mowed as white storks habitats (flagship species). Amphibian ponds were restored, a Centre for Interpretation of the Natural and Cultural Heritage opened, webcams were installed at stork nests and local trainings organised on hay-making techniques to better preserve biodiversity.
6. PROJECT ANALYSIS

During the work on the Analysis Report a database of past, ongoing, and planned development and nature conservation projects was constructed, covering both national and international projects. In this chapter a short description of the relevant projects is given and in tabular form the main characteristics (name of the project, project theme, progress phase, geographical scale, country relevance, scope and results in physical dimensions, level of integration, stakeholder involvement, cost category, date of completion, potential threats and benefits) listed.
<table>
<thead>
<tr>
<th>Name of the project</th>
<th>Project theme</th>
<th>Progress phase</th>
<th>Geographical scale</th>
<th>Country relevance</th>
<th>Scope and results in physical dimensions</th>
<th>Level of integration</th>
<th>Stakeholder involvement</th>
<th>Cost category</th>
<th>Date of completion</th>
<th>Potential threats and benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Management of Drava River Trajnostno upravljanje območja reke Drave (TrUD)</td>
<td>Nature conservation</td>
<td>Finished</td>
<td>Regional</td>
<td>National, transboundary</td>
<td>Pilot area was the stretch of river Drava between Selnica on Dravi and Središče ob Dravi. Aims of the project were: improve knowledge and awareness about biodiversity, improvement of habitat conditions and making a strong base for management and sustainable use of the area. The project provided an improved information infrastructure, an integrated draft management plan and inventory (habitats, birds, butterflies, fish, plans).</td>
<td>The project used an integrative approach.</td>
<td>Stakeholders involved in project: nature conservation, development agencies, agriculture, energetics, local municipalities, fishery, hunting, NGO-s, forestry</td>
<td>261.468 EUR</td>
<td>2006</td>
<td>Implementation problems</td>
</tr>
<tr>
<td>Dra-Mur-CI</td>
<td>Flood protection (structural), water management, sediment management</td>
<td>Finished</td>
<td>Regional</td>
<td>National, transboundary</td>
<td>A catalogue of flood scenarios gives also hydrologic and hydraulic analysis of the Drava river with some of its tributaries. Studies of flood protection measures on Drava river (sections from Rosegg to Lavamünd and Malečnik to Duplek) and on Mura river. An information platform on floods - sharing data between Austria and Slovenia. Public will be informed on flood risks, flood hazards and flood protection. Also public will be warned when floods are possible.</td>
<td>Stakeholders: water sector authorities and civil protection in Slovenia and Austria. End users: Drava and Mura catchment area residents, special government services, public services and HPP managers.</td>
<td>3.500.000 EUR</td>
<td>30.6.2013</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Riparian Ecosystem Restoration of the Lower Drava River in Slovenia - LIVEDRAVA

### Nature conservation
- **Objective:** Pilot area between Maribor and Središče ob Dravi. Aims of the project are to do restoration works, measures to improve habitat quality, transform wastewaters basins into a semi-natural wetland, education, development of nature-friendly tourism, scientific research.
- **Integration:** Integration between partners and with stakeholders.
- **Involvement:** Involvement of public and stakeholders on different levels.
- **Cost:** 4,409,483 EUR end of 2017
- **Impact:** Improvement of ecosystems and biodiversity.

### Collection and treatment of waste water in the upper Drava river basin
- **Objective:** Construction of infrastructure for collection and treatment of wastewater in municipalities Dravograd, Muta, Radlje ob Dravi, Selnica ob Dravi and Vuzenica, 33,6 km canalization system and 3 wastewater treatment plants.
- **Integration:** Integration between involved local communities.
- **Cost:** 370,000 EUR October 2015
- **Impact:** Improvement of water quality in river Drava/groundwater.

### Collection and treatment of waste water in the Drava river basin (3.part) - Municipality Središče ob Dravi
- **Objective:** Construction of infrastructure for collection and treatment of wastewater in municipality Središče ob Dravi, 22,8 km canalization system and one wastewater treatment plant.
- **Integration:** No/ Not known.
- **Cost:** 102,000 EUR end of 2015
- **Impact:** Improvement of water quality in river Drava/groundwater.
<table>
<thead>
<tr>
<th>Project Description</th>
<th>Water Management</th>
<th>On-going</th>
<th>Regional</th>
<th>National</th>
<th>Description</th>
<th>Integration</th>
<th>Cost</th>
<th>End of Project</th>
<th>Environmental Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection and treatment of waste water in Ptuj field</td>
<td>wastewater treatment</td>
<td>On-going</td>
<td>Regional</td>
<td>National</td>
<td>Construction of infrastructure for collection and treatment of wastewater in municipalities Ptuj, Gorišnica and Markovci, 40,6 km of canalization system and one wastewater treatment plant.</td>
<td>Integration between involved local communities.</td>
<td>13000000 EUR</td>
<td>end of 2015</td>
<td>Improvement of water quality in river Drava/groundwater</td>
</tr>
<tr>
<td>Ensuring flood protection in the area of the upper and lower Drava</td>
<td>Flood protection</td>
<td>On-going</td>
<td>Regional</td>
<td>National</td>
<td>Flood protection infrastructure on upper and lower Drava, Meža, Mislinje, Dravinja, Polskava and Pesnica. 10,4 km renovated dikes, 10,2 km new dikes, new and upgraded retention reservoirs. These measures will be done at the Malečnik and Dogoše and Vurberg-Duplek sections of the lower Drava, on the river Pesnica (construction of Pristava AK), at Meža and Mislinje and in the area of Dravinja with Polskava.</td>
<td>Integration between involved local communities.</td>
<td>38000000 EUR</td>
<td>end of 2015</td>
<td>Improvement of the flood protection. Possible negative impacts on biodiversity.</td>
</tr>
<tr>
<td>Hiking and biking (Recreation in nature - hiking and biking without borders)</td>
<td>Recreation, other (sustainable development)</td>
<td>Finished</td>
<td>supra-local</td>
<td>Regional, transboundary</td>
<td>Information (brochures, internet, promotion) on different hiking, cycling and nordic walking routes in Austria and Slovenia (Pohorje, Podravje, Pomurje Koroška). Project promotes both: natural and cultural values in 2 countries. Tourism service providers were involved as stakeholders.</td>
<td></td>
<td>1800000 EUR</td>
<td>1.4. 2012</td>
<td>Potential benefit is that touristic information are given through internet in 8 European languages. This way promotion is made across</td>
</tr>
<tr>
<td>drinking water supply in Drava river basin</td>
<td>On-going</td>
<td>supralocal</td>
<td>National</td>
<td>Upgrading the water supply system in 5 municipalities along Drava River: Dravograd, Muta, Podvleka, Radlje ob Dravi in Vuzenica.</td>
<td>Integration between municipalities.</td>
<td>Most important stakeholders are end users, which is local population.</td>
<td>33106504 EUR</td>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>borders of the pilot area.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIKROTUR</td>
<td>Finished</td>
<td>Local</td>
<td>Regional</td>
<td>Network between 5 micro touristic destinations in the municipalities: Duplek, Kungota, Maribor, Pesnica and Šentilj.</td>
<td>Integration between local communities.</td>
<td>Involvement of key actors of the target area, tourism.</td>
<td>60.520 EUR</td>
<td>2013</td>
<td></td>
</tr>
<tr>
<td>5 micro touristic destinations to ensure sustainable land use and to increase quality of living environment in rural areas and to encourage competitiveness and develop new business opportunities.</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Project</td>
<td>Sector</td>
<td>Status</td>
<td>Scale</td>
<td>Goal</td>
<td>Expected Outcome</td>
<td>Potentially Affected Areas</td>
<td>Duration</td>
<td>Notes</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>MURA-DRAVA BIKE</td>
<td>Recreation, other (sustainable development)</td>
<td>Finished</td>
<td>supra-local</td>
<td>Transboundary</td>
<td>Results are 2 brochures including maps of bike routes with description of routes and tourist attractions. One bike route is along Mura river and other is along Drava river from Dravograd (Slo) to Gornji Kuršovec (Hr).</td>
<td>Project promotes both: natural and cultural values in 2 countries - Croatia and Slovenia. Tourism service providers were involved as stakeholders.</td>
<td>1.799.067 EUR</td>
<td>Promoting regions in Slovenia and Croatia that have, until now, unexploited their touristic potential.</td>
<td></td>
</tr>
<tr>
<td>Podravje-Ptuji_ormož regional destination organization</td>
<td>Other (tourism)</td>
<td>Ongoing</td>
<td>Regional</td>
<td>National</td>
<td>Promotion of tourism service providers and their products in 27 local communities in north-east part of Slovenia.</td>
<td>Successful integration between public (local communities) and private sector (tourism providers). Stakeholders: 27 local communities and several tourism service providers from the private sector.</td>
<td>2013</td>
<td>Potential benefits: Increasing income from tourism and the promotion of tourism service providers and their products</td>
<td></td>
</tr>
<tr>
<td>Agro-Environment</td>
<td>Industry</td>
<td>Finished</td>
<td>International</td>
<td></td>
<td>Exchange of information, improving the environmental performance and fostering the economic growth of the agro-food sector related to Eco-innovation and Environmental Technologies. Spain, Portugal, Italy, Greece, France and Slovenia.</td>
<td>Integrating ecology and food industry by encouraging eco-innovation in companies and by creation of a platform which promotes the transfer of technologies and best environmental management practices. Stakeholders: Small and Medium Enterprises in the agro-food sector, experts in environmental technologies and best practices in the agro-food sector, Regional Authorities, Universities, Innovation &amp; Technology Centres and other relevant stakeholders.</td>
<td>2011</td>
<td>Potential benefits: Dissemination of technologies and best environmental management practices in the Mediterranean agro-food sector. Implementation of an ambitious plan for communication and dissemination of project</td>
<td></td>
</tr>
<tr>
<td>Bike route from the source to the mouth of Drava river - Dravska kolpot Dravska kolesarska pot od izvira do izliva - Dravska kolpot</td>
<td>Recreation, spatial planning</td>
<td>Finished</td>
<td>Spatial planning</td>
<td>Transboundary</td>
<td>A map of bike routes along Drava River that connects bike routes between Austria and Slovenia.</td>
<td>Establishment of cross-border coordination in the planning, developing and implementing of activities in the field of cycling tourism along the Drava River.</td>
<td>Stakeholders: tourism service providers, bike tourists.</td>
<td>86,422 EUR</td>
<td>end of 2007</td>
</tr>
</tbody>
</table>
7. STAKEHOLDER ANALYSIS

The aim of the stakeholder analysis is the identification of individuals, companies, interest groups or other organisations that have an interest connected to development or conservation projects within the Drava River Corridor; either in a supportive way (initiating, carrying out the project, etc.) or objecting against it (based on conflicting interest or on environmental grounds). The purpose of the analysis is to understand stakeholder aspirations in order to be able to propose sound solutions to conflicts among development and conservation goals. Thus, the results of the stakeholder analysis will be primarily utilized within the consensus building stakeholder participation process that takes place in a subsequent phase (Activity 4.1) of the SEE River project.

7.1. Methodology of stakeholder identification

Stakeholders can be defined as any person, group or organisation that is likely to be affected by, or have an interest in, the decisions being made. In the SEE River project activities on the Drava pilot areas, stakeholders are all organisations or persons:

- that are involved in the managing of the river corridor,
- that live, work, own property, or perform economic or other activities in the river corridor,
- represent groups with specific interests in the area,
- any other organisation or individual affected by the decisions relating to conservation or development of the area.

In Drava River Corridor in Slovenia, stakeholders’ identification is an on-going process, performed as a multi-step analysis:

1. Identification of stakeholders from different expert fields on national level,
2. Identification of stakeholders from different expert fields on local level:
   - Stakeholders Influence on local level from governmental point of view (usually those with higher level of impact on taking decisions),
   - Influence or interest on local level from other points of view (business, interest, others) (usually those with high motivation to become actively involved in problem-solving and/or future implementation).

Considering the level of involvement, four groups of stakeholders have been identified see the scheme below).
Figure 27: Four groups of stakeholders in project area

7.2. Identified stakeholders

The list and short characterisation of all identified stakeholders is contained in the next table. It contains all relevant stakeholders of the pilot area, and also those that have a major role in other parts of the Drava river corridor.

In last column, stakeholders are defined according to their level of involvement:
- on national and/or local level and
- as one of the above mentioned groups.

Note: there is no media stated in the next list.
### Table 12: Stakeholders identified in the Drava River Corridor in Slovenia

<table>
<thead>
<tr>
<th>Name of Stakeholder</th>
<th>Sector</th>
<th>Organisational category</th>
<th>Scope of operation</th>
<th>Related project</th>
<th>Involvement in stakeholder participation process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministries (Agriculture and Environment, Infrastructure and Spatial Planning, Economic Development)</td>
<td>water management, nature conservation, agriculture, fishery, forestry, waste, climate changes, environment, energy, spatial planning, tourism, regional development,</td>
<td>authority</td>
<td>national, bilateral, multilateral</td>
<td>RBMP, flood protection projects, Natura 2000, Attract SEE, state infrastructural projects, others</td>
<td>Participation on national level, participation on local level</td>
</tr>
<tr>
<td>Slovenian Environment Agency</td>
<td>water monitoring</td>
<td>Public institution (body of the Ministry of Agriculture and the Environment), consultation and implementation body</td>
<td>national, regional/local</td>
<td>Input for RBMPs in Slovenia, environmental monitoring, others</td>
<td>Participation on national level, participation on local level; Key Driver/representatives of key stakeholders</td>
</tr>
<tr>
<td>Institute for Water of the Republic of Slovenia</td>
<td>water management, planning and implementation, surface waters</td>
<td>Public institution, consultation and implementation body</td>
<td>National, bilateral, multilateral</td>
<td>Preparation of RBMPs in Slovenia, others</td>
<td>Participation on national level, participation on local level; Coordination Team</td>
</tr>
<tr>
<td>Institute of the Republic of Slovenia for Nature Conservation</td>
<td>nature conservation, biodiversity</td>
<td>Public institution, consultation and implementation body</td>
<td>National, bilateral, multilateral</td>
<td>Natura 2000 PUN2000, Wetman, Alpa, SEE River, others</td>
<td>Participation on national level, participation on local level; Coordination Team</td>
</tr>
<tr>
<td>Geological Survey of Slovenia</td>
<td>underground waters,</td>
<td>Public institution, consultation and implementation body</td>
<td>National, bilateral, multilateral</td>
<td></td>
<td>Participation on national level; Identified stakeholder;</td>
</tr>
<tr>
<td>Slovenia Forest Service</td>
<td>Forest management planning, forest and nature protection</td>
<td>Public institution, consultation and implementation body</td>
<td>National, bilateral, multilateral</td>
<td>SylvaMED, Wetman</td>
<td>Participation on local level; Key Driver/representatives of key stakeholders</td>
</tr>
<tr>
<td>Fisheries Research Institute of Slovenia</td>
<td>freshwater and marine fisheries, business services of sport and recreational fisheries</td>
<td>Public institution, consultation and implementation body</td>
<td>National, bilateral, multilateral</td>
<td>Wetman</td>
<td>Participation on national level; Identified stakeholder;</td>
</tr>
<tr>
<td>Institute for the Protection of Cultural Heritage of Slovenia</td>
<td>immovable cultural heritage, associated movable and intangible heritage</td>
<td>Public institution, implementing regulations</td>
<td>National, bilateral, multilateral</td>
<td></td>
<td>Participation on national level, participation on local level; representatives of key stakeholders</td>
</tr>
<tr>
<td>Institute of Agriculture and Forestry Maribor and Ptuj</td>
<td>Agriculture</td>
<td>Public institution, consultation and implementation body</td>
<td>Regional, local</td>
<td>Participation on local level; Key Driver/Representative of key stakeholders</td>
<td></td>
</tr>
<tr>
<td>Administration of the Republic of Slovenia for Civil Protection and Disaster Relief</td>
<td>constituent body of the Ministry of Defense</td>
<td>Public institution</td>
<td>National, local</td>
<td>Participation on local level; Identified stakeholder</td>
<td></td>
</tr>
<tr>
<td>Chamber of Commerce</td>
<td>All sectors</td>
<td>Sectoral association with local office, all types of business</td>
<td>Transnational, national, local</td>
<td>Participation on local level; Representative of key stakeholders</td>
<td></td>
</tr>
<tr>
<td>Local communities (Markovci, Ptuj, Starše, Gorišnica, Hajdina, Videm, Maribor, Duplek, Miklavž na Dravskem polju, Dornava, Kidričevo, Cirkulane, Zavrč, Ormož)</td>
<td>Local authorities; all sectors</td>
<td>Public</td>
<td>Regional, local</td>
<td>Participation on local level; Key drivers/representative of key stakeholders</td>
<td></td>
</tr>
<tr>
<td>Common management board of local municipalities in Lower Drava Region</td>
<td>Spatial planning, infrastructure</td>
<td>Public</td>
<td>Regional, local</td>
<td>Participation on local level; Representative of key stakeholders</td>
<td></td>
</tr>
<tr>
<td>Association of Municipalities and towns of Slovenia</td>
<td>Representative association</td>
<td>Public</td>
<td>National, regional/local</td>
<td>Participation on local level; Representative of key stakeholders</td>
<td></td>
</tr>
<tr>
<td>Intermunicipal office for environment protection</td>
<td>Nature conservation, water management, flood protection</td>
<td>Public</td>
<td>Regional/local</td>
<td>Participation on local level; Representative of key stakeholders</td>
<td></td>
</tr>
<tr>
<td>Maribor Development Agency</td>
<td>Regional development, tourism</td>
<td>Public</td>
<td>Regional/local</td>
<td>Participation on local level; Key driver</td>
<td></td>
</tr>
<tr>
<td>Bistra Ptuj</td>
<td>Regional development agency</td>
<td>Public</td>
<td>Regional/local</td>
<td>Participation on local level; Key driver</td>
<td></td>
</tr>
<tr>
<td>Dravske elektrarne Maribor (Drava Hydropower plants)</td>
<td>Hydropower</td>
<td>State owned company</td>
<td>Regional/local</td>
<td>Participation on local level; Coordination Team (observer), Key driver</td>
<td></td>
</tr>
<tr>
<td><strong>Local fishery associations</strong></td>
<td><strong>Fishery, tourism</strong></td>
<td><strong>Interest association with local offices</strong></td>
<td><strong>National, regional/local</strong></td>
<td><strong>Participation on local level; Key driver, representative of key stakeholders</strong></td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
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<td>-----------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>BirdLife Slovenia (DOPPS)</td>
<td>Bird and habitats directive</td>
<td>NGO</td>
<td>Transnational, national, regional/local</td>
<td>LiveDRAVA, other</td>
<td></td>
</tr>
<tr>
<td>Engineering companies (VGB, VGP, IEI, ZUM)</td>
<td>Spatial planning</td>
<td>Business</td>
<td>National, regional/local</td>
<td>LiveDRAVA</td>
<td></td>
</tr>
<tr>
<td>Local Action Groups</td>
<td>Different sectors (agriculture, tourism etc.)</td>
<td>Public-private partnership</td>
<td>Regional/local</td>
<td>Participation on local level; Key driver</td>
<td></td>
</tr>
<tr>
<td>Fish farms</td>
<td>Fishery</td>
<td>Private</td>
<td>Regional/local</td>
<td>Participation on local level; Representative of key stakeholders</td>
<td></td>
</tr>
<tr>
<td>Tourist associations (Zavod za turizem MB-Pohorje, Zavod za šport Ptuj)</td>
<td>Tourism</td>
<td>Private</td>
<td>Regional/local</td>
<td>Participation on local level; Key driver, representative of key stakeholders</td>
<td></td>
</tr>
<tr>
<td>Local hunting association</td>
<td>Interest association</td>
<td>Regional/local</td>
<td>Participation on local level; Identified stakeholder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bike associations</td>
<td>tourism</td>
<td>Interest association</td>
<td>Transnational, national, regional/local</td>
<td>Participation on local level; Key driver</td>
<td></td>
</tr>
<tr>
<td>Terme Ptuj</td>
<td>tourism</td>
<td>Private, enterprises</td>
<td>National, regional/local</td>
<td>Participation on local level; Identified stakeholder (potential financial partner in implementation of action plans)</td>
<td></td>
</tr>
<tr>
<td>Perutnina Ptuj</td>
<td>tourism</td>
<td>Private, enterprises</td>
<td>National, regional/local</td>
<td>Participation on local level; Identified stakeholder (potential financial partner in implementation of action plans)</td>
<td></td>
</tr>
</tbody>
</table>

*also stated in Institutional Setup Analysis*
8. MAP OF HOTSPOTS

Making use of the results of Chapters 2 and 3 on resources and risks – with special emphasis on nature values, conservation goals and economic resources, on flood and water quality risks –, and including their spatial relationships as established in Chapter 4, moreover the spatial information of development projects (or aspirations) addressed in Chapter 6, a map of conflicting river corridor uses has been constructed. In the pilot area the conflict spots or zones were identified in a profound way, while on the rest of the DRC potential conflicts zones were assigned in a more indicative manner, using the available, less detailed data and extrapolations.

Conflict locations are categorised and marked separately by type (e.g. conservation versus river training, versus flood control, versus tourism, etc.) and significance.

The map of hotspots prepared within the 5 National Drava River Corridor Analysis Reports will be merged into a map of the whole DRC.
9. SYNERGIES AND CONFLICT ANALYSIS

Based on the database of projects and the results of the institutional and stakeholder analysis, the possible synergies and conflicts among projects and stakeholder aspiration will be analysed in this chapter. Proposed means of the analysis will be the synergy table and the conflict table constructed on known or estimated characteristics of development projects and nature conservation measures, plans. Using these tables, possible synergies and conflicts between/among different categories of projects can be cross-examined. Based on the above tables, a more concrete analysis of the actual projects will be given in this chapter.

This is just a reminder of what the Analysis Report in its extended form will contain. This chapter need not be elaborated in the first issue of the Report. The total length of this chapter should be about 2-3 pages.
10. FEASIBLE MEASURES

The aim of this chapter is to offer a set of feasible measures, which can be applied in the course of the project for

- the stakeholder involvement and consensus building process;
- the resolution of particular conflicts;
- promoting integrated river corridor management approaches;
- reshaping project ideas to have better local/regional/international acceptance, to be eligible for financing schemes, to reconcile with other sectorial or stakeholder aspiration.

Some of the proposed measures do concern processes, like stakeholder involvement, consensus building, conflict resolution, while others concern project content, and it was worthwhile to differentiate between the two categories.

The Analysis Report is not intended to come up with decisions; this is definitely in the hands of the stakeholders and the public authorities responsible for policies and licensing. Therefore it was necessary to offer a choice of potential measures the interested parties might select from.

10.1. Process oriented measures

Introduce here those measures that can help the consensus building process aimed at Action 4.2 (Agreement on common vision, goals and measures), and are relevant in the case of the pilot area (and for the national DRC).

10.2. Project content related measures

Introduce here those project content elements that might help reshaping contradictory project ideas relevant in the case of the pilot area (and for the national DRC).

Little can say about actual measures at this phase of the project, when the pilot area status is not known in its full detail. Apart from own ideas generated by a better insight of the pilot area, the authors will be able to rely also on the - best practices identified and - elements of the Toolkit developed within Work Package 3.

This is just a reminder of what the Analysis Report in its extended form will contain. This chapter need not be elaborated in the first issue of the Report. The total length of this chapter should be about 3 pages.
11. PROGRESS INDICATORS AND BENCHMARKS

Progress indicators are the means to measure the distance between a past and a present or future status, with reference of the fulfilment of certain goals. In this case the goals were derived from the objectives of the Drava River Declaration. Most of these objectives are rather general and worded in an easily perceptible manner, therefore the indicators have also be kept as simple as possible, to be in accordance with the comprehensive nature of the Declaration.

As a response to the 10 DRV goals, river corridor status might be analysed through the following indicators:

1. Intergovernmental policy integration indicator
2. Flood warning indicator
3. Water retention indicator
4. River and floodplain restoration indicator
5. Biotope network indicator
6. Migratory fish connectivity indicator
7. Cross-border recreation indicator
8. Riparian country cooperation indicator
9. Integrated river basin management indicator
10. Stakeholder partnership indicator

The definition of the indicators can be found in Appendix 1 of this Report.

As the Declaration was signed in 2008, we are accounting progress between 2008 and 2012 (or 2013). In this respect, progress indicators show, how far the region got in the direction of the 10 objectives since 2008. Progress is quantified by the indicators, but fulfilment of the goals is in many cases the matter of qualitative categories. These categories are denoted by benchmarks.

By definition, the indicator’s scope is the whole of the Drava River Corridor. Nevertheless they can be applied to any part of it, even to the pilot area. They can be adapted by setting the indicator’s reference variables (river length, river corridor area, number of projects, number of river disconnections, etc.) to that of the pilot area.

There might be a need to apply other indicators more relevant for a given pilot area (e.g. indicators on flood defence, biotope status, water quality, etc.). You are free elaborate and extend the palette with those. Provide an explanation about them in your Appendix 2, in a manner similar to the Drava River Declaration indicators.

This is just a reminder of what the Analysis Report in its extended form will contain. This chapter need not be elaborated in the first issue of the Report.

The total length of this chapter should be about 3 pages.
12. REFERENCE DOCUMENTS

The NDRCAR covers a broad range of topics, and draws upon several types of sectoral, international, regional, and local documents and plans. This Report has been based on the following references:

Sectoral documents
- Nature conservation act – ZON (Uradni list RS, št. 96/04 – UPB2)
- Decree on special protection areas (Natura 2000 areas) (Uradni list RS, št. 49/04, 110/04, 59/07, 43/08, 8/12, 33/13, 35/13 (popr.), 39/2013 Odl.US)
- Decree on the categories of valuable natural features (Uradni list RS, št.52/02, 67/03)
- Decree on ecologically important areas (Natura 2000 areas) (Uradni list RS, št. 48/02, 33/13)

International documents

Regional documents
- Pravni režimi varstva kulturne dediščine (eVrD), Register nepremične kulturne dediščine (Rkd), ©Ministrstvo za kulturo, stanje na dan 2010.

Local documents
- Ptuj. 2013. www.ptuj.info
13. APPENDIX 1

Progress Indicators
Derived from the objectives of the Drava River Declaration
1st Draft

Progress indicators are a means to measure the fulfilment of objectives set in the Drava River Declaration. In order to make the actual processes comparable to the objectives, these rather general objectives should be transformed into a more specific set of targets that can be associated with appropriate indicators. The targets – in accordance with the focus of our project – should be within the context of the river corridor. Some of the objectives allow a considerable degree of freedom in the selection of targets (e.g. #1, 8, 9, and 10), while others are worded almost in an operational manner (e.g. #2 and 6) and lead to unambiguous targets. Nevertheless, in every case special care had to be given to the selection, not to end up with targets that are either too specific or too general, otherwise the indicators will become marginal or meaningless, respectively. An other important issue is data demand and availability: all indicators should be determined from information that is either readily available or at least can be made available with reasonable a effort. As the Declaration was signed in 2008, we are accounting progress between 2008 and 2012 (or 2013). In this respect, progress indicators show, how far the region got in the direction of the 10 objectives since 2008.
1. INTERGOVERNMENTAL POLICY INTEGRATION INDICATOR

Drava River Declaration Objective:

1. To promote the Drava River as a model for integrated implementation of EU policies on water and nature protection

The EU Directives on water management (Water Framework Directive), flood protection (Flood Directive), and biodiversity conservation (Flora-Fauna-Habitat Directive and Birds Directive) constitute a fundamental basis for river basin management in the Drava River catchment. Intergovernmental coordination and exchange of information can positively reinforce the implementation of relevant policies.

Rationale of the indicator:

This objective calls for inter-governmental coordination to achieve an integrated implementation of EU policies concerning water management, flood protection and biodiversity conservation. (Although the Declaration mentions the Drava River catchment, but within the context of this project, it should be understood as the Drava River Corridor.)

Practical inter-governmental coordination of Drava River issues takes place in Bilateral Commissions set up for discussing water or environment related topics of common interest. The scope and general responsibilities of similar Commissions having a mandate on the River and in each of the Drava countries should be outlined in the national Analysis Reports. Based on the findings, the potential of these bodies for policy integration can be evaluated.

Aspects for establishing an indicator on intergovernmental policy integration might be the followings:

- complexity of the scope of the commissions: whether water and biodiversity conservation issues are integrated within one commission (e.g. in a subcommission) or decisions are taken in separate commissions with limited or no overlap;
- the ability of the commissions to overview problems that need multilateral instead of bilateral vision, as in the case of the Drava River.

Proposal for an Intergovernmental Policy Integration Indicator can be formulated when more detailed information on the different commissions are available.
2. FLOOD WARNING INDICATOR
Drava River Declaration Objective:

2. To enhance flood protection through the improvement of flood warning systems and through increased information exchange.

Flood protection in the Drava River basin is a shared responsibility of all riparian countries. To give warnings in flood-prone areas at an early stage, flood risk must be detected sufficiently early to provide time for people to react. In a context of cross-border coordination and climate change along the Drava River, emphasis should be given in future to the improvement and adjustment of flood forecast models and flood warning systems.

Rationale of the indicator:
The purpose of a flood warning system is to forecast a time-profile of the flood wave (flood crest and shape) with a given accuracy and lead-time. This lead time can be compared to the response time, i.e. to the time period required for advance warning to carry out the protection measures adequate to the expected flood hazard.

Improvement of the flood warning system might aim at
- technical and organisational aspects, including the telemetric system, the forecasting model, and the transfer/dissemination of flood warning information to local communities; and
- cooperation and information-exchange aspects, mainly among organisation actively involved in flood defence. In case of floods, there is a vital need for information exchange on events affecting flood flow, e.g. on inundations, dam failures, reservoir operation, etc.. Once cooperation on information exchange has been established, consequent technical requirements (data transfer, evaluation and forecast) fall into the previous category.

**Flood Warning Indicator (FWI)** is the quotient of the lead-time (LT) and the response time (RT) necessary for different protection measures or actions.

\[
FWI = \frac{LT}{RT}
\]

As lead-times and response times (and consequently FWI) vary along the river and depend also on the size of the population and assets endangered, they should be determined on a place-to-place basis.

Response times in most countries are connected to certain levels of flood alert. Many countries (including Hungary) adopted a three level flood alert system (initial alert, flood warning, severe flood warning) plus an additional level for emergency mobilization and evacuation. Each of these levels are conditioned on actual and/or forecasted meteorological and/or flood phenomena (e.g. amount of precipitation, river stage, rise of water, etc.) and trigger a predefined set of actions. The proposed indicator is the quotient of the lead-time and the response time connected to local flood alert levels.

To evaluate the indicator, the following questions should be answered for different sections of the river:
- How much earlier it becomes known that the flow will exceed the flood warning, the severe flood warning or the emergency (e.g. evacuation) level, with a predefined certainty? (In other words, what is the lead-time of the forecast having at least 75% success probability?)
- How much time is needed for the execution of actions defined for a severe flood situation (or an evacuation)?

Example
Based on available hydro-meteorological information a serious flood event can be forecasted with 6 hours of lead-time and with 75% reliability, moreover 5 hours are needed to evacuate a given community at risk. In this case the flood warning indicator (FWI = LT75%/RT) is 1.2 which can be considered good. Maybe the forecasting system is worth a bit of an improvement, to gain an additional hour of LT, which would result an excellent index. But in general it is good enough.
Nevertheless, in several critical flood situations unexpected interventions and unreported events did occur: either on a tributary (e.g. release of water from a filled-up reservoir accelerating rise of the river stage), or at an upstream section of the river (e.g. a dike failure causing a drop in the flood crest downstream). Due to the lack of information exchange these unaccounted events decrease the reliability of our forecast, resulting in underestimated hazards and false alarms. Because of these, in actual cases the 75% certain lead-time proved to be only 3 hours, thus the FWI is only 0.6, which we consider unsatisfactory.

**Reliability** of the forecast plays a key role in the Flood Warning Indicator. Out of the many criteria forecast reliability is measured with, for our purpose the Conditional Success Index (CSI) could be suggested, which is a general indicator of the ability to forecast an uncommon event (see: WMO Manual on Flood Forecasting and Warning (2011), Chapter 4., p.4-13). The CSI can be calculated in the following manner:

\[
\text{CSI} = \frac{\text{hits}}{\text{hits} + \text{false alarms} + \text{misses}}
\]

In the above formula, hits, false alarms and misses are counts of the following events within a given time period:

- **hits** - is the number of successful extreme event forecasts;
- **false alarms** – is the number of forecasts, where the forecasted extreme event was more serious than the actual;
- **misses** – is the number of forecasts, where the forecasted extreme event was less serious than the actual.

If CSI is above 33%, the forecasting system is considered useful. Between 50% and 75% the forecast is informative and above 75% reliable.

** Benchmarks for the Flood Warning Indicator:**
- \( FWI < 1.0 \) unsatisfactory warning
- \( 1.0 \leq FWI < 1.2 \) acceptable warning
- \( 1.2 \leq FWI \) satisfactory warning
3. WATER RETENTION INDICATOR
Drava River Declaration Objective:
3. To enhance flood protection through protection and restoration of water retention areas along the Drava River
Recent insights – particularly based on flooding disasters – indicate that linear security measures for protection from floods alone may not provide the most effective solutions. In the face of climate change and an expected increase in extreme flood events, we aspire to an improvement in the flood situation and raising the level of system security along the Drava River – this means in the first instance preservation, and then, where necessary and feasible, creation or restoration of suitable water retention areas.
Rationale of the indicator:
Water retention is an emerging if partial solution for flood protection. Nevertheless, ranging from rain water retention measures (upper part of the basin), through emergency reservoirs (within the river valley or outside of it), to retention in depressions and oxbow lakes within the river corridor. Also, the level of integration with river restoration and nature protection goals can be rather different.
Within the Analysis Report, the available practices and plans (including maps, technical data and operation rules) should be collected and analysed.
Target values (as of 2008):
a. the number and extent of actual and potential water retention areas within the pilot area and on the catchment;
b. the volume of water that can be potentially retained in retention areas.
Water Retention Indicator (WRI):
a1. the number of potential water retention areas versus the target value;
a2. the areal extent of potential water retention areas or facilities versus the target value;
b. the volume of potential water retention areas or facilities versus the target value.
4. RIVER & FLOODPLAIN RESTORATION INDICATOR
Drava River Declaration Objective:
4. To continue and further develop restoration of the Drava River and its floodplains
In recent years many river restoration and rehabilitation projects have shown that flood protection and nature conservation need no longer conflict with each other. River restoration often leads to an enhancement of ecological diversity. Water retention areas associated with the river can prevent uncontrolled outflow of water, thus improving flood protection. Further river restoration and rehabilitation projects with these multiple benefits will be encouraged, both on national level and in a transboundary context, taking into account the economic capacities of particular states.
Rationale of the indicator:
This goal can be related to the WFD notion of cross-sectional hydro-morphological status of the river corridor. Potential restoration measures might aim at renaturalization of the riverbed in terms of flow dynamics and shape, removal or modification of groyne fields, renaturalization of the riverbank, removal of hard embankments, revitalisation of cut of river branches, restoration of wetlands and natural vegetation on the floodplain, extension of the floodplain by relocation of the levees, etc.
As there are too many different restoration measures that can be taken into account, a simple set of indicators might be of practical use, namely
a. the area of the riverbed restored,
b. the area of the riverbank restored,
c. the area of the dead-branches and that of the floodplain where biotics were restored.

**Target values:** Within the Analysis Report, an inventory of the actual or potential restoration sites and their areal extent should be prepared and target values (as of 21008) be established for all four restoration types.
River & Floodplain Restoration Indicator (RFRI):

$$RFRI_{a,b,c,d} = \text{the area of potential restoration sites of type } a, b, c, \text{ and } d \text{ versus their respective target values.}$$
5. BIOTOPE NETWORK INDICATOR
Drava River Declaration Objective:
5. To maintain and further develop the Drava River as an “ecological backbone”
Ecological core zones along the Drava River such as Natura 2000 areas, nature conservation areas, landscape conservation areas or free flowing river sections form an “ecological backbone” of the river basin. This transnational biotope network has to be safeguarded through active transboundary cooperation. The establishment of transboundary protected area systems such as the proposed UNESCO Biosphere Reserve “Danube-Drava-Mura” across five riparian countries forms a key part of this, and will be supported.

Rationale of the indicator:
Both objective #5 and #6 aim at the longitudinal ecological connectivity of the river corridor: #5 on the river as well as the floodplain, while #6 concentrate on the river itself and with respect to migratory fish. Since longitudinal connectivity within the riverbed is and will be limited by the barrages of the hydropower plants, connectivity of the biotopes can realistically be pursued on the floodplain only. Thus the objective can be reformulated as aiming at the extension and interconnection of the ecological zones (Natura 2000 sites, nature parks, biosphere reserves) along floodplain; preferably on both, but at least on one of the riverbanks.
Within the Analysis Report protected areas and their potential longitudinal extension and interconnections should be explored.

Target values (as of 2008):
a. Length of the actual and potential ecological protection zones along the Drava, as measured separately on both riverbanks;
b. The number of disconnections to be eliminated.

Biotope Network Indicator (BNI):
\[
BNI = \left( \frac{L_{2013} - L_{2008}}{L_{2008}} \right) \times 100 \%
\]

where
L2008 – is the length target value as of 2008;
L2013 – is the length of the of the potential ecological zones along the river, measured separately on both riverbanks by the end of 2013.

Benchmark:  BNI = 100%, target is met
6. MIGRATORY FISH CONNECTIVITY INDICATOR

Drava River Declaration Objective:
6. To re-establish the ecological connectivity of the Drava River for migratory fish

As a result of numerous barriers, the Drava River is no longer passable for fish migrating over long distances. In the future we aim to cooperate in establishing appropriate measures, including fish passes and fish by-passes, to support fish migration in the Drava River and its tributaries, in accordance with the objectives of the Water Framework Directive and the Habitats Directive.

Rationale of the indicator:
This objective – as responding to the diagnose given in the “Present Situation” section of the Declaration – asks for the longitudinal continuity of the Drava river with respect to migratory fish. In 2008 there were 24 hydropower plants along the Drava that could have formed obstacles in the way of migration.

Before setting the actual target, the following questions should be answered:
- What species to which point of the river would migrate were there no obstacles in their way?
- Which hydropower plants or other structures formed obstacles in 2008 for those species and which form by the end of this year, due to the lack or inappropriate design of fish-passes?

**Target value:** number of fish-passes to be constructed or improved regarding the 2008 status (N2008)

Migratory Fish Connectivity Indicator:
MFI = (N2008 - N2013)/N2008 • 100 [%]

where
N2008 – is the target value as of 2008;
N2013 – is the number of fish passes to be constructed or improved according to end of 2013 status.

**Benchmark:** MFI = 100%, target is met
7. CROSS-BORDER RECREATION INDICATOR

Drava River Declaration Objective:

7. To establish the Drava River as a cross-border recreation area

The Drava River provides an attractive location for holiday-makers. A 366 km Drava River cycle path leads from the river’s source to Maribor in Slovenia. Opportunities for sustainable regional recreation developments of this kind, based on the Drava River’s intrinsic values, should be further explored. We aim to enhance the quality of the Drava River’s environment for those who seek recreation and relaxation in an attractive landscape setting.

Rationale of the indicator:

Within Objective #7, there are a three separate goals included:

a. development of sustainable tourism in the region: that means, the type and number of recreational facilities and the visitor load is in balance with the ecological and socio-cultural carrying capacity of the Drava River Corridor and its municipalities;
b. to establish cross-border tourism opportunities along the Drava;
c. to improve the environmental quality of the DRC.

Due to the differences in the goals, three separate target values should be established. **Target values** shall be derived within the Analysis Reports of the pilot areas in the following proposed terms:

a. the number of recreational facilities within the riparian zone (angling and camp sites, beaches, harbours) allowed by National Park management rules or municipal regulations;
b. the type and extent of cross-border tourist facilities and programmes (e.g. length of existing and planned cycle path along the DRC, number and length of organised boating tours along the river, etc);
c. water quality standards for bathing waters to be met at locations of potential beaches.

Progress indicators:

a1. The number of recreational facilities in the riparian zone versus the allowed number of facilities;
a2. The number of tourist arrivals versus the population of the municipalities within the pilot area;
b2. The length of the actual cross-border recreational facilities and programmes versus the total length;
b2. The number of actual cross-border recreational facilities and programmes versus the total number;
c. The number of actual and potential beach locations where bathing water quality standards has been met.
8. RIPARIAN COUNTRY COOPERATION INDICATOR
Drava River Declaration Objective:
8. To use opportunities for the Drava River to be a connecting lifeline for different nations
After many years of fragmented approaches, today’s more unified Europe offers new opportunities to bring together the people of many different origins who live in the Drava River basin. Those responsible for water management and nature conservation in each country will initiate new dialogues with their counterparts in the other riparian countries, in coordinated efforts towards the shared aim of a high quality of life for the people in this region.

Rationale of the indicator:
This objective is partly in overlap with objective #1 with regard to international institutional cooperation in water management and nature conservation issues. Since this part of the goals is already taken into account at objective #1, consequently objective #8 should be oriented to the promotion of cooperation and dialogue among municipalities and citizens of the riparian countries along the Drava. Trans-boundary connections on the citizen level might take the form of cultural events, discussion of regional development of mutual interest, joint local projects in connection with the Drava and its environment, or infrastructure development regarding cross-border traffic (bridges, ferries) and communication.
Target value:
Within the Analysis Report, an inventory of the actual and potential cross border cooperation projects, cultural events, dialogue initiatives and potential infrastructure development possibilities should be prepared. The target value is the number of items inventoried.
Riparian Country Cooperation Indicator (RCCI):
RCCI = the number of potential cooperation items versus the target value.
9. INTEGRATED RIVER BASIN MANAGEMENT INDICATOR

Drava River Declaration Objective:
9. To undertake integrated river basin management rather than fragmented sectoral measures

International agreements concluded in recent years such as “Agenda 21”, and EU Directives such as those on Water, Floods, Flora, Fauna and Habitats, Wild Birds and Sustainable Energy Sources, together with the shift in social perceptions which these texts represent, strengthen the ongoing development of more sustainable approaches in the field of flood protection and hydropower. Modern approaches to activities such as these, therefore, in a context of integrated river basin management, seek to integrate economic, ecological and social aspects. Harmonised planning of water management, flood protection, hydropower use, recreation and biodiversity conservation can lead to sustainable solutions that also have higher public acceptance.

Rationale of the indicator:
This objective is similar to Objective #1 as far as both require the integration of water management and biodiversity conservation issues. Objective #9, on the other hand includes a broader range of activities into the context of integrated river basin management, like sustainable development of flood protection, hydropower generation, recreation and other economic sectors.

An indicator for integrated river basin management can be derived from the evaluation of water related development projects using Table A1.1 “Interrelationship evaluation table”. Rows of the table contain the number of projects according their main objective. If a project has only one objective (that is its main objective in fact) then it will get a score in the column corresponding that one. If it has additional, integrated objectives, it will get a score at each of the corresponding columns. Scores of an other project have to be added to the scores of projects having the same main objective. Non-integrated projects will collect scores in the main diagonal only, while integrated projects will get multiple scores.

Example: A flood protection project gets a score in the column “Flood protection”, and also 1 in “Floodplain rehabilitation” in case it has a component for widening the floodplain by relocation of the levee. An additional score can be given at “Biodiversity protection in the floodplain” for an eventual oxbow lake rehabilitation component.

Integrated River Basin Management Indicator (IRBMI):
IRBMI = Total number of scores versus the sum of scores within main diagonal.

Benchmarks:
IRBMI < 1.2  poor integration
1.2 ≤ IRBMI ≤ 1.5  good integration
1.5 ≤ IRBMI  excellent integration

(Having actual information on projects of a pilot area, the benchmarks can be modified.)
Table A1.1: Interrelationship Evaluation Table (example)

<table>
<thead>
<tr>
<th>Integrated objectives of the project</th>
<th>River hydro-morphology improvement</th>
<th>Floodplain rehabilitation</th>
<th>Biodiversity conservation in the river</th>
<th>Biodiversity conservation on the floodplain</th>
<th>Flood protection</th>
<th>Rural development</th>
<th>Tourism</th>
<th>Transport</th>
<th>Hydropower generation</th>
<th>Main diagonal score</th>
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<td>Main objective of the project</td>
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10. STAKEHOLDER PARTNERSHIP INDICATOR
Drava River Declaration Objective:
10. To undertake further development of the Drava River area in partnership with its resident human populations
Those engaged in agriculture, forestry, tourism, energy production and economic development, as well as residents in local communities, are all important partners in achieving the objectives of sustainable development of the Drava River. Adequate cooperation among all these groups can help to minimize any conflict between ecosystem values and economic development.

Rationale of the indicator:
Objective #10 is promoting public participation or in more general terms, stakeholder participation (participatory) in the planning and decision making process of regional development issues, as a means to steer economic development towards environmental sustainability.
It is clear from the wording of the objective, that the associated indicator should not be intended to measure the economic development of the region or the environmental sustainability of that development, but the stakeholder involvement.
The Analysis Report should identify those development projects that have a significant impact on the river, the riverbank or nature protection zones within the DRC, moreover it should reveal, whether stakeholders, including local residents – and when justified, also of the neighbouring country – were adequately involved in the decision making process.

Reference value: the number of significant development projects between 2008 and end of 2013.
Stakeholder Partnership Indicator (SPI)
SPI = the number of significant projects where stakeholders were involved in decision making versus the reference value.